Professional Ethics and Morals
(Common to All Branches)

Credits : 0
Course Code: 16HS2201

Course Objectives:

- To help students regulate their behavior in a professional environment as employees.
- To make students aware of the impact of taking non-ethical engineering decisions.
- To understand that mind and desire control is needed for being ethical.
- To understand organizational culture and to adapt to varying cultures without compromising ethical values.

Course Outcomes:

On completion of this course, students should be able

1. Realize the importance of human values.
2. Understand that excessive desires of the mind make a person unethical and restless, while fewer desires lead to peace and professional progress.
3. Assess different types of risks involved in unethical practices. Know various means of protesting against unethical practices.
4. Assess the benefits of restraining from unethical practices like bribery, extortion, nepotism, nexus between politicians and industrialists.
5. Summarize case studies of ethical violations in Chernobyl meltdown, Challenger disaster, Ford Pinto design, Kingfisher Airlines financial misappropriation.

Unit-I :

Introduction To Terminology In Ethics:

Integrity, Honesty, Courage, Empathy, Personality, Character, Self-Confidence, Respect for Others – Work culture, Social responsibility, Responsibilities as a citizen, Cooperation and commitment – Religion vs. Spirituality, Philosophy, Customs and practices – Self-interest, Fear, Deception, Ignorance, Ego, Uncritical acceptance of authority.

Unit- II:

Mind And Its Mysteries:

What is Mind? Mind and body, Mind and food – Mental faculties – Theory of perception, Memory, Imagination, Thought-Culture, Desires – Cultivation of Virtues, Control of Senses and Mind – Concentration, Meditation and Enlightenment.

Unit-III :

Risk And Safety In Engineering:

Estimating risk – What is acceptable risk? – Engineer's liability, Changing legal rights of the employees by non-participation, by protest – Environmental laws and judicial intervention in related matters.

Unit-IV :

Non-Ethical Practices In Vogue:

Conflict of Interest, Occupational crime – How multinational corporations influence government decisions, public policy – Engineers as managers, advisors and experts, Engineers as moral

leaders – Problem of bribery, extortion, grease payments, nepotism – Nexus between politicians and industrialists.
Case Study: Chinese Minister Sentenced to Death for Corruption.

Unit-V :

Case Studies – Variety Of Moral Issues In Profession:
Chernobyl nuclear disaster, Fukushima reactor meltdown, Challenger blowup, Ford Pinto design, Highway safety, Kingfisher Airlines financial misappropriation.

Text Books:

1. Charles E Harris, Micheal J Rabins, Engineering Ethics, Cengage Learning Pub.
2. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill Pub.
3. Swami Sivananda, Mind, Its Mysteries and Control, Divine Life Society Pub.

Intellectual Property Rights and Patent
(Common to All Branches)

Credits : 0.0
Course Code: 16HS3202

Course objective:

- To study the basics of intellectual property law.
- To acquire knowledge on copy right law and other formalities related to it.
- To explore knowledge on patent law and cyber law.
- To become familiar about trade mark law.
- To provide knowledge on different aspects of trade secrets.

Course outcomes:

1. Able to **study** basics of intellectual Property Law.
2. Able to **describe** copy right law and other formalities.
3. Able to **analyze** patent and cyber law.
4. Able to **explain** trade mark law.
5. Able to **summarize** different aspects of trade secrets.

Unit I

Basics of Intellectual Property Law: Introduction to Intellectual Property Law; Evolutionary past; Intellectual Property Law Basics; Types of Intellectual Property; Innovations and Inventions of Trade related Intellectual Property Rights; Agencies Responsible for Intellectual Property Registration; Infringements; Over use or Misuse of Intellectual Property Rights; and Compliance and Liability Issues.

Unit II

Copyright Law and Infringements: Introduction to Copyrights; Principles of Copyright; Subject Matters of Copyright; Rights Afforded by Copyright Law; Copyright Ownership; Transfer and Duration; Right to Prepare Derivative Works; Rights of Distribution; Rights of performers; Copyright Formalities and Registration; Limitations; Infringement of Copyright; International Copyright Law; and Semiconductor Chip Protection Act.

Unit III

Fundamentals of Patent and Cyber Law: Introduction to Patent Law; Rights and Limitations; Rights under Patent Law; Patent Requirements; Ownership and Transfer; Patent Application Process and Granting of Patent; Patent Infringement and Litigation; International Patent Law; Double Patenting; Patent Searching; Patent Cooperation Treaty; and New developments in Patent Law.

Introduction to Cyber Law; Information Technology Act; and Cyber Crime and E-commerce.

Unit IV

Trade Mark Law: Introduction to Trade Mark; Trade Mark Registration Process; Post registration procedures; Trade Mark maintenance; Transfer of rights; Inter parties Proceedings; Infringement; Dilution of Ownership of Trade Mark; Likelihood of confusion; Trade Mark claims; Trade Marks Litigation; and International Trade Mark Law.

Unit V

Principles of Trade Secrets: Introduction to Trade Secrets; Maintaining Trade Secret; Physical Security; Employee Access Limitation; Confidentiality Agreement; Trade Secret Law; Unfair Competition; Trade Secret Litigation; Breach of Contract; and Application of State Law.

Text Books:

1. Deborah E. Bouchoux: “Intellectual Property”. Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications

Reference Books:

1. Prabhuddha Ganguli: ‘Intellectual Property Rights” Tata Mc-Graw –Hill, New Delhi
2. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual PropertyRights", Excel Books. New Delhi.
4. P Narayanan, Intellectual Property Law, Eastern Law House; Third Edition (2013)

PROFESSIONAL ETHICS AND HUMAN VALUES

HUMAN VALUES

The Story of a Carpenter

An elderly carpenter was ready to retire. He told his employer-contractor of his plans to leave the house- building business and live a more leisurely life with his wife enjoying his extended family.

He would miss his paycheck, but he needed to retire. They could get by. The contractor was sorry to see his good worker go and asked if he could build just one more house as a personal favor.

The carpenter said yes, but in time it was easy to see that his heart was not in his work. He resorted to shoddy workmanship and used inferior materials. It was an unfortunate way to end his career.

When the carpenter finished his work and the builder came to inspect the house, the contractor handed over the house key to the carpenter. "This is your house," he said, "it is my parting gift to you."

What a shock! What a Shame! If only he had known he was building his own house, he would have done it all so differently. Now he had to live in the home he built none too well.

(Modified from LIVING WITH HONOUR by SHIV KHERA)

Do we find ourselves in similar situations as the carpenter?

Moving through our work hours fast paced, driven to "get the job done", without much thought to moral values.

How do we regain our focus as individuals and organizations?

This is the challenge for the employee and the employer.

Ethics are fundamental standards of conduct by which we work as a professional.

VALUES

Values are individual in nature.

Values are comprised of personal concepts of responsibility, entitlement and respect.

Values are shaped by personal experience, may change over the span of a lifetime and may be influenced by lessons learned.

Values may vary according to an individual's cultural, ethnic and/or faith-based background.

"Never change your core values."

In spite of all the change around you, decide upon what you will never change: your core values.

Take your time to decide what they are but once you do, do not compromise on them for any reason.

Integrity is one such value.

MORALS

Morals are guiding principles that every citizen should hold.

Morals are foundational concepts defined on both an individual and societal level.

At the most basic level, morals are the knowledge of the difference between right and wrong.

PERSONAL ETHICS

Simply put, all individuals are morally autonomous beings with the power and right to choose their values, but it does not follow that all choices and all value systems have an equal claim to be called ethical.

Actions and beliefs inconsistent with the Six Pillars of Character - trustworthiness, respect, responsibility, fairness, caring and citizenship - are simply not ethical.

PERSONAL ETHICS - everyday examples

Software piracy

Expense account padding

Copying of homework or tests Income taxes

"Borrowing" nuts and bolts, office supplies from employer Copying of Videos or CD's

Plagiarism

Using the copy machine at work

RELIGION AND ETHICS

The "Golden Rule" is a basic tenet in almost all religions: Christian, Hindu, Jewish, Confucian, Buddhist, Muslim.

"Do unto others as you would have others do unto you."

"Treat others as you would like them to treat you" (Christian).

"Hurt not others with that which pains you" (Buddhist)

"What is hateful to yourself do not do to your fellow men" (Judaism)

"No man is a true believer unless he desires for his brother that which he desires for himself" (Islam)

MORALITY AND ETHICS

Concerns the goodness of voluntary human conduct that affects the self or other living things

Morality (Latin *mores*) usually refers to any aspect of human action
Ethics (Greek *ethos*) commonly refers only to professional behavior

Ethics consist of the application of fundamental moral principles and reflect our dedication to fair treatment of each other, and of society as a whole.

An individual's own values can result in acceptance or rejection of society's ethical standards because even thoughtfully developed ethical rules can conflict with individual values.

ASPECTS OF ETHICS

There are two aspects to ethics:

The first involves the ability to discern right from wrong, good from evil and propriety from impropriety.

The second involves the commitment to do what is right, good and proper. Ethics entails action.

An ALGEBRA course will teach you ALGEBRA.
A HISTORY course will teach you HISTORY.
A MANAGEMENT course will teach you principles of MANAGEMENT.

But, Will an *ETHICS* course teach you to be E*THICAL*?
Think !

ENGINEERING ETHICS

"Technology can have no legitimacy unless it inflicts no harm"-Adm.H.G. Rickover, father of the US nuclear navy.

- *What does Adm. Rickover mean by this?*
- *Should engineers avoid technology that has the potential for inflicting harm on a society or its members?*

Engineers have an ethical and social responsibility to themselves, their clients and society.

Practically (although there is much debate about this), engineering ethics is about balancing cost, schedule, and risk.

ENGINEERING ETHICS is:

the study of moral issues and decisions confronting individuals and organizations involved in engineering and

the study of related questions about moral ideals, character, policies and relationships of people and organizations involved in technological activity.

TRAINING IN PREVENTIVE ETHICS

Stimulating the moral imagination

Recognizing ethical issues

Developing analytical skills

Eliciting a sense of responsibility

Tolerating disagreement and ambiguity

IMPEDIMENTS TO RESPONSIBILITY

Self-interest.

Fear.

Self-deception.

Ignorance.

Egocentric tendencies.

Microscopic vision.

Groupthink.

QUESTIONABLE ENGINEERING PRACTICES

Trimming – "smoothing of irregularities to make data look extremely accurate and precise"

Cooking – "retaining only those results that fit the theory and discarding others". Forging – "inventing some or all of the research data…"

Plagiarism – misappropriating intellectual property.

Conflicts of interest (such as accepting gifts.)

- actual
- potential
- apparent

CLEARLY WRONG ENGINEERING PRACTICES

Lying

Deliberate deception

Withholding information

Failing to adequately promote the dissemination of information Failure to seek out the truth

Revealing confidential or proprietary information

Allowing one's judgment to be corrupted.

SENSES OF EXPRESSION OF ENGG. ETHICS

Ethics is an activity and area of inquiry. It is the activity of understanding moral values, resolving moral issues and the area of study resulting from that activity.

When we speak of ethical problems, issues and controversies, we mean to distinguish them from non moral problems.

Ethics is used to refer to the particular set of beliefs, attitudes and habits that a person or group displays concerning moralities.

Ethics and its grammatical variants can be used as synonyms for ‘morally correct’.

VARIETIES or APPROACHES OF MORAL ISSUES

MICRO-ETHICS emphasizes typically everyday problems that can take on significant proportions in an engineer’s life or entire engineering office.

MACRO-ETHICS addresses societal problems that are often shunted aside and are not addressed until they unexpectedly resurface on a regional or national scale.

MORAL PROBLEMS IN ENGINEERING

(SOME EXAMPLES)

4.1. An inspector discovered faulty construction equipment and applied a violation tag, preventing its use. The supervisor, a construction manager viewed the case as a minor abrasion of the safety regulations and ordered the removal of the tag to speed up the project. When the inspector objected to this, he was threatened with disciplinary action.

4.2. An electric utility company applied for a permit to operate a nuclear power plant. The licensing agency was interested in knowing what emergency measures had been established for humans safety in case of reactor malfunctioning. The utility engineers described the alarm system and arrangements with local hospitals for treatment. They did not emphasize that this measures applied to plant personnel only and that they had no plans for the surrounding population. When enquired about their omission, they said it was not their responsibility.

4.3. A chemical plant dumped wastes in a landfill. Hazardous substances found their way into the underground water table. The plant’s engineers were aware of the situation but did not

change the method of disposal because their competitors did it the same cheap way, and no law explicitly forbade the practice.

4.4. Electronics Company ABC geared up for production of its own version of a popular new item. The product was not yet ready for sale, but even so, pictures and impressive specifications appeared in advertisements. Prospective customers were led to believe that it was available off the shelf and were drawn away from competing lines.

TYPES OF INQUIRIES

1. NORMATIVE INQUIRY

These are about 'what ought to be' and 'what is good'. These questions identify and also justify the morally desirable norms or standards.

Some of the questions are:

A. How far engineers are obligated to protect public safety in given situations?

When should engineers start whistle blowing on dangerous practices of their employers?

Whose values are primary in taking a moral decision, employee, public or govt?

Why are engineers obligated to protect public safety?

When is govt justified in interfering on such issues and why?

CONCEPTUAL INQUIRY:

These questions should lead to clarifications on concepts, principles and issues in ethics. Examples are:

What is 'SAFETY' and how is it related to 'RISK'

'Protect the safety, health and welfare of public'-What does this statement mean?

What is a bribe?

What is a ‘profession’ and who are ‘professionals’?

3. FACTUAL (DESCRIPTIVE) INQUIRIES

These are inquiries used to uncover information using scientific techniques. These inquiries get to information about business realities, history of engineering profession, procedures used in assessment of risks and engineers psychology.

Why study *ENGINEERING ETHICS*

ENGINEERING ETHICS is a means to increase the ability of concerned engineers, managers, citizens and others to responsibly confront moral issues raised by technological activities.

MORAL DILEMMMA

There are three types of complexities.

VAGUENESS: This complexity arises due to the fact that it is not clear to individuals as to which moral considerations or principles apply to their situation.

CONFLICTING REASONS: Even when it is perfectly clear as to which moral principle is applicable to one’s situation, there could develop a situation where in two or more clearly applicable moral principles come into conflict.

DISAGREEMENT: Individuals and groups may disagree how to interpret, apply and balance moral reasons in particular situations.

Steps in confronting MORAL DILEMMAS:

Identify the relevant moral factors and reasons.

Gather all available facts that are pertinent to the moral factors involved.

Rank the moral considerations in the order of their importance as they apply to the situation.

Consider alternative course of action, tracing the full implications of each, as ways of solving dilemma.

Talk with colleagues, seeking the suggestions and perspectives of the dilemma.

Arrive at a carefully reasoned judgment by weighing all the relevant moral factors and reasons in light of facts.

All the above steps are distinct, even though they are inter-related and can often be taken jointly

MORAL AUTONOMY

This is viewed as the skill and habit of thinking rationally about ethical issues on the basis of moral concerns independently or by self-determination.

Autonomous individuals think for themselves and do not assume that customs are always right.

They seek to reason and live by general principles.

Their motivation is to do what is morally reasonable for its own sake, maintaining integrity, self-respect, and respect for others.

"One who breaks an unjust law must do so openly, lovingly, and with a willingness to accept the penalty. I submit that an individual who breaks a law that conscience tells him is unjust and willingly accepts the penalty… is in reality expressing the highest respect for the law." *Rev. Martin Luther King, Jr.* in Letter from a Birmingham Jail, 1963.

A person becomes morally autonomous by improving various practical skills listed below:

Proficiency is recognizing moral problems and issues in engineering.

Skill in comprehending, clarifying and critically assessing arguments on opposing sides of moral issues.

The ability to form consistent and comprehensive viewpoints based upon consideration of relevant facts.

Awareness of alternate responses to issues and creative solutions for practical difficulties.

Sensitivity to genuine difficulties and subtleties

Increased precision in the use of a common ethical language necessary to express and also defend one's views adequately.

Appreciation of possibilities of using rational dialogue in resolving moral conflicts and the need for tolerance of differences in perspective among orally reasonable people.

A sense of importance of integrating one's professional life and personal convictions i.e. maintaining one's moral integrity.

KOHLBERG'S THEORY

STAGES OF MORAL DEVELOPMENT

Pre-conventionalLevel

Whatever benefits oneself or avoids punishment. This is the level of development of all young children. -Avoid punishment & Gain Reward

ConventionalLevel

Uncritical acceptance of one's family, group or society are accepted as final standard of morality. Most adults do not mature beyond this stage. -1.Gain Approval & Avoid Disapproval & 2. Duty & Guilt

Post-conventionalLevel

Motivation to do what is morally reasonable for its own sake, rather than solely from ulterior motives, with also a desire to maintain their moral integrity, self-respect and the respect of other autonomous individuals. They are 'Morally autonomous' people. -1. Agreed upon rights & 2. Personal moral standards

GILLIGAN'S THEORY

Pre-conventional Level

This is the same as Kohlberg's first level in that the person is preoccupied with self centered reasoning, caring for the needs and desires of self.

Conventional level

Here the thinking is opposite in that, one is preoccupied with not hurting others and a willingness to sacrifice one's own interests in order to help or nurture others (or retain friendship).

Post-conventional Level

Achieved through context-oriented reasoning, rather than by applying abstract rules ranked in a hierarchy of importance. Here the individual becomes able to strike a reasoned balance between caring about other people and pursuing one's own self-interest while exercising one's rights.

Differences between the TWO THEORIES

KOHLBERG	GILLIGAN
I. Ethics of rules and rights	*Ethics of care*
II. Studies based on well educated, white male's only, tending male bias.	*Studies included females and colored peoples*
III. Application of abstract rules ranked in the order of importance	*Application of context-oriented reasoning.*
IV. Studies were hypothesized for both the genders even though the study was conducted mostly on males	*Study was conducted on both genders and it was found, men based their reasoning on 'justice' and women based theirs on 'care'*

HEINZ'S DILEMMA

The famous example used by Kohlberg was called "Heinz's dilemma". A woman living in Europe would die of cancer unless she was given an expensive drug. Her husband, Heinz, could not afford it. But the local pharmacist, who had invented the drug at only one tenth of the sale price refused to sell it to Heinz who could only raise half the required money from borrowings. Desperation drives Heinz to break into the pharmacy and steal the drug to save his wife.

When respondents were asked whether and why Heinz should or should not steal a drug to save his wife from a life-threatening illness. The responses of the individuals were compared with a prototypical response of individuals at particular stages of moral reasoning. Kohlberg noted that irrespective of the level of the individual the response could be same, but the reasoning could be different.

For example, if a child reasoning at a 'preconventional' level might say that it is not right to steal because it is against law and someone might see you.

At a 'conventional' level, an individual might argue that it is not right to steal because it is against law and laws are necessary for society to function.

At a 'postconventional' level, one may argue that stealing is wrong because is against law and it is immoral.

CONSENSUS AND CONTROVERSY

CONTROVERSY:

All individuals will not arrive at same verdict during their exercising their moral autonomy.

Aristotle noted long ago that morality is not as precise and clear-cut as arithmetic.

Aim of teaching engg ethics is not to get unanimous conformity of outlook by indoctrination, authoritarian and dogmatic teaching, hypnotism or any other technique but to improve promotion of tolerance in the exercise of moral autonomy.

CONSENSUS:

The conductor of a music orchestra has authority over the musicians and his authority is respected by them by consensus as otherwise the music performance will suffer. Hence the authority and autonomy are compatible.

On the other hand, tension arises between the needs for autonomy and the need for concerns about authority. The difference between the two should be discussed openly to resolve the issue to the common good.

PROFESSIONS AND PROFESSIONALISM

Engineers normally imagine that they are servants to organizations rather than a public guardian. Responsibility to the public is essential for a professional.

Who is a professional?

Obviously a *member* of a profession.

What is a profession?

'JOB' or 'OCCUPATION' that meets the following criteria from which a person *earns his living.*

Knowledge – Exercise of skills, knowledge, judgment and discretion requiring extensive formal criteria.

Organization - special bodies by members of the profession to set standard codes of ethics,

Public good-The occupation serves some important public good indicated by a code of ethics.

Who is a professional engineer?

Has a bachelor's degree in engineering from an accredited school

Performs engineering work

Is a registered and licensed Professional Engineer

Acts in a morally responsible way while practicing engineering

Differing views on Professionals

"Only consulting engineers who are basically independent and have freedom from coercion can be called as professionals." -Robert L.Whitelaw

"Professionals have to meet the expectations of clients and employers. Professional restraints are to be imposed by only laws and government regulations and not by personal conscience."

-Samuel Florman

"Engineers are professionals when they 1) attain standards of achievement in education, job performance or creativity in engineering and 2) accept the most basic moral responsibilities to the public as well as employers, clients, colleagues and subordinates."

-Mike Martin & Roland Schinzinger

MOTIVES FOR PROFESSIONALISM

A desire for interesting and challenging work and the pleasure in the act of changing the world.

The joy of creative efforts. Where a scientist's interest is in discovering new technology, engineers interest is derived from creatively solving practical problems.

The engineer shares the scientist's job in understanding the laws and riddles of the universe.

The sheer magnitude of the nature – oceans, rivers, mountains and prairies – leads engineers to build engineering marvels like ships, bridges, tunnels, etc., which appeal to human passion.

The pleasure of being in the presence of machines generating a comforting and absorbing sense of a manageable, controlled and ordered world.

Strong sense of helping, of directing efforts towards easing the lot of one's fellows.

The main pleasure of the engineer will always be to contribute to the well-being of his fellow-men.

MODELS OF PROFESSIONAL ENGINEERS

SAVIOR: The representative engineer is a savior who will redeem society from poverty, inefficiency, waste and the drudgery of manual labour.

GUARDIAN: Engineers know, the directions in which and pace at which, technology should develop.

BUREAUCRATIC SERVANT: The engineer as the loyal organization person uses special skills to solve problems.

SOCIAL SERVANT: Engineers, in co-operation with management, have the task of receiving society's directives and satisfying society's desires.

SOCIAL ENABLER AND CATALYST: Engineers play a vital role beyond mere compliance with orders. They help management and society understand their own needs and to make informed decisions.

GAME PLAYER: Engineers are neither servants nor masters of anyone. They play by the economic game rules that happen to be in effect at a given time.

TYPES OF ETHICAL THEORIES

S.NO	TYPES	BASED ON
1	Virtue ethics	Virtues and vices

2	Utilitarianism	Most good for most people
3	Duty ethics	Duties to respect persons
4	Rights ethics	Human Rights

VIRTUE ETHICS

- *"The unexamined life is not worth living."* (Socrates, 470-399 B.C.)
  "The happy life is thought to be virtuous; now a virtuous life requires exertion and does not consist in amusement." (Aristotle, 384-322 B.C.)

The Four Main Virtues

Prudence (mind): to think about a moral problem clearly and completely
Temperance (emotions): control attraction to positive emotions
Fortitude (emotions): control aversion for negative emotions
Justice (will): choose according to truth and fairness.

Virtue Ethics

Focuses on the type of person we should strive to be
Actions which reflect *good character* traits (virtues) are inherently *right*
Actions which reflect *bad character* traits (vices) are inherently *wrong*
Virtue ethics are tied more to individual behavior than to that of an organization (e.g. business, government)

ARISTOTLE says that moral virtues are tendencies, acquired through habit formation, to reach a proper balance between extremes in conduct, emotion, desire and attitude i.e. virtues are tendencies to find the Golden Mean between the extremes of too much and too little.

Some of the virtues are defined using examples here:

Virtue	Too much	Too less
(Golden mean between extremes)		
Courage	*Foolhardiness*	*Cowardice*
Truthfulness	*Revealing all in violation of tact and confidentiality*	*Being secretive or lacking in candor*
Generosity	*Wasting one's resources*	*Being miserly*
Friendliness	*Being annoyingly effusive*	*Sulky or surly*

PROFESSIONAL RESPONSIBILITY

Being morally responsible as a professional.

Most basic and comprehensive professional virtue.

Creation of useful and safe technological products while respecting the autonomy of clients and public, especially in matters of risk taking.

This encompasses a wide variety of the more specific virtues grouped as follows:

SELF DIRECTION VIRTUES:

Fundamental virtues in exercising our moral autonomy and responsibility. e.g. self understanding, humility, good moral judgment, courage, self discipline, perseverance, commitments, self-respect and dignity

PUBLIC SPIRITED VIRTUES:

Focusing on the good of the clients and public affected by the engineers' work by . not directly and intentionally harming others i.e. 'nonmaleficence'.

Benificence, sense of community, generosity are other virtues falling in this category.

TEAMWORK VIRTUES:

Enables professionals to work successfully with others. E.g. collegiality, cooperativeness, the ability to communicate, respect for authority, loyalty to employers and leadership qualities.

PROFICIENCY VIRTUES:

Mastery of one's craft that characterize good engineering practice e.g. competence, diligence, creativity, self-renewal through continuous education.

MORAL INTEGRITY

Moral integrity is the unity of character on the basis of moral concern, and especially on the basis of honesty. The unity is consistency among our attitudes, emotions and conduct in relation to justified moral values.

SELF-RESPECT

- Valuing oneself in morally appropriate ways.
- Integral to finding meaning in one's life and work
- A pre-requisite for pursuing other moral ideals and virtues.
- Self-respect is a moral concept of properly valuing oneself but self-esteem is a psychological concept of positive attitude towards oneself.

Self-respect takes two forms.

Recognition self-respect is properly valuing oneself because of one's inherent moral worth, the same worth that every other human being has.

Appraisal self-respect is properly valuing ourselves according to how well we meet moral standards and our personal ideals.

VARIOUS SENSES OF RESPONSIBILITY

Responsibility ascribed by i) virtue, ii) obligations, iii) general moral capacities of people, iv) liabilities and accountability for actions and v) blameworthiness or praiseworthiness.

AITAM,TEKKALI

By virtue: A person is said to be a responsible person when we ascribe a moral virtue to the person. We expect that the person is regularly concerned to do the right thing, is conscientious and diligent in meeting obligations. In this sense, professional responsibility is the central virtue of engineers.

By obligation: Moral responsibilities can be thought of as obligations or duties to perform morally right acts.

By general moral capacity: When we view a person as a whole rather than one with respect to a specific area, we are actually thinking about the active capacity of the person for knowing how to act in morally appropriate ways e.g. the capacity of children grow as they mature and learn.

By accountability: Responsibility also means being accountable, answerable or liable to meet particular obligations. The virtue of professional responsibility implies a willingness to be accountable for one's conduct.

By being blameworthy: When accountability for a wrongdoing is at issue, responsible becomes a synonym for blameworthy. When right conduct is the issue, the context is praiseworthiness.

CAUSAL AND LEGAL RESPONSIBILITIES

Causal Responsibility: consists simply in being a cause of some event. E.g. lightning as being responsible for a house catching fire.

Legal Responsibility: consists simply in being a cause for harm that was so unlikely and also unforeseeable that no moral responsibility is involved

UTILITARIANISM

That which produces the maximum benefit for the greatest number of people (e.g. Democracy)

Tries to achieve a balance between the good and bad consequences of an action

Tries to maximize the well-being of society and emphasizes what will provide the most benefits to the largest group of people

This method is fundamental to many types of engineering analysis, including risk-benefit analysis and cost-benefit analysis

Drawbacks:

Sometimes what is best for the community as a whole is bad for certain individuals in the community

It is often impossible to know in advance which decision will lead to the most good

Organizing Principles to Resolving Ethical Issues

Utilitarian thinking

– a standard that promotes those individual actions or rules that produce the greatest total amount of utility to those affected.

– A code that enjoins engineers to promote the safety, health, and welfare of the public.

– What is utility, though? Happiness?

Preference utilitarianism

– promote those conditions that allow each individual to pursue happiness as he or she conceives it.

- Two conditions necessary for this: freedom and well-being.
- Practically, for engineers, this advocates cost/benefit analyses.

Problems with Utilitarianism

Difficult to quantify benefits for ALL those affected.

"Greatest good" difficult to apply to an all-inclusive population.

Someone gets "shafted" – approach justifies perpetrating injustice on individuals, i.e., someone gets left out.

Three approaches:

Cost/benefit – quantifiable approach. Maximize positive utilities (benefits) against negative utilities (costs).

Act utilitarian – "Will the course of action produce more good than any alternative course of action that I could take"?

Rule utilitarian – "Would utility be maximized if everyone did the same thing in the same circumstances"? Adoption of commonly accepted rules.

COST-BENEFIT ANALYSIS:

Assess the available options

Assess the costs and benefits of each option for the entire audience affected

Make the decision that is likely to result in the greatest benefit relative to cost.

ACT-UTILITARIANISM:

(professed by John Stuart Mills)

Focuses on individual actions, rather than general rules.

An act is right if it is likely to produce the most good for the most people involved in the particular situation.

Rules may be broken whenever doing so will produce the most good in a specific situation.

Happiness is the only 'intrinsic' good and all others are 'instrumental' goods that serve as the means of happiness.

RULE-UTILITARIANISM:

(professed by Richard Brandt)

This regards moral values as primary.

We should follow the rules and avoid bribes, even when those acts do not have the best consequences in a particular situation, because the general practice of following rules and not bribing produce the most overall good

Rules should be considered in sets called 'moral codes'. A moral code is justified when followed, would maximize the public good more than alternative codes would.

DUTY ETHICS (Immanuel Kant's view)

Contends that certain acts (or duties) should be performed because they are inherently ethical such as:

be honest,
keep promises,
do not inflict sufferings on other people,
be fair,
make reparation when you have been unfair,
how gratitude for kindness extended by others
seek to improve own intelligence and character,
develop one's talents,
don't commit suicide.

Duties, rather than good consequences, is fundamental.

Individuals who recognize their ethical duties will choose ethically correct moral actions

These duties should meet Kant's 3 conditions i.e.

1. It should express respect for persons,

- People deserve respect because they have capacity to be *autonomous and for exercising goodwill*.
- Goodwill is the *conscientious and honest effort* to do what is right according to universal principles of duties.
- Moral motives and intentions play a prominent role in duty ethics rather than utilitarianism.

It is an universal principle

Duties are binding on us only if they are applicable to everyone. They must be universalisable.

3.It expresses command for autonomous moral agents. Duties prescribe certain actions categorically, without qualifications or conditions attached. Valid principles of duties are *Categorical Imperatives*. They contrast with non-moral commands called *Hypothetical Imperatives* which are conditional.

The above ▬► 'RESPECT for PERSONS'

Drawback of Kant's duty ethics: It has failed to be sensitive to how principles of duty can *conflict* with each other thereby creating Moral dilemmas.

Rawls Development on Kant's Duty Ethics

Rawls argues that all rational people would agree to abide by two basic moral principles:

Each person is entitled to the most extensive amount of liberty compatible with an equal amount for others and

Differences in social power and economic benefits are justified only when they are likely to benefit everyone, including members of most disadvantaged groups.

RIGHTS ETHICS (JOHN LOCKE – 1632-1704)

Everyone has inherent moral rights

Everyone has rights that arise from *EXISTING* (i.e. right to Life, maximum individual Liberty, and human Dignity are Fundamental Rights).

Other rights arise as a Consequence.

Duties arise because people have rights, not vice versa.

Any act that violates an individual's moral rights is ethically unacceptable.

Rights ethics was highly individualistic.

Rights are primarily entitlements that prevent other people from meddling in one's life. These are referred to as Liberty Rights or Negative Rights that place duties on other people not to interfere with one's life.

e.g. Individuals do not have rights to life because others have duties not to kill them.

Instead, possessing the right to life is the reason why others ought not to kill them.

Drawbacks

How do we prioritize the rights of different individuals?

Rights ethics often promote the rights of individuals at the expense of large groups/society

A.I.Melden's version of Rights Ethics

Human rights are intimately related to communities of people.

This version is known as POSITIVE WELFARE RIGHTS and is defined as rights to community benefits for living a minimally decent human life.

EVALUATION OF ETHICAL THEORIES

We are basically not interested in which of the ethical theories is the best. It is believed that there are areas in which each theory complements others by how they differ.

Procedure for General Evaluation:

Ā • Ā Ā • Ā • Ā •
he theory must be clear and formulated with concepts that are coherent and applicable.

Ā • Ā Ā • Ā • Ā •
t must be internally consistent in that none of its tenets contradicts any other.

Ā • Ā Ā • Ā • Ā •
either the theory nor its defense can rely upon false information.

Ā • Ā Ā • Ā • Ā •
t must be sufficiently comprehensive to provide guidance in specific situations of interest to us.

Ā • Ā Ā • Ā • Ā •
t must be compatible with our most carefully considered moral convictions about concrete situations.

SELF-INTEREST AND ETHICAL EGOISM

Psychological Egoism

All of our actions can be reduced to self-interest

We always do what we most *want* to do. e.g., a man who helps others has *chosen* to do so, so he sees doing it, is in his *self-interest*

We do what makes us feel good. e.g., a man who helps others must get *pleasure* from doing it – hence it is in his *self-interest*

The Problem of Counter Examples

What about *charity* and *pity*?

These require the egoist to distinguish selfish and unselfish *acts* from selfish and unselfish *motives*

Charity – I enjoy showing *my power*

Pity – I worry that it might happen to *me*

So again, doing these, we act from *self-interest*

AITAM,TEKKALI

Confusion over self-interest and selfishness

Not all actions are done from selfishness

Brushing my teeth (self-interested but not selfish)

Also confusion over self-interest and pleasure

Not all actions are done from self-interest

Smoking cigarettes (pleasurable but not self-interested)

Self-interest = any interest the self has

What do all major Ethical Theories say about this?

All major theories acknowledge the *importance* of Self Interest.

Utilitarians take into account one's own good as well as others.

Duty ethics emphasizes duties to ourselves.

Right ethicists talk about our rights to pursue our own good.

Virtue ethicists emphasize the importance of self-respect.

But all these theories also emphasize that the pursuit of self interest must be balanced with our moral responsibilities to others.

Ethical Egoism

A different view, which talks of morality as only the pursuit of self interest

Self interest is a 'rational concern' requiring consideration of one's long-term interests.

E.g., taking bribe may appear to serve one's self interest but it does not serve the long-term interest of self. Hence taking bribe is not acceptable since it would not do any good on a long-term. This was professed by Thomas Hobbes (1588-1679) and Ayn Rand (1905-1982).

Ayn Rand – with only one life to live, the individual is of utmost importance

It is in one's self-interest to adopt the Moral Point of View (Hobbes' Social Contract)

CUSTOMS and ETHICAL RELATIVISM

Relativism:

Distinction between "morals" ("treatment of others") and "mores" ("harmless customs")

Cultural (Descriptive) Relativism:

Factual Claims: "x is considered right in society y at time t" and "is considered wrong in society z at time t"

Empirical Conclusion: Moralities are relative

This is either true or false (anthropology –a study of mankind , its customs, beliefs, etc.can figure it out)

Normative (Ethical) Relativism:

Normative Claim: "What is considered right in society x at time t *is right for that society*"

A particular culture cannot be judged from outside of that culture.

'Ethical Relativism' says that actions are morally right when they are approved by law and custom.

They are wrong when they violate laws and custom.

Ethical *egoism* tries to reduce moral reasons to matters of self interest, 'ethical *relativism*' attempts to reduce moral values to laws, conventions and customs of particular societies.

Consequences of Normative Relativism

We cannot say other "morals" are inferior to our own society's

We decide the value of our actions based only on what our particular society thinks

We should show a lot of tolerance for different customs and outlooks in a society in which we live in. It means that customs can have moral significance in deciding how we should act. This view is called 'ethical pluralism'.

Reasons for Acceptance Of Ethical Relativism

The reasons professed for acceptance of ethical relativism is threefold.

Laws seem so tangible and clear-cut. They provide a public way ending seemingly endless disputes about rights and wrongs. But many times, moral reasons seem to be at variance with laws e.g. apartheid laws.

Moral standards vary dramatically from one culture to another. The only kind of objectivity possible is limited to a given set of laws in a given society. Acknowledging this relativity of morality encourages the virtue of tolerance of differences among societies.

Moral judgments should be made in relation to factors that from case to case, usually making it impossible to formulate rules which are simple. Customs and laws are usually morally relevant factors that should be taken into account.

RELIGION and DIVINE COMMAND ETHICS

Ethics and Religion:

Moral issues and religious belief are related in several positive ways.

First, they are shaped over time from the central moral values of major world religions.

Second, religious views often support moral responsibility by providing additional motivation for being moral.

Third, sometimes religions set a higher moral standard than is conventional.

Societies often benefit from a variety of religions that make prominent particular virtues, inspiring their members to pursue them beyond what is ordinarily seen as morally obligatory.

Divine Command Ethic:

This says that an act which is right is commanded by god and the one which is wrong is forbidden by God.

The difficulty in this is to know precisely what God's commands are and in knowing whether God exists.

We can view that moral reasons are *not reducible* to religious matters, although religious belief may provide an *added inspiration* for responding to them.

Uses Of Ethical Theories

Ethical theories aid in identifying the moral considerations or reasons that constitute a dilemma.

They provide a precise sense of what kinds of information are relevant to solving moral development.

They sometimes, offer ways to rank the relevant moral considerations in order of importance and provide a rough guidance in solving moral problems.

The theories help us identify the full moral ramifications of alternative courses of action, urging a wide perspective on the moral implications of the options and providing a systematic framework of comparing alternatives.

The theories augment the precision with which we use moral terms and they provide frame works for moral reasoning when discussing moral issues with colleagues.

By providing frame works for development of moral arguments, the theories strengthen our ability to reach balanced and insightful judgments.

UNIT III - ENGINEERING AS SOCIAL EXPERIMENTATION

To undertake a great work and especially a work of novel type means, carrying out an experiment. It means taking up a struggle with the forces of nature without the assurance of emerging as a victor after the first attack.

Louis Marie Henri Navier (1785 - 1836) - *Founder of Structural Analysis*

ENGINEERING AS EXPERIMENTATION

Experimentation (Preliminary tests or Simulations) plays a vital role in the design of a product or process.

In all stages of converting a new engineering concept into a design

like, first rough cut design,

usage of different types of materials and processes, detailed design,

further stages of work design and the finished product,

Experiments and tests are conducted to evaluate the product. Modifications are made based on the outcome of these experiments.

The normal design process is thus iterative (modifications being made on the basis of feedback information acquired from the tests).

Even though various tests and experiments are conducted at various stages, the engineering project as a whole in its *totality* can be viewed as an *experiment.*

SIMILARITIES TO STANDARD EXPERIMENTS

Any project is carried out in partial ignorance due to

The uncertainties in the abstract model used for the design calculations,

The uncertainties in the precise characteristics of the materials purchased,

The uncertainties caused by variations in processing and fabrication of materials and

The uncertainties about the nature of stresses the finished product will encounter.

Indeed, Engineer's success lies in the *ability to accomplish tasks* with only a *partial knowledge* of scientific laws about nature and society.

The final outcome of engineering projects, like those of experiments, is generally uncertain. Very often, possible outcomes are not even known and great risks may be presented which could never be thought of.

Effective Engineering relies upon knowledge gained about products both before and after they leave the factory- knowledge needed for improving current products and creating better ones. That is, ongoing success in engineering depends upon gaining new knowledge.

LEARNING FROM THE PAST

Engineers should learn not only from their own earlier design and operating results, but also from other engineers.

Engineers repeat the past mistakes of others due to the following reasons.

Lack of established channels of communication.

Misplaced pride in not asking for information

Embarrassment at failure or fear of litigation (legal problems).

Negligence.

***Examples**:*

The *Titanic* lacked sufficient number of life boats resulting in the death of 1522 out of 2227 (life boat capacity available was only 825), a few decades later *Arctic* perished due to the same problem.

In June 1966, a section of the Milford Haven Bridge in Wales collapsed during construction. A bridge of similar design, erected by the same bridge- builder in Melbourne, Australia, also partially collapsed in the month of October, same year. During this incident 33 people were killed and many were injured.

Malfunctions occurred at nuclear reactors at various locations and the information reports were with Babcock and Wilcox, the reactor manufacturer. In spite of these, no attention was paid leading to a pressure relief valve giving rise to the Three Mile Island nuclear accident on March 28, 1979.

CONTRASTS WITH STANDARD EXPERIMENTS

EXPERIMENTAL CONTROL: In standard experiments, members are in two different groups. Members of *one group receive special* experimental treatment. The other group members, called '*control group' do not receive* special treatment, though they are from the same environment in all other respects.

But this is not true in engineering, since most of the experiments are not conducted in laboratories. The subjects of experiments are human beings who are outside the experimenter's control.

Thus it is not possible to study the effects of changes in variable on different groups. Hence only historical and retrospective data available about various target groups has to be used for evaluation. Hence engineering as a social experimentation seems to be an extended usage of the concept of experimentation.

INFORMED CONSENT: has two elements, *knowledge* and *voluntariness*. The subjects (human beings) should be given all the information needed to make a reasonable decision. Next, they must get into the experiment without being subjected to *force, fraud or deception*. Supplying complete information is neither necessary nor in most cases possible. But *all relevant information* needed for making a reasonable decision on whether to participate should be conveyed. Generally, we all prefer to be the subject of our own experiments rather than those of somebody else.

Conditions defining *Informed or Valid Consent*

The consent is given voluntarily

The consent is based on information a rational person would want, together with any other information requested and presented to them in understandable form.

The consenter was competent to process the information and make rational decisions.

Information has been widely disseminated.

The subject's consent is offered by proxy by a group that collectively represents many subjects like interests, concerns and exposure to risk.

'Engineering experiments are not conducted to gain new knowledge unlike scientific experiments'. Is this distinction necessary?

This distinction is not vital because we are concerned *about the manner* in which the experiment is conducted, such as *valid consent* of human subjects being sought, *safety measures* taken and means exist for *terminating* the experiment *at any time* and providing all participants a *safe exit*.

Features of morally responsible engineers in social experimentation

***Conscientiousness*:** A primary obligation to protect the safety of human subjects and respect their right of consent.

***Relevant information*:** A constant awareness of the experimental nature of any project, imaginative forecasting of its possible side effects and a reasonable effort to monitor them.
Moral autonomy: Autonomous, personal involvement in all steps of the project.
Accountability: Accepting accountability for the results of the project.

CONSCIENTIOUSNESS:

Conscientious moral commitment means sensitivity to the full range of relevant moral values.

Sensitivity to responsibilities that is relevant.

Willingness to develop the skill and expend the effort needed to reach the best balance possible among these considerations.

Conscientiousness means consciousness because mere intent is not sufficient.

Conceiving engineering as social experimentation restores the vision of engineers as guardians of the public interest in that they are duty bound to guard the welfare and safety of those affected by engg projects.

RELEVANT INFORMATION:

Conscientiousness is blind without relevant factual information. Moral concern involves a commitment to obtain and assess all available pertinent information. Another dimension to factual information is the consequences of what one does. While regarding engg as social experimentation points out the importance of context, it also urges the engineer to view his or her specialized activities in a project as part of a larger whole having a social impact that may involve a variety of unintended effects. It may be better to practice ‘defensive engg’ (Chauncy Starr) or ‘preventive engg’ (Ruth Davis).

MORAL AUTONOMY

People are morally autonomous when their moral conduct and principles of action are their own.

Moral beliefs and attitudes must be a critical reflection and not a passive adoption of the particular conventions of one's society, religion or profession.

Moral beliefs and attitudes cannot be agreed to formally and adhered to merely verbally.

They must be integrated into the core of one's personality and should lead to committed action.

It is wrong to think that as an employee when one performs '*acts'* serving company's interests, one is no longer morally and personally identified with one's actions.

Viewing engg as a social experimentation helps to overcome this flawed thought and restores a sense of autonomous participation in one's work.

As an experimenter, an engineer is exercising the specialized training that forms the core of one's identity as a professional.

A social experiment that can result in unknown consequences should help inspire a critical and questioning attitude about the adequacy of current economic and safety standards.

In turn, this leads to better personal involvement with work.

ACCOUNTABILITY:

Responsible people accept moral responsibility for their actions.

Accountability is the willingness to submit one's actions to moral scrutiny and be open and responsive to the assessment of others.

It should be understood as being culpable and blameworthy for misdeeds.

Submission to an employer's authority creates in many people a narrow sense of accountability for the consequences of their action. This is because of

Only a small contribution is made by one individual, when large scale engineering work is fragmented. The final product which is far away from one's immediate workplace, does not give a proper understanding of the consequences of one's action.

Due to the fragmentation of work, a vast diffusion of accountability takes place. The area of personal accountability is delimited to the portion of work being carried out by one.

The pressure to move on to another new project does not allow one to complete the observations long enough. This makes people accountable only for meeting schedules and not for the consequences of action.

To avoid getting into legal issues, engineers tend to concentrate more on legal liabilities than the containment of the potential risks involved in their area of work.

Viewing engineering as a social experimentation makes one overcome these difficulties and see the problem in whole rather than as part.

ENGINEERING CODES OF ETHICS

Engineering Codes of Ethics have evolved over time

EARLY CODES

- Codes of personal behavior
- Codes for honesty in business dealings and fair business practices
- Employee/employer relations

NEWER CODES

Emphasize commitments to safety, public health and environmental protection

Express the rights, duties and obligations of members of the Profession

Do not express new ethical principles, but coherently restate existing standards of responsible engineering practice

Create an environment within the Profession where ethical behavior is the norm

Not legally binding; an engineer cannot be arrested for violating an ethical code (but may be expelled from or censured by the engineering society)

***Are Engineering Codes Needed*? NO:**

–Engineers are capable of fending for themselves

–Common law is available to defend in ethical disputes

–Offended public can seek redress through courts

***Are Engineering Codes Needed*? YES:**

–Engineers have few or no resources to defend themselves in an ethical dispute

–Common law is available in reality only with great difficulty

–Conversely, the public has similar problems in seeking redress through legal channels

***Objections* to Existing Engineering Codes of Ethics:**

–Relatively few engineers are members of engineering societies.

–Non-members don't necessarily follow the ethical codes.

–Many engineers either don't know that the codes exist, or have not read them.

Which ethical codes apply?

–Depending upon your discipline and organizational affiliations, you may be bound by one, two or even more ethical codes:

•Discipline related (ASME, IEEE, ASCE, IIE etc.)

•National Society of Professional Engineers

(NSPE) •Employee codes (corporation, university,

etc.) •Union Codes

Engineering Ethics

Our engineering ethics codes are derived from a Western cultural

tradition –Ancient Greeks

–Judeo-Christian religions

–Philosophers and thinkers (e.g. Locke, Kant, Mills)

The Hammurabi Code

If a builder has built a house for a man and has not made his work sound, and the house he has built has fallen down and so caused the death of the householder, that builder shall be put to death. If it causes the death of the householder's son, they shall put the builder's son to death….
(Hammurabi, King of Babylon, 1758 B.C.)

Code of Ethics for Engineers

Accreditation Board for Engineering and
Technology (ABET)
The Fundamental Principles

Engineers shall uphold and advance the integrity, honor, and dignity of the engineering profession by:

using their knowledge and skill for the enhancement of the human race;

being honest and impartial and serving with fidelity the public, their employers, and clients;

striving to increase the competence and prestige of the engineering profession.

supporting the professional and technical societies of their discipline.

The Fundamental Cannons

Engineers shall

hold paramount the safety, health, and welfare of the public in the performance of their professional duties;

perform service only in areas of their competence;

issue public statements only in an objective and truthful manner;

act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest;

build their professional reputations on the merits of their services and shall not compete unfairly with others

act in such manner as to uphold and enhance the honor, integrity and dignity of the profession;

continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision.

CODES OF ETHICS - *ROLES OR FUNCTIONS*

Inspiration and Guidance:

Codes provide positive stimulus for ethical conduct and helpful guidance by using positive language.

Codes should be brief to be effective and hence such codes offer only general guidance.

Supplementary statements or guidelines to give specific directions are added by a number of societies or professional bodies.

2**. Support:**

Codes give positive support to those seeking to act ethically.

An engineer under pressure to act unethically can use one of the publicly proclaimed codes to get support for his stand on specific moral issues.

Codes also serve as legal support for engineers.

Deterrence and discipline:

Codes can be used as a basis for conducting investigations on unethical conduct. They also provide a deterrent for engineers to act immorally.

Engineers who are punished by professional societies for proven unethical behaviour by revoking the rights to practice as engineers are also subjected to public ridicule and loss of respect from colleagues and local community.

This helps to produce ethical conduct even though this can be viewed as a negative way of motivation.

Education and mutual understanding:

The codes can be used for discussion and reflection on moral issues and thereby improve the understanding of moral responsibilities among all engineers, clients, public and good organizations.

5. Contributing to the profession's public image:

Codes present the engineering profession as an ethically committed society in the eyes of the public thus enhancing their image.

6. Protecting status quo:

Codes establish ethical conventions, which can help promote an agreed upon minimum level of ethical conduct.

7. Promoting business interests:

Codes can place unwarranted restraints of commerce on business dealings.

Relative importance of the various functions of codes of ethics

The perspective of engg as social experimentation clearly emphasizes the primary role 'supportive function' of the codes of ethics. This is so because, only this support enables engineers, speak out clearly and openly their views, to those affected by engg projects.

The, 'inspiration and guidance' and 'educative' functions are also important in promoting mutual understanding and in motivating engineers to act with higher moral standards.

The 'disciplinary' function in engg codes is of secondary importance. Those with unethical conduct when exposed are subject to law. Developing elaborate paralegal procedures within professional societies duplicates a function which can be done better by legal system. At best, codes should try to discipline engineers in areas which are not covered by law.

The worst abuse of codes has been to restrict honest moral effort in the name of 'preserving profession's public mage' and 'protecting status quo'. The best way to increase trust is by encouraging and aiding engineers to speak freely and responsibly about public safety.

Limitations **of Codes of Ethics**

Codes are restricted to general and vague wording. They cannot be straightaway applied to all situations. It is impossible to foresee the full range of moral problems that can arise in a complex profession like engg.

It is easy for different clauses of codes to come into conflict with each other. Usually codes provide no guidance as to which clause should have priority in those cases, creating moral dilemmas.

They cannot serve as the final moral authority for professional conduct. If the code of a professional society is taken as the last word, it means that we are getting into a particular set of conventions i.e. ethical conventionalism.

Andrew Oldenquist and Edward Slowter pointed out how the existence of separate codes for different professional societies can give members the feeling that ethical conduct is more relative than it is and that it can convey to the public the view that none is 'really right'. The current codes are by no means perfect but are definitely steps in the right direction.

The problems of law in engineering

The greatest problem of law in engg is of 'minimal compliance'. Engineers and employers can search for loop holes in the law to barely keep to its letter while violating its spirit. Engineers will tend to refer to standard readymade specifications rather than come up with innovative ideas. Minimal compliance led to the tragedy of the 'Titanic'.

Continually updating laws and regulations may be counter-productive and will make law always lag behind technology. This also overburdens the rules and regulators.

Many laws are ‘non-laws’ i.e. laws without enforceable sanctions. These merely serve as window dressing, frequently gives a false sense of security to the public.

The opponents of the law may burden it intentionally with many unreasonable provisions that a repeal will not be far off.

Highly powerful organizations, like the government can violate the laws when they think they can get away with it by inviting would be challengers, to face them in lengthy and costly court proceedings. This also creates frustration with the law.

Role of law in engineering

It is wrong to write off rule-making and rule following as futile. Good laws, effectively enforced, clearly produce benefits.

Reasonable minimum standards are ensured of professional conduct.

It also provides a self-interested motive for most people and corporations to comply. They also serve as powerful support and defense for those who wish to act ethically in situations where ethical conduct might not be welcome.

Viewing engineering as social experimentation provides engineers with a better perspective on laws and regulations.

Precise rules and enforceable sanctions are appropriate in cases of ethical misconduct that involve violations of well established and regularly reexamined procedures that have as their purpose the safety of public.

In areas of experimentation, rules must not attempt to cover all possible outcomes of an experiment, nor must they force the engineer to adopt a rigidly specified course of action. Here the regulations should be broad based guidelines but should hold the engineer accountable for his or her decisions.

UNIT IV – SAFETY, RESPONSIBILITIES AND RIGHTS

SAFETY AND RISK

Imagine you are a fresh graduate.

You get a job as an engineer in a large atomic power plant.

Would you take it or not?

Under what conditions would you take it?

Under what conditions would you not?

Why?

People as Consumers:

Active Consumers: directly involve themselves e.g., mowing the lawn, washing clothes or toasting bread.

Passive Consumers: have less choice and less control e.g., Water, Electricity, Petrol,

Bystanders: e.g., exposed to Pollution from unknown sources

.What is safe to Entrepreneurs, may not be so to Engineers. e.g., Pilots: "Indian Airports are not safe; Low Vision in Fog“

What is safe to Engineers, may not be so to Public. e.g., Top loading Washing Machine

Typically several groups of people are involved in safety matters but have their own interests at stake. Each group may differ in what is safe and what is not.

Concept of Safety

1. “A ship in harbor is safe, but that is not what ships are built for” – John A. Shedd

2. ‘A thing is safe if its risks are judged to be acceptable’ - William W. Lawrence

We buy an ill-designed Iron box in a sale-> Underestimating risk

We judge fluoride in water can kill lots of people -> Overestimating risk We hire a taxi, without thinking about its safety -> Not estimating risk How does a judge pass a judgement on safety in these 3 cases?

….*So, this definition won't do in real life.*

Then, what is acceptable also depends upon the individual or group’s value judgment. Hence a better, *working definition* of *concept of safety* could be,

“A thing is safe (to a certain degree) with respect to a given person or group at a given time if, were they fully aware of its risks and expressing their most settled values, they would judge those risks to be acceptable (to that certain degree).” -Mike Martin and Roland Schinzinger

A thing is NOT SAFE if it exposes us to unacceptable danger or hazard

RISK is the potential that something unwanted and harmful may occur.

We take a risk when we undertake something or use a product that is not safe. Risk in technology could include dangers of

bodily harm,

economic loss, or

environmental degradation.

Some may assume that “safety” is a concrete concept, while “risk” is a vague, hypothetical concept

In fact, its the other way around

Risks always exist. But true safety never exists, except in hypothetical situations So, risk is *reality*, safety is *fantasy*

What degree of risk is acceptable?

Safety is a matter of how people would find risks acceptable or unacceptable, if they knew the risks, and are basing their judgments on their *most settled value* perspective.
So, to this extent, it is *objective*.

Perspectives differ.
To this extent, it is *subjective*.

So, Safety is *'acceptable risk'*.

Acceptable Risk

'A risk is acceptable when those affected are generally *no longer (or not) apprehensive* about it.'

Apprehension (i.e. anxiety) depends largely on factors such as

whether the risk is assumed voluntarily.

how the probabilities of harm (or benefit) is perceived.

job-related or other pressures that causes people to be aware of or to overlook risks.

whether the defects of a risky activity or situation are immediately noticeable or close at hand .

whether the potential victims are identifiable beforehand.

Voluntary risk and Control

A person is said to take *'VOLUNTARY RISK'*

-when he is subjected to risk by either his own actions or action taken by others and -*volunteers* to take that risk without any apprehension.

-For example, John and Ann Smith enjoy riding motorcycles over rough ground for amusement. They take voluntary risk, part of being engaged in such a potentially dangerous sport.

Connected to this notion of voluntarism is the matter of *Control*. In the example cited, the Smiths are aware of the high probability of accident figures in such a sport, but they display characteristically *unrealistic confidence* of most people when they believe the dangers to be *under their control.* In terms of engineering as social experimentation, people are more *willing to be the subjects of their own experiments* than of someone else's (whether social experiment or not).

Chauncey Starr informs us that individuals are more ready to assume voluntary risks than involuntary risks, even when voluntary risks are 1000 times more likely to produce a fatality than the involuntary ones.

A DISASTER = A seriously disruptive event + A state of unprepared ness.
e.g., Titanic collision with an iceberg, at night: Emergency
Fewer lifeboats, inadequate training and warnings of icebergs unheeded -> Disaster.

Effect of information on risk assessments

The manner in which information necessary for decision making is presented can greatly influence how risks are perceived. Consider this example:

In a particular case of disaster management, the only options available are provided in 2 different ways to the public for one to be chosen (where lives of 600 people are at stake).

Alternate 1

If program A is followed, 200 people will be saved. If Program B is followed, 1/3 probability is 600 people will be saved and 2/3 probability that nobody will be saved.

Response

72% of the target group chose option A and 28% option B

Alternate 2

If program A is followed, 400 people will die. If Program B is followed, 1/3 probability is that nobody will die and 2/3 probability that 600 people will die.

Response

This time only 22% of the target group chose option A and 78% option B

Conclusion:

The option perceived as yielding firm gain will tend to be preferred over those from which gains are perceived as risky or only probable.

Option emphasizing firm losses will tend to be avoided in favour of those whose chances of success are perceived as probable.

Secondary Costs of Products

Cost of products is High, if designed unsafely

- Returns and Warranty Expenses
- Loss of Customer Goodwill
- Cost of litigation
- Loss of Customers due to injuries in using it
- Cost of rework, lost time in attending to design problems

Manufacturer's understanding of the risk in a product is necessary:

- To help reduce secondary costs
  - To know the possible risk for purposes of pricing, disclaimers, legal terms and conditions, etc.
- To know the cost of reducing the risks
- To take a decision before finalizing the design.

Buyer's understanding of the risk in a product is necessary:

To judge whether he/she wants to take the risks

To judge whether the 'risk vs. costs' justifies taking the risk.

'JOB RELATED RISKS'

Many workers *are taking risks in their jobs* in their stride like being exposed to asbestos.

Exposure to risks on a job is in one sense of *voluntary nature* since one can always refuse to submit to the work or may have control over how the job is done.

But generally workers have *no choice* other than what they are told to do since they *want to stick to the only job* available to them.

But they are *not* generally *informed* about the exposure to toxic substances and other dangers which are *not readily* seen, smelt, heard or otherwise sensed.

Occupational health and safety regulations and unions can have a better say in correcting these situations but still things are far below expected safety standards.

Engineers while designing work stations must take into account the casual attitude of workers on safety (esp. when they are paid on piece rate).

Problems faced by engineers about *public concept of safety*

The optimistic attitude that things that are familiar, that have not caused harm before and over which we have some control *present no risks*.

The serious shock people feel when an accident kills or maims people *in large numbers* or *harms those we know*, even though statistically speaking such accidents might occur infrequently.

'Safety in a commodity comes with a price' – Explain.

Absolute safety is never possible to attain and safety can be improved in an engineering product only with an increase in cost.

On the other hand, *unsafe* products *incur secondary costs* to the producer beyond the primary (production) costs, like warranty costs loss of goodwill, loss of customers, litigation costs, downtime costs in manufacturing, etc.

Figure indicates that P- *Primary costs are high for a highly safe* (low risk) product and S- *Secondary costs are high for a highly risky* (low safe) product.

If we draw a curve T=P+S as shown, there is a *point at which costs are minimum* below which the cost cannot be reduced.

If *the risk* at Minimum Total Cost Point is *not acceptable*, then the producer has to *choose* a *lower acceptable risk* value in which case the *total cost* will be *higher* than M and the product designed accordingly.

It should now be clear that '*safety comes with a price'*
only .

Knowledge of risk for better safety

> Robert Stephenson writes that all the accidents, the harms caused and the means used to repair the damage *should be recorded* for the benefit of the younger Members of Profession.
>
> A faithful account of those accidents and the damage containment was really *more valuable* than the description of successful work.

Hence it is imperative that knowledge of risks will definitely help to attain better safety.

But it should be borne in mind, that still gaps remain, because

i)there are some industries where information is *not freely shared* and

ii)there are always *new applications of old technology* that render the available information *less useful*.

Uncertainties encountered in design process

A decision on maximising profit or maximising the return on investment.

Uncertainties about applications like dynamic loading instead of static loading, vibrations, wind speeds.

Uncertainties regarding materials and skills required in the manufacturing. Changing economic realities.

Unfamiliar environmental conditions like very low temperature.

The available standard data on items like steel, resistors, insulators, optical glass, etc are based on statistical averages only.

Due to the inherent nature of processes, all compts have a tolerance in design leading to the probability statistics by which assemblies' capability is assessed.

Testing strategies for safety

***Some commonly used testing methods*:**

Using the past experience in checking the design and performance.

Prototype testing. Here the one product tested may not be representative of the population of products.

Tests simulated under approximately actual conditions to know the performance flaws on safety.

Routine quality assurance tests on production runs.

The above testing procedures are not always carried out properly. Hence we cannot trust the testing procedures uncritically. Some tests are also destructive and obviously it is impossible to do destructive testing and improve safety.

In such cases, a simulation that traces hypothetical risky outcomes could be applied.

Scenario Analysis (Event -> Consequences)

Failure Modes & Effects Analysis (Failure modes of each component)

Fault Tree Analysis (System Failure -> Possible Causes at component level) What if there is a combination of factors?

All Analysis pre-suppose a thorough understanding of the physical system

Failure modes and effect analysis (FMEA) :

This approach systematically examines the failure modes of each component, without however, focusing on relationships among the elements of a complex system.

Fault Tree Analysis (FTA) :

A system failure is proposed and then events are traced back to possible causes at the component level. The reverse of the fault-tree analysis is 'event – tree analysis'. This method most effectively illustrates the disciplined approach required to capture as much as possible of everything that affects proper functioning and safety of a complex system.

Risk Benefit Analysis

Ethical Implications

When is someone entitled to *impose* a risk on another in view of a supposed benefit to others?

Consider the worst case scenarios of persons exposed to *maximum risks* while they are reaping only *minimum benefits.* Are their rights *violated*?

Are they provided *safer* alternatives?

Engineers should keep in mind that *risks to known persons are perceived differently* from statistical risks

Engineers may have *no control* over grievance redressal.

Conceptual difficulties in Risk-Benefit Analysis

Both risks and benefits lie *in future*

Heavy discounting of future because the very low present values of cost/benefits do not give a true picture of future sufferings.

Both have related uncertainties but difficult to arrive at expected values

What if *benefits* accrue to *one party* and *risks to another*?

Can we *express* risks & benefits in a *common set of units*?

e.g. Risks can be expressed in one set of units (*deaths* on the highway) and benefits in another *(speed of travel)*?

Many projects, which are highly beneficial to the public, have to be *safe also*.

Hence these projects can be justified using RISK-BENEFIT analysis. In these studies, one should find out

What are the risks involved?

What are the benefits that would accrue?

When would benefits be derived and when risks have to be faced?

Who are the ones to be benefited and who are the ones subjected to risk-are they the same set of people or different.

The issue here is *not*, say, *cost-effective* design but it is only *cost of risk taking Vs benefit* analysis. Engineers should *first recommend* the *project feasibility* based on risk-benefit analysis and once it is justified, *then* they may get into *cost-effectiveness* without increasing the risk visualized.

In all this, engineers should ask themselves this ethical question: 'Under what conditions, is someone in society entitled to *impose a risk on someone* else on behalf of a *supposed benefit to others.'*

Difficulties in assessing Personal Risks

Individuals are ready to *assume voluntary* risks than *involuntary* risks.

The difficulty here is generally in assessing personal risks which are involuntary.

The problem of quantification of risk raises innumerable problems.

For example, how to assign a rupee *value to one's life*. There is no over the counter trade in lives.

Even for a sale, it has to be clear *under what conditions* the sale is to take place.

If one buys a kg of rice it matters whether it is just one additional purchase one makes *regularly* or it is the first rice purchase *after quite sometime*.

Even when compensations are made to people exposed to involuntary risk, the basis on which it is made or even the intensity of risk could be *different for different people*.

As of now, the one suggestion could be to employ an *open procedure*, overseen by trained arbiters, in each case, where *risk to individuals is to be studied and remedied*.

Public Risk and Public Acceptance

Risks and benefits to public are more easily determined than to individuals

National Highway Traffic Safety Administration (NHTSA)- proposed a value for life based on:

loss of future income

other costs associated with the accident

estimate of quantifiable losses in social welfare resulting from a fatality

NOT a proper basis for determining the optimal expenditure allocated to saving lives

Accounting publicly for benefits and risks

Engineers should account publicly for benefits and risks in the following manner:

Engineers must remain as *objective* as humanly possible in their investigations and conclusions.

They must also *state* openly any *personal biases* that they may have about the project being investigated.

Engineers, even if they are acknowledged experts, may *not have complete knowledge* of the issues at hand.

They should, if necessary, *admit* their *lack of knowledge*, in any particular area publicly.

A willingness to *admit uncertainty* and also to *reveal methodology* and sources particularly when numerical data is presented.

The way statistical information is presented can create misconceptions in the public mind. Hence it should be *presented in a way to improve realistic interpretations*.

They must *consider the views of the parties affected* by the project under study *before* coming to conclusions.

The type of action taken should be morally evaluated regardless of its consequences. If it is wrong to violate certain rights, then figuring out the benefit of the consequences of doing so is irrelevant.

Difficulties in establishing Safeguards

Incomplete knowledge of the engineering subject

Refusal to face hard questions caused by lack of knowledge False sense of security

e.g. Nuclear waste disposal problem

Caution in stating probabilities of rare events

Varying understanding of risk based on presentation of facts

Risk assessments based on incorrect/unacceptable assumptions/data

Only a few persons/groups participate in the exercise

Some of the ways by which engineers may try to reduce risks.

In all the areas of works, engineers should give top priority for product safety.

They should believe that accidents are caused by dangerous conditions that can be corrected. Negligence and operator errors are not the principal causes of accidents.

If a product is made safe, the initial costs need not be high if safety is built into a product from the beginning. It is the design changes done at a later date that are costly. Even then life cycle costs can be made lower for the redesigned or retrofitted product (for safety).

If safety is not built into the original design, people can be hurt during testing stage itself.

They should get out of the thinking that warnings about hazards are adequate and that insurance coverage is cheaper than planning for safety.

All it takes to make a product safe is to have different perspective on the design problem with emphasis on safety.

Examples of Improved Safety

Magnetic door catch introduced on refrigerators

Prevent death by asphyxiation of children accidentally trapped inside The catch now permits the door to opened from inside easily

Cheaper than older types of latches

Dead-man Handle for Drivers in trains

Semaphore signaling

Volkswagen's car safety belt

Attachment on the door so that belt automatically goes in place on entry

Liability

Early logic and social philosophy: (Richard C. Vaughan)

‘Caveat Emptor’: buyer beware

Examine what you want before you buy

If he is negligent, he suffers the bad bargain.

Law will not aid those who are negligent

‘Privity of Contract’: User, if he is not a party to the contract, has no rights for any claim (user buys from the retailer and not from the manufacturer).

Manufacturer was made liable for injuries resulting from negligence in the design/manufacture

The new law: concept of Strict Liability was established in the case ‘Green man vs. Yuba Power Products’ in California.

If the product sold is defective, the manufacturer is liable for any harm that results to users

Implications to Engineers:

Engineers must weigh chances of *defect causing injury* against *cost of minimizing defects*

Minimal compliance is insufficient – not enough adhering to accepted practices & standards

Standards are *mere checklists* - use them creatively and judgmentally

Engineers *can be sued* personally even when *acting according* to guidelines set by *employers*

e.g. One county highway engineer was sued for failure to repair roads-- had to pay $2 million

Some Cos. protect their engineers and allow themselves to be sued for such money damages

Independent engineers can write liability limits into their contracts

Good knowledge of liability is necessary for engineers

‘SAFE EXIT’

It is almost impossible to build a completely safe product or one that will never fail. When there is a failure of the product *SAFE EXIT* should be provided.

Safe exit is to assure that

when a product fails, it will fail safely,

that the product can be abandoned safely and iii) that the user can safely escape the product.

More than the questions of who will build, install, maintain and pay for a safe exit, the most important question is who will recognize the need for a safe exit. This responsibility should be an integral part of the experimental procedure.

Some examples of providing ‘SAFE EXIT’:

Ships need lifeboats with sufficient spaces for all passengers and crew members.

Buildings need usable fire escapes

Operation of nuclear power plants calls for realistic means of evacuating nearby communities

Provisions are needed for safe disposal of dangerous materials and products.

Colleagiality & Its Elements

‘Collegiality is a kind of connectedness grounded in *respect for professional expertise* and in a *commitment to the goals and values of the profession* and as such, collegiality includes a disposition to *support and co-operate with one’s colleagues*’.

- Craig Ihara

The central elements of collegiality are *respect, commitment, connectedness and co-operation*.

Respect: Acknowledge the worth of other engineers engaged in producing socially useful and safe products.

Commitment: Share a devotion to the moral ideals inherent in the practice of engineering.

Connectedness: Aware of being part of a co-operative undertaking created by shared commitments and expertise.

Collegiality, like most virtues, can be misused and distorted.

It should not be reduced to 'group interest' but should be a shared devotion for public good.

It is not defaming colleagues, but it does not close the eyes to unethical practices of the co-professionals, either.

Classifications of Loyalty

Agency-Loyalty

Fulfill one's contractual *duties* to an employer.

Duties are particular *tasks for which* one is *paid*

Co-operating with colleagues

Following legitimate *authority* within the organization.

Identification-Loyalty:

It has to do with attitudes, emotions and a sense of *personal identity*.

Seeks to meet one's moral duties with personal *attachment and affirmation*.

o It is against *detesting* their employers and companies, and do work *reluctantly* and *horribly* (this is construed as *disloyalty*)

This means

Avoid conflicts of interest,

Inform employers of any possible conflicts of interest,

Protect confidential information,

Be honest in making estimates,

Admit one's errors, etc.

Loyalty - *Obligation of Engineers*

Agency-Loyalty

Engineers are *hired* to do their duties.

Hence *obligated* to employers within proper limits

Identification-Loyalty

Obligatory on two conditions;

When some important *goals are met* by and through a group in which the engineers participate

When employees are *treated fairly*, receiving the share of benefits and burdens.

But clearly, identification-loyalty is a *virtue* and *not* strictly an *obligation*.

Relationship - Professionalism and Loyalty

Acting on professional *commitments* to the public is *more effective* to serve a company *than* just *following* company orders.

Loyalty to employers may *n*ot mean *obeying* one's immediate *supervisor*.

Professional obligations to both an employer and to the public might *strengthen rather than contradict* each other.

Need for Authority

Authority is needed since

Allowing everyone to exercise *uncontrolled individual discretion creates chaos* (confusion).

Clear lines of authority *identifies areas of* personal responsibility and *accountability*.

Institutional Authority and Expert Authority

Institutional authority

'The institutional right given to a person to exercise power based on the resources of the institution'.

It is acquired, exercised and defined within institutions.

It is given to individuals to perform their institutional duties assigned within the organisation. There is not always a perfect match between the authority granted and the qualifications needed to exercise it.

Expert authority

'The possession of special knowledge, skill or competence to perform some task or to give sound advice'.

Engineers may have expert authority but their institutional authority, *may only be*, to *provide management* with analysis of possible ways to perform a technical task, after which they are *restricted to following management's directive* about which option to pursue. In large companies, *engineers, advisors and consultants* in staff function carry *expert authority*, while *institutional authority* is vested only with *line managers*.

Authority Vs Power

Ineffective persons, even if vested with authority by their institution, *may not be able to summon* the power their position allows them to exercise. On the other hand, people who are

effective may be *able to wield greater power* that goes beyond the authority attached to the positions they hold. Highly respected engineers of proven integrity belong to this class.

Authority - Morally justified

Observations on authority.

An *employer* who has institutional authority may *direct engineers* to do something that is *not morally justified.*

Engineers may feel that they have an institutional *duty to obey* a directive that is *morally unjustified*, *but* their moral *duty*, all things considered, *is not to obey.*

To decide whether a specific act of *exercising institutional authority is morally justified,* we need to know whether the institutional *goals are* themselves *morally permissible* or desirable and whether that *act violates* basic moral duties.

'Zone Of Acceptance' of Authority

'A subordinate is said to accept authority whenever he permits his behaviour to be guided by the decision of a superior, without independently examining the merits of that decision' - Herbert Simon

Simon notes that all employees tend to have a *'zone of acceptance'* in which they are willing to accept their employer's authority.

Within that zone, an individual, relaxing his own critical faculties, *permits* the decision of the *employer to guide* him.

Employees generally *do not make an issue* of questionable incidents on morality, *out of a sense of responsibility* to give their employer leeway within which to operate and often *not to risk their jobs*.

The *problem increases* when employees slowly *expand* the boundaries of *tolerance and rationalize* it.

This only shows that engineers should *never stop* critically *reviewing* the employer's *directives* especially *on moral issues*.

'Faithful Agent Argument'

National Society of Professional Engineers (NSPE) Code states,

"The engineer ……will act in professional matters for client, or employer *as a faithful agent or trustee*……He will *not actively participate* in strikes, picket lines or other *coercive action*"

meaning that when one is a faithful trustee of one's employer he cannot actively participate in any collective forcible action.

Board of Ethical Review argued that engineers *have a higher standard* than self interest and that their ethical duty is to act for their employer as a faithful agent or trustee.

Collective bargaining is *inconsistent with loyalty* to employers because it

is against the desires of the employer
uses force or coercion against the employer and
involves collective and organized opposition.

But *every instance* of such conduct *need not be unethical.*

An example:

Three engineers sincerely feel that they are underpaid. After their representations to their bosses are in vain, they threaten their employer, politely, that they would seek employment elsewhere. Here, even though, they act against the desires of their employer and have acted collectively, they have not acted unethically or violated their duty.

Conclusion: '*Faithful agency*' only *concerns with performing one's duty* but *does not mean* that safety, salary and other economical *benefits cannot be negotiated* from a position of strength. Employee's duty to employer *does not mean unlimited sacrifice* of self-interest.

'Public Service Argument'- Collective bargaining.

'Public Service Argument' is an *argument against* collective bargaining.

The paramount duty of engineers is *to serve the public.*

Unions, by definition, *promote* the *interests of their members* and whenever there is a clash of interests, the interest of the general public is ignored by them. Though the argument is a valid one, it looks at the worst possible scenarios with unions and *decides that* engineering *unions act* only *irresponsibly*.

A body of engineers can *promote engineers' interest* within limits set *by professional concern* for the public good.

Benefits of Collective Bargaining.

Unions have created *healthy salaries* and *high standard of living* of employees.

They give a *sense of participation* in company *decision making*.

They are a good *balance to the power* of employers to fire employees at will.

They provide an *effective grievance redressal* procedure for employee complaints.

Harms Caused by Collective Bargaining.

Unions are *devastating the economy* of a country, being a main *source of inflation*

With unions, there is *no congenial (friendly)*, cooperative *decision making*.

Unions *does not promote* quality performance by making job *promotion and retention based on seniority*.

They *encourage unrest and strained relations* between employees and employers.

'Confidentiality or confidential information'

Information considered desirable to be kept secret.

Any information that the employer or client would like to have kept secret in order to compete effectively against business rivals.

- This information includes *how business is run, its products, and suppliers,* which directly affects the ability of the company to compete in the market place
- *Helps* the competitor to *gain advantage* or catch up

Privileged information, Proprietary information and Patents.

Privileged information:

'Information available only on the *basis of special privilege*' such as granted to an employee working on a special assignment.

Proprietary information:

Information that a company *owns or is the proprietor of*. This is primarily used in *legal sense*.

Also called *Trade Secret*. A trade secret can be virtually any type of information that has *not become public* and which an employer has *taken steps to keep secret*.

Patents:

Differ from trade secrets.

Legally protect specific products from being manufactured and sold by competitors *without* the express *permission of the patent holder*.

They have the *drawback of being public* and competitors may *easily work around them* by creating alternate designs.

Obligation of Confidentiality

1. Based on ordinary moral considerations:

Respect for autonomy:

Recognizing the legitimate control over private information (individuals or corporations).

This control is required *to maintain their privacy* and protect their self-interest.

Respect for Promise:

Respecting promises in terms of *employment contracts* not to divulge certain information considered sensitive by the employer

III.*Regard for public well being*:

Only when there is a *confidence* that the physician *will not reveal* information, the patient will have the *trust to confide* in him.

Similarly *only when companies maintain* some degree of *confidentiality* concerning their products, the benefits of *competitiveness* within a free market are *promoted*.

Based on Major Ethical Theories:

- All theories profess that employers have *moral and institutional rights* to decide what information about their organization should be released publicly.
- They acquire these rights as *part of their responsibility to protect the interest of the organization*.
- All the *theories*, rights ethics, duty ethics and utilitarianism *justify this confidentiality* but in different ways.

Effect of Change of Job on Confidentiality

- Employees are *obliged* to protect confidential information regarding former employment, *after a change of job.*

  The *confidentiality trust* between employer and employee *continues beyond* the period of employment.

  But, the employee *cannot be forced not to seek* a change of job.

  The *employer's right* to keep the trade secrets confidential by a former employee *should be accepted* at the same time, the *employee's right* to seek career advancement *cannot also be denied*.

Conflict of Interest

Conflict of Interest arises when two conditions are met:

The professional is in a relationship or a role that requires exercising good judgment on behalf of the interests of an employer or client and

The professional has some additional or side interest that could threaten good judgment in serving the interests of the employee or client. E.g. *When an engineer is paid based on a percentage of the cost of the design and there is no incentive for him to*

cut costs- The distrust caused by this situation compromises the engineers' ability to cut costs and calls into question his judgement.

<u>'An act of gift' and 'An act of bribe'</u>

'A *gift* is a *bribe* if you can't *eat, drink or smoke it in a day*'.

'If you think that your offer of acceptance of a particular gift would have *grave* or merely *embarrassing consequences for your company if made public*, then the gift should be considered a bribe'.

'*Bribe* can be said to be a *substantial* amount of money or goods offered beyond a stated business contract with the *aim of winning an advantage* in gaining or keeping the contract'.

Here '*substantial*' means that which is *sufficient to distort the judgment* of a typical person.

Conflict of Interest created by Interest in other companies

When one *works actually for the competitor* or subcontractor as an employee or consultant.

Having *partial ownership or substantial stock holdings* in the competitor's business.

AITAM,TEKKALI

It may *not arise* by merely having a *spouse working for sub-contractor* to one's company, but it *will arise* if one's *job also includes granting contracts* to that subcontractor.

Tempting customers away from their current employer, while still working for them *to form* their own *competing business*.

Moonlighting usually creates *conflicts* when working for competitors, suppliers or customers but *does not conflict when working for others without affecting* the present employer's business.

'Moonlighting' means working in one's spare time for another employer.

Conflicts of Interest created by Insider information

- *Using inside information* to *set-up a business* opportunity for *oneself or family or friends.*
- *Buying stock* in the company for which one works is *not objectionable* but it should be based on the *same information* available to the public.
- The *use* of any company *secrets* by employee to *secure a personal gain* threatens the interest of the company.

Avoiding Conflicts Of Interests

Taking guidance from *Company Policy*

In the absence of such a policy taking a *second opinion from a coworker or manager*.

This gives an impression that there no intension on the part of the engineer to hide anything.

In the absence of either of these options, to *examine ones own motives* and *use the ethical* problem solving *techniques*.

One can look carefully into the professional codes of ethics *which uniformly forbid conflicts of interest*. Some of these codes have very explicit statements that can help determine whether or not the situation constitutes conflict of interest.

Types Of Crime

Domestic crime

Non-accidental crime committed *by members* of the family

Professional Crime

to day occupation

Blue collar crime (or) Street crime

Crime *against person, property* (theft, assault on a person, rape)

Victimless crime

Person *who commits* the crime *is the victim* of the crime. E.g. Drug addiction

Hate crime

Crime done on the banner of *religion, community, linguistics*

Occupational Crime

Occupational crimes are *illegal acts* made possible through one's *lawful employment*.

It is the *secretive violation of laws* regulating work activities.

When committed by office workers or professionals, occupational crime is called '*white collar crime*'.

People Committing Occupational Crimes

Usually have *high standard of education*

From a *non-criminal family background*

Middle class male around *27 years of age* (70% of the time) with *no previous history*

No involvement in drug or alcohol abuse

Those who had *troublesome life* experience in the childhood (Blum)

People *without firm principles* (Spencer)

Firms with *declining profitability* (Coleman, 1994)

Firms in highly *regulated areas and volatile market* -pharmaceutical, petroleum industry.(Albanese, 1995)

Price Fixing

An act was passed, which *forbade* (prevented) companies from *jointly setting prices* in ways that *restrain free competition* and trade. Unfortunately, many senior people, well respected and positioned were of the opinion that '*price fixing*' was good for their organizations and the public.

Employees Endangering Lives of Employees

Employers indulge in exposing their employees to safety hazards. They *escape criminal action* against them, by paying *nominal compensations* even if their crimes are proved in court. And even this happens *only when the victim sues company* for damages under civil law.

Engineers' Moral Rights

Engineers' moral rights fall into categories of *human, employee, contractual and professional rights.*

Professional rights:

The right to form and *express one's professional judgment freely*

The right to *refuse* to carry out *illegal and unethical activity*

The right to *talk publicly* about one's work *within bounds* set by confidentiality obligation The right to *engage* in the activities of *professional societies*

The right to *protect* the clients and the public *from the dangers* that might arise from one's work

The right to professional *recognition* of one's services.

Right of Professional Conscience

There is one *basic* and generic professional right of engineers, the *moral right to exercise responsible professional judgment* in pursuing professional responsibilities.

Pursuing these responsibilities involves *exercising* both *technical judgment* and *reasoned moral convictions*.

This basic right can be referred to as *the right of professional conscience.*

Right of Conscientious Refusal

The right of Conscientious refusal is the right to *refuse to engage in unethical behaviour* and to refuse to do so *solely because one views it as unethical.*

Two situations to be considered.

1. Where there is widely shared agreement in profession as to whether an act is unethical
Here, professionals have a moral right to refuse to participate in such activities.

Where there is room for disagreement among reasonable people over whether an act is unethical.

Here, it is possible that there could be *different ethical view points* from the professional and the employer.

In such cases the engineers can have a *limited right* to *turn down* assignments that violates their personal conscience *only in matters of great importance* such as threats to human life.

This right also depends on the *ability* of the employer *to reassign* the engineer to alternate projects *without serious economic hardships* to the orgn.

The *right of professional conscience does not extend to the right to be paid for not working.*

Right to Recognition

Right to Recognition involves two parts.

The right to *reasonable remuneration* gives the moral right for fighting against corporations making good profits while engineers are being paid poorly. Also is the case where patents are not being rewarded properly by the corporations benefiting from such patents.

The other *right to recognition* is non-monetary part of recognition to the work of engineers.

But *what is reasonable remuneration or reasonable recognition* is a difficult question and should be resolved by discussions between employees and employers only.

Professional Rights & Ethical Theories

1. Rights Ethics:

The most basic human right, which needs no justification, as per A.I.Meldon, is to pursue one's legitimate (those that do not violate others' rights) interests.

The right to pursue legitimate interests gives a person right to pursue professional moral obligations.

This may be viewed as a human right of conscience directly derived from the basic human right.

2. Duty Ethics:

I have a right to something only because others have duties or obligations to allow me (and not interfere) to do so.

If we derive the meaning of 'others' as employers, then the basic professional right is justified by reference to others' duties to support or not interfere with the work related exercise of conscience by professionals.

3. Utilitarianism*:*

Public good can be served by allowing professionals to meet their obligations to the public.

These obligations arise due to the professional's role in promoting public good.

The basic goal of producing the most good for the greatest number of people is enough to justify the right of professional conscience.

Whistle-blowing and Its Features

Whistle blowing is an *act of conveying information* about a *significant moral problem* by a *present or former employee*, *outside approved channels* (or against strong pressure) to someone, in a position to take action on the problem.

The features of *Whistle blowing* are:

Act of Disclosure: *Intentionally conveying information outside approved organizational channels when the person is under pressure not to do so from higher-ups.*

Topic: *The information is believed to concern a significant moral problem for the organization*.

Agent: *The person disclosing the information is an employee or former employee.*

Recipient: *The information is conveyed to a person or organization who can act on it.*

Types of Whistle Blowing

External Whistle blowing*:* The act of passing on information outside the organisation.
Internal Whistle blowing: The act of passing on information to someone within the organization but outside the approved channels.

Either type is likely to be considered as disloyalty, but the second one is often seen as less serious than the latter. From corporations' point of view both are serious because it leads to distrust, disharmony, and inability of the employees to work together.

Open Whistle blowing: Individuals openly revealing their identity as they convey the information.

Anonymous Whistle blowing*:* Individual conveying the information conceals his/her identity.

Procedures to be followed before Whistle Blowing

Except for extreme *emergencies*, always try *working through normal* organizational *channels*.

Be *prompt* in expressing objections.

Proceed in a tactful manner with *due consideration to the feelings* of others involved.

As much as possible, *keep supervisors informed* of your actions, both informally and formally.

Be accurate in observations and claims and *keep all formal records* documenting relevant events.

Consult colleagues for *advice* and also to *avoid isolation*.

Consult the ethics committee of your professional society before going outside the organization.

Consult a lawyer regarding potential legal liabilities.

A great deal of introspection and reflection are required before WB. Motive should neither be for revenge upon fellow employee, supervisor or company nor in the hope of future gains like book contracts or speaking tours etc.

Conditions to be satisfied before Whistle Blowing

Richard T. De George suggests the following:

The *harm* that will be done by the product to the public is *serious* and considerable.

The individual makes his/her concern *known to his/her superiors*

.

If one does not get any proper response from immediate superiors, then one should *exhaust the channels* that are available *within the organization* including the board of directors.

One must have *documented evidence* that would *convince* a reasonable and impartial *observer* that one's view of the situation is correct and the company policy is wrong.

There must be *strong evidence* that making the information public will in fact *prevent the threatened serious harm.*

Prevention of Whistle Blowing

The following *actions* will *prevent/reduce* whistle blowing:

Giving *direct access* to higher levels of management by announcing '*open door'* policies with guarantee that *there won't be retaliation.* Instead such employees should be *rewarded for fostering ethical behavior* in the company.

This gives greater freedom and promotes open communication within the organization.

Creation of an Ethics Review Committee with *freedom to investigate complaints and make independent recommendations* to top management.

Top priority should be given to *promote ethical conduct* in the organization *by top management*.

Engineers should be *allowed to discuss in confidence*, their moral concerns with the ethics committee of their professional societies.

When there are differences on ethical issues between engineers and management, *ethics committee members* of the professional societies *should be allowed* to enter into these discussions.

Changes and updations in law must be explored by engineers, organizations, professional societies and government organizations on a continuous basis.

Employee Rights

Employee rights are any rights, moral or legal, that involve the status of being an employee.

Employee rights are:

There should be *no discrimination* against an employee *for criticizing* ethical, moral or legal policies and practices of the organization.

The organization will *not also discriminate* against an employee for *engaging in outside activities* or for objecting to an organization directive that violates common norms of morality.

The employee *will not be deprived of* any enjoyment of *reasonable privacy* in his/her workplace.

No personal information about employees *will be collected* or kept other than what is necessary to manage the organization efficiently and to meet the legal requirements.

No employee who alleges that her/his rights have been violated *will be discharged* or penalized *without a fair hearing* by the employer organization.

Some clear examples: falsifying data, avoidance on the safety of a product

Discrimination

Discrimination generally means *preference* on the grounds of *sex, race, skin colour, age or religious outlook*.
In everyday speech, it has come to mean *morally unjustified treatment of people on arbitrary or irrelevant grounds*.
Therefore to call something 'Discrimination" is to condemn it.
But when the question of justification arises, we will call it *'Preferential Treatment'*.

Intellectual Property Rights

Intellectual Property is a product of the *human intellect* that has *commercial value*
Many of the rights of the ownership common to real and *personal property* are also *common* to *Intellectual Property*

Intellectual Property can be *bought, sold, and licensed*

Similarly it can be *protected against theft* and *infringement* by others

Patent, Design & Trademark* together with *Copyright* form *TOTAL INTELLECTUAL PROPERTY

PATENT

Derived from the Latin word 'LITTERAE PATENTES' which means 'Open Letters' or 'Open Documents' to confer rights and privileges.

A contract between an Inventor and the Government

An exclusive privilege monopoly right granted by the Government to the Inventor

Invention may be of an Industrial product or process of manufacture

Invention should be new, non-obvious, useful and patentable as per Patents Act

The right to the inventor is for limited period of time and valid only within the territorial limits of a country of grant.

Examples: *a drug compound, a tool, maybe*

software effects

DESIGN

Meant for beautifying an industrial product to attract the consumer public Shaping, Configuration or Ornamentation of a vendible Industrial product Exclusive 'Design Rights' to the originator for a limited term

Patents & design embrace the production stage of an industrial activity

TRADE MARK

Trade Mark is a name or symbol adopted for identifying goods

Public can identify from the Trade Mark from whom the product is emanating

Trade Marks protection is given for an industrial product by the Government

Examples: Channel No.5's smell, Jacque Villeneuve's face!

COPY RIGHTS

The right to original literary and artistic works

- Literary, written material
- Dramatic, musical or artistic works
- Films and audio-visual materials
- Sound recordings
- Computer Programmes/software
- SOME databases

Example: Picasso's Guernica, Microsoft code, Lord of the Rings

Need For A Patent System

Encourages an inventor to disclose his invention

- Encourages R & D activities as the industries can make use of the technology, & avoids reduntant research

Provides reasonable assurance for commercialisation.

- Provides an inducement to invest capital in the new lines of production and thus , help for technical development and upgradation.
- One may get a very good return of income through Patent Right on the investment made in R & D.

Effect of Patent

- A patentee gets the exclusive monopoly right against the public at large to use,sell or manufacture his patented device.
- A patentee can enforce his monopoly right against any infringement in the court of law for suitable damages or profit of account.
- The Government ensures full disclosure of the invention to the public for exchange of exclusive monopoly patent right to the inventor.

UNIT V - GLOBAL ISSUES

1. Give an account of Bhopal Gas Tragedy.

On December 3, 1984, Union Carbide's pesticide-manufacturing plant in Bhopal, India leaked 40 tons of the deadly gas, methyl isocyanate into a sleeping, impoverished community

killing 2,500 within a few days, 10000 permanently disabled and injuring 100,000 people. Ten years later, it increased to 4000 to 7000 deaths and injuries to 600,000.

Risks taken:

Storage tank of Methyl Isocyanate gas was filled to *more than 75%* capacity as against Union Carbide's spec. that it should *never be more than 60%* full.

The company's West Virginia plant was controlling the safety systems and *detected leakages thro' computers* but the Bhopal plant *only used manual labour for control and leak detection.*

The Methyl Isocyanate gas, being highly concentrated, *burns parts of body* with which it comes into contact, even *blinding eyes and destroying lungs*.

Causal Factors:

Three protective systems *out of service*

Plant was *understaffed* due to costs.

Very *high inventory of MIC*, an extremely toxic material.

The accident occurred in the *early morning.*

Most of the people killed lived in a shanty (poorly built) town located very close to the plant fence.

Workers made the following attempts to save the plant:

They tried to turn on the plant refrigeration system to cool down the environment and slow the reaction. (*The refrigeration system had been drained of coolant weeks before and never refilled -- it cost too much*.)

They tried to route expanding gases to a neighboring tank. (*The tank's pressure gauge was broken and indicated the tank was full when it was really empty.*)

They tried to purge the gases through a scrubber. (*The scrubber was designed for flow rates, temperatures and pressures that were a fraction of what was by this time escaping from the tank. The scrubber was as a result ineffective*.)

They tried to route the gases through a flare tower -- to burn them away. (*The supply line to the flare tower was broken and hadn't been replaced*.)

They tried to spray water on the gases and have them settle to the ground -- by this time the chemical reaction was nearly completed. (*The gases were escaping at a point 120 feet above ground; the hoses were designed to shoot water up to 100 feet into the air*.)

In just 2 hours the chemicals escaped to form a deadly cloud over hundreds of thousands of people incl. poor migrant labourers who stayed close to the plant.

What are the benefits of Multi National corporations doing business in less developed countries for both the MNCs and the host country?

Benefits to MNCs:

Inexpensive labour

Availability of natural resources

Favourable tax conditions

Fresh markets for products

Benefits to developing host countries:

New jobs

Greater pay and greater challenge

Transfer of advanced technology

Social benefits from sharing wealth

3. What are the three senses of relative values?

3.1. Ethical Relativism

Actions are morally right in a particular society if they are approved by law, custom, or other conventions of the society.

3.2. Descriptive Relativism

Value beliefs and attitudes differ from culture to culture and this is a fact.

3.3. Moral Relationalism or Contextualism (Ethical pluralism)

Moral judgements should be made in relation to factors that vary between issues. Hence it is not possible to formulate rules that are simple and applicably to all situations.

Which standards should guide engineers' conduct when working in foreign countries?

Alternate 1: 'When in Rome, do as the Romans do'

Alternate 2. Follow the identical practices which were followed in the home country.

Both are unacceptable. *A via media should be found based on the context.*

5. What are the International Rights as enumerated by Thomas Donaldson?

The right to freedom of physical movement

The right to ownership of property

The right to freedom from torture

The right to a fair deal

The right to non-discriminatory treatment

The right to physical security

The right to freedom of speech and association

The right to minimal education

The right to political participation

The right to subsistence

What can MNCs do to promote morally just measures? Or what are Richard T. De George's guidelines for moral promotion by MNCs?

MNCs business should do *more overall good* than bad towards the economy of the *host country than* doing good to a *few corrupt leaders* in oppressive regimes.

They must *respect laws and regulations* of the local country *as long as they do not violate* basic *moral rights*.

They must *pay a living wage*, even when local companies fail to pay such a wage, but otherwise pay only enough to attract competent workers.

It is permissible for the US to transfer dangerous technology like asbestos production to another country and then simply adopt that country's safety laws *only under the following conditions*.

–Workers may be so desperate for income to feed their families that they will work under almost any conditions

–Pay workers for the extra risk

Good judgements exercised in good faith, than abstract principles, is the only way to address practical problems.

7. Write in brief about Technology Transfer and Appropriate Technology?

7.1. Technology Transfer:

'The process of moving technology to a novel setting and implementing there.'

Novel setting is any situation containing at least one new variable relevant to success or failure of given technology

Transfer of technology from a familiar to a new environment is a complex process

7.2. Appropriate Technology:

'Identification, transfer, and implementation of the most suitable technology for a new set of conditions'

Conditions include social factors that go beyond routine economic and technical engineering constraints

Identifying them requires attention to an array of human values and needs that may influence how a technology affects the novel situation

Intermediate technology

How is environment degraded?

By causing injuries to nature

i. Usually this damage is caused slowly

ii. Sometimes this also happens in sudden strikes

Misuse of our resources, fouling our environment

Practicing growths in consumptions and population leading to non-availability of resources

Industrial activity denudes land(to destroy all plant and animal life), pollutes atmosphere and water, reduces the yield from sea and land

What are the questions to be answered by Engineers in their role as experimenters?

How does an industry affect the environment?

How far it can be controlled?

Whether protective measures are available and implemented?

Whether engineers can ensure safe & clean environment?

What is acid rain? What are its effects?

***Acid rain*:**

- pH of normal rain is 5.6
- pH of rainfall in north eastern areas of North America is 3.9 to 4.3.
- It is 10 to 100 times more acidic than normal. This is ‘acid rain’.
- Snowmelt into water releases huge amount of acid which got frozen during winter.

Effects:

'Acid shock' from snowmelt causes mass destruction of fish. On long term it also harms fish eggs and sources of food.

Thousands of lakes were killed by acid rain in Scandinavia and North America.

The causes are burning of fossil fuels leading to release of SO_2 in particular and Nitrogen oxides.

Problems of Sweden caused by Industrial plants in England and North Europe.

Problems of North America caused by utilities in Ohio valley, the largest polluter of SO_2 in USA.

Some of the potential changes are still unknown

Micro organisms in soil are being affected

Groundwater is polluted but its ultimate effects are not known

The effects may be known only after another 100 years

Effect on food sources are also unclear

11. What are the other problems caused to the environment?

Build-up of CO_2 from the use of fossil fuels by Industrial nations could result in *Greenhouse effect*.

Damage to protective OZONE layer due to the release of Freon is related to technological products used by the people of these nations.

12. What is Greenhouse effect?

'Greenhouse Effect' is defined as 'The progressive warming up of earth's surface due to blanketing effect of man made CO_2 in the atmosphere.'

A greenhouse is that body which allows the short wavelength incoming solar radiation to come in, but does not allow the long wave outgoing infra red radiation to escape. The earth's atmosphere bottles up the energy of the sun and it acts like a green house, where CO_2 acts like a glass windows.

13. What are the effects of Greenhouse?

The temperature effect of the CO_2 and water vapour combined together has a long range impact on the global climate.

Because of increased concentration of CO_2 and due to much warmer tropical oceans, there may occur cyclones and hurricanes and early snow melt in mountains will cause more floods during monsoon.

Increase in global temperature can adversely effect the world food production.

At higher altitudes in the atmosphere, CO_2 undergoes photochemical reactions producing CO, which is drastically dangerous.

CFCs are responsible for 20% increase in warming. This may increase the chances of diseases in humans and animals.

Describe the case study of environmental degradation caused by PCB & Kanemi's Oil?

In Southern Japan, in 1968 a large number of people suffered by *disfigurement of skin, discolouration, fatigue, numbness, respiratory distress, vomiting and loss of hair.*

- 10,000 people *got affected & some died*
- Two groups of 121 people each were tested and results were as follows:

  It was found that *fried food using rice oil* produced by Kanemi company was eaten which *caused the problem*

  After 7 months of investigation….

  – It was found that the *presence of Polychlorinated biphenyl-PCB* was the *cause for the effects* and it was present in the rice oil.

  – Rice Oil was heated at low pressure to remove the odour thro' a heat exchanger and a liquid known as KANECHLOR *which contained PCB was used* for heat transfer

  – Pipes of the heat exchanger was *corroded* and *led to leakage thro' those pinholes*.

– In fact, Kanemi had been *replenishing 27 kgs of lost PCB per month for sometime* without realizing the seriousness.

Indirect path – this rice was used as chicken-feed and half of one million chickens that were fed died.

Other Similar Effects:

Plastic bakery *wrappers containing PCB* mixed with ground stale bread was *used as chicken-feed* and 140000 chickens had to be slaughtered in New York.

PCB leaked into fishmeal from a heating system in North Carolina plant and 12000 tons of fishmeal were contaminated and 88000 chicken, fed with fishmeal had to be destroyed.

High pressure *injection of water* near Baldwin Dam in Los Angeles *caused* the reservoir *crack* open along a fault line. The water released killed 5 and damaged property worth $14 million.

How can we internalise Costs of Environmental Degradation?

Time cost of a product – includes numerous factors like effect of pollution, the depletion of energy and raw materials, social costs, etc.

If these costs are internalized (added to the price), then the cost can be charged directly to the beneficiary of the degradation of environment.

It is better to make the user to pay for all its costs than to levy higher taxes.

An acceptable mechanism for price fixing must be found by the engineer with the help of the economist, scientist, lawyer and politician which could protect the environment through self correcting procedures.

Good design practices may give better environmental protection without added cost.

Give a brief account of Technology Assessment?

- Engineers are said to be finding the *right answers for the wrong questions*
- *Finding the right questions* is much *more difficult than* finding the *right answers* to these questions

Engineers should

Try to assess the technology and its environmental impacts and focus on containing the major adverse effects.

During assessment even if engineers were strongly believe that the projects have no adverse effect, they should continue to monitor the outcome even after its implementation which only would give the complete picture of the consequences of the project.

Write short notes on Sentient – Centered Ethics, Bio – Centric Ethics, Ecocentric Ethics and Human – Centered Environmental Ethics.

Sentient – Centered Ethics

Sentient animals are those which feel pain and pleasure. This version of Nature-centered ethics is advanced by some utilitarians, notably Peter Singer, who says that right action maximizing good for all should *include sentient animals as well as humans*. Failure to do so leads discrimination like racism, which is known as 'Speciesism'. There is always a dispute as to whether the inherent worth of animals can be equated to human beings or not.

Bio – Centric Ethics

This regards *all living organisms as having inherent worth*. We should live with the virtue of '*reverence to life*', as set forth by Albert Schweitzer (1875-1965). This will enable us to take decisions about when life can be sacrificed.

Ecocentric Ethics

This locates *inherent worth in Ecological systems* and this approach is different from the other two, as it is not individualistic. This is voiced by Aldo Leopold (1887-1948). There is another view that ecocentric ethic does not replace socially generated human-oriented duties to family, neighbours and humanity

Human – Centered Environmental Ethics

This is an extension of ethical theories to combat threats to human beings presented by the destruction of nature.

18. Define computer ethics?

Computer Ethics deals with 'the evaluation of and decision making in a variety of moral problems caused by computers'.

19. What shifts are caused in power relationships by Computers?

Power relationship caused by Computers:

***Job Elimination*:**

Computers still continue to lead to elimination of jobs.

While employees cannot be paid when there is no work, all attempts are to be made by employers to readjust work assignments and retain employees.

The absence of this practice creates an employee or pubic backlash against introduction of Computers.

***Customer Relations*:**

It is very easy for a customer to notice an error in a computer printout, of the price difference between what is shown at the shelf and what is shown in cash receipt register.

Here moral sense and long term business requirement requires that the policies should be made favourable to consumers.

Biased Software:

A group of people with known convictions, may tend to produce software which favours their views rather than views from all angles to let the user decide finally.

Stock Trading:

Automatic, hands-off trading of stocks and currency can be performed, benefiting the trading community but it will harm the intended purposes.

Unrealistic Expectations:

Sales personnel have a tendency to oversell systems that are too large for customers' requirements; sometimes even those which are not ready for delivery.

Political Power:

By obtaining information about different groups of people regarding their attitudes and values, the computers can be made to help politicians to make speeches, send mails, etc. which would be appealing selectively to these groups.

Military Weapons:

Computerised military weapons, even if perfected, will only make opposing countries to develop their striking or responding capability which is not healthy for the world.

20. What problems are encountered in the use of computers with properties?

The two major problems encountered in the use of computers with properties are:

Embezzlement and

Theft of software and information

How the problem of embezzlement takes place through computers and why?

The speed and geographic coverage of the computer system and the difficulty of tracing the transactions through computers makes catching the thieves troublesome.

Computers are abused in i) stealing by employees at work, ii) stealing by non-employees or former employees, iii) stealing from or cheating clients and consumers, iv) violating contracts for computer sales or service and v) conspiring to use computer networks to engage in widespread fraud.

Penalties for computer crime are mild compared to conventional crimes.

Passwords and more recently, data encryptions are used for security with limited effectiveness.

Explain briefly about Data and Software with respect to property problems.

'Data' is information stored in a computer.

'Software' or 'program' consists of i) an algorithm, ii) a source code and iii) an object code.

Software can be protected by Copyrights and Trade secret laws. Patenting on software is limited to detailed coding sequences but not final products. Algorithms and object codes cannot be copyrighted. But source code can be copyrighted.

Eg. Buying one copy and reproducing dozens of copies.

Describe how and in what ways 'violation of privacy' occurs in and through Computers.

Computers make more information available to more people. This makes protection of computer privacy difficult.

***1. Inappropriate Access*:**

Documents recorded for a crime which one did not commit but was arrested.

As a child you were arrested for drinking alcohol

Medical data about visits to a psychiatrist.

A loan default to a National Bank.

Any of the above information can be accessed by, let us say, a prospective employer during a security check.

***2. Data Bank Errors*:**

Even erroneous information when generated by computers is taken to be authenticated.

Immediate reaction to such wrong information may mostly prove to be incorrect.

***3. Hackers*:**

'Hackers' are people who compulsively challenge any computer security system, choke networks, give out false information, etc.

This can be extremely harmful.

It is a violation of property rights.

At the least, it reduces productivity by shutting down systems.

Individual privacy, national security, freedom to protect proprietary information are three values requiring limits on access to information.

24. How has law responded to computer abuses?

A series of laws enacted to prevent abuse of information.

Information can be accessed only by consumer consent or court order.

Consumers have the right to examine and challenge information contained in computers.

25. What Professional Issues arise in Computer ethics?

Owing to the high degree of job complexity and technical proficiency required, a lot of issues arise in engineering ethics.

***Computer failures*:**

Failures can occur due to either hardware or software

Hardware errors do not occur frequently.

Software errors are the major failures of the computers.

Hardware errors are easily detected.

Software errors are difficult to detect.

Trial runs are absolutely essential to check the program.

***Computer Implementation*:**

New computer system should be attempted successfully before the old one becomes inoperative. Many failure cases have been reported while switching over to a new system.

*3. **Health Conditions*:**

Ergonomic conditions should be implemented to reduce back problems, provide wrist support, to become good looking.

26. Give one argument each for and against Weapons Development?

Weapons Development is a **defensive measure** against greater destruction by political adversaries, terrorists and enemy states.

They are **devices to kill** human beings, innocent civilians or equally unwilling soldiers on the other side.

27. What should engineers do in taking part in Weapons development?

Engineers need to examine one's conscience to take part in any form of weapon development.

They have to consider the circumstances leading to the specific conflict and decide whether it is justified to take part in associated weapons development.

If necessary, they should refuse to be a part of it and be prepared to face consequences.

How much is being spent in Defence expenditure and how Arms Trade gets promoted by private manufacturers of arms?

Hundreds of billions of dollars, annually, throughout the world, are being spent for military operations.

25% of this is spent on just procurement of weapons.

17% of these are spent in transactions across countries

Promotion of Arms Deals:

Krupp, a family of successful arms merchants and manufacturers

Armies and navies invested in Krupp's nickel steel armour

Then Krupp made chrome steel shells that can pierce nickel leading to further investment by military.

Then they made a high-carbon armour plate that can resist the new shells resulting in more orders

Then Krupp again produces, 'capped shot' with explosive noses which can pierce through the high-carbon armoured plate also

Arms deals continued to flourish

Vickers and Schneider-another arms manufacturer

Supplying arms to Chinese, Japanese and Russians

Pointing out the growth of the Japanese navy to Chinese

Pointing out the growth of the Chinese to their rivals, Russians

Russia – Japanese war in 1905 was useful for the cause of arms manufacturers. Russians lost the war, hence ordered fresh arms for rehabilitation

Japanese won the war, but were upset since terrible bloodbath was caused by Russians machine guns on land.

29. Describe the destructive nature and power of weapons and their development?

Towards the end of World War II, night raids sometimes on civilian areas were very common

The deaths caused by Atom bombs on Hiroshima, Nagasaki were not more than the deaths caused by single air raids in World War II

But they were horrible because of their power in rapid delivery of destructive power in immense concentration

Hiroshima Bomb – equivalent to 20000T of TNT powder carried on 267 bogies of railroad (2 miles long) for one bomb – again equivalent to 740-B52 bombers to carry this load.

USSR exploded Hydrogen bombs in 1960 – 50 & 60 mega ton range for tests with capabilities such as:

2000 to 3000 times powerful than Hiroshima bomb

4000 to 6000 miles long train required to carry an equivalent amount of TNT powder which will take 100 hours to pass any point

Will require one and a half million planes +(bombers) to carry the powder

USSR had 5800 megatons (9500 warheads on 2700 launchers) and
USA had 3300 megatons (10800 warheads on 2000 launchers)

Illustrate the involvement of engineers in Weapons Development with examples.

Bob is employed by a firm manufacturing anti-personnel bombs. These bombs tie up much of the enemy's resources in treating the wounded who survive its explosion (by showering its fragments on to the victims). Though he does not like to be involved in bomb mfr., he justifies himself that someone would have to mfr them. If he does not, then someone else will. Of course, his family also needs a steady income.

A chemical engineer, Mary, got into napalm mfg when she was promoted. She does not like wars, but she feels that govt. knows better about international dangers. She also knows that if she continues doing well in her job, she will again be promoted to work on a commercial product.

Ron is a specialist in missile control and guidance. He knows that he was one of the engineers instrumental in keeping any potential enemy in check through his work. At least, there is enough mutual deterrence for a third world war.

Joanne is an electronics engineer working also on avionics for fighter planes that are sold abroad. She does not want these planes to be sold to hostile countries. Since she does not have any say on who should be their customers, she even alerts occasionally her journalist friends with information about her work which she feels all public should have.

Anyone who is involved in weapons development should be very clear as to his/her motives for being in the industry.

31. What are the Problems of Defense Industry in brief?

Large military build-ups, massive projects all lead to unethical business practices and the urgency of completion of the weapons projects does not allow proper controlling and monitoring.

'Technology creep' – development of cruise missiles alters diplomatic arrangements

The impact of secrecy surrounding any defense activity

Overall effect of defense spending on economy

32. Explain the problems of defense industry with examples.

Large military build-ups: $2 billion cost overrun on the development of C5-A cargo plane reported to the public by Ernest Fitzgerald due to poor operating efficiencies in defense industry. He pointed out how large suppliers felt secure in not complying to cost-cutting plans but small contractors were willing.

> *25% firms hold 50%of all defense contracts and 8 firms conduct 45% of defense research.*

Technology creep: The arms are not only growing in size, it is also becoming better. The development of a new missile or one that can target more accurately, by one country, can upset or destabilize a diplomatic negotiation. Sometimes this fad for modernization leads to undesirably consequences. The F15 fighter planes were supposed to be fastest and most maneuverable of its kind but most were not available for service due to repairs, defects and lack of spares. Engineers should be beware of such pitfalls.

Impact of secrecy: Secrecy poses problems to engineers. Engineers should be aware of the answers to the following questions:

> *Should discoveries of significance to military be informed to govt.? Can they be shared with other researchers, in other countries? Should they be withheld from the scientific and public community? Will the secrecy in weapons development will also serve to hide corruption or their mistakes in defense establishments? Can secrecy help the promotion of weapons systems without criticism or interference from outsiders?*

Effect on economy: Every dollar spent on defense produces less jobs than what could be provided for by using the resource on other neglected sectors such as education and road development. May be a changeover by training defense engineers to use their designs, processes and techniques to bring about better, competitive civilian products is what would be the most appropriate thing to do now.

33. What are the difficulties in Decommissioning Weapons?

Even now, shells (duds or live) which landed about 90 years back during World War I are found by farmers during ploughing. Special bomb disposal squads are being kept busy with hundreds of calls.

There are, still more, unexploded and hidden bombs allover the world that fell during World War II

Severed limbs and dead bodies are being discovered in lands filled with mines in Cambodia and Vietnam in 1960s and70s.

Anti-personnel weapons are found in Afghanistan, Angola, Bosnia, Mozambique, Nicaragua and Somalia.

These weapons are easily spread by air but are very difficult and dangerous to detect and remove.

About 100 million landmines remain still scattered in the above countries as per estimates by U.S.State dept.

Landmines present a serious ethical dilemma to leaders who want to be ethical in wars also

Design, mfr, deployment and eventually their disposal is a huge experiment.

Widespread ignorance on radiation amongst the public

Gas warfare experiments, Anthrax carriers, nuclear weapons all cause both known and unknown problems

Engineers dealing with dangerous material should consider both the intended use and also the unintended consequences and also their disposal.

34. Which studies are more useful to 'engineer managers' than even engineering?

Richard L.Meehan, a civil engg graduate from MIT, was retained by General Electric as a consultant to testify before Nuclear Regulatory Commission about the capability of GE's nuclear plant in California, U.S.A. to withstand earthquakes.

He found, while trying to understand the effect of earthquakes on nuclear plants, that

His basic study of physics is more useful in studying this area compared to the more advanced studies in engg.

His understanding of risk analysis was based not only on probability theory but also on value judgement about safety.

But more interesting was that understanding people was more important than anything else.

Person oriented skills are as important to engineers as technical skills.

Why managements prefer to make engineers as managers than non-engineers? / Why engineers find management positions attractive?

Engineers undergo the *most intensive technical training* amongst professionals. But still, many of them move to managerial positions early in their career for which they received no training.

Organisations find it easier to *teach the business side to engineers* than teaching engineering to non-engineers.

They also value the *quantitative analysis, strong work-ethics, and confidence in problem solving* exhibited by engineers.

Engineers also prefer the management attractive, since career in management offers *better recognition* than technical track.

'Managers' responsibility is to conduct business to increase profits'. Discuss.

Nobel laureate Milton Friedman said '*The social responsibility of business is to increase its profits……. The responsibility of managers is to conduct business in accordance with their stockholders' desires, which generally will be to make as much*

money as possible while conforming to he basic rules of society, both those embodied in law and those embodied in ethical custom'

The ethical custom refered by Friedman means only 'refraining from fraud, deception and corruption.

But Martin and Schinzinger say that Friedman is not correct in saying that managers' ethics reduce to only responsibility to maximize profits for stockholders.

The primary responsibility of managers is to produce product or service while maintaining respect for persons, including customers, employees and public.

Ethically, personnel and safety comes first before profits.

By definition, compared to charitable institutions, religions, organizations, etc organizations and corporates operate only for profits.

But the ultimate goal of managers should be to make valuable products that are also profitable since profit making is one of the conditions to be in business.

Good business and sound ethics go together. Hence the moral roles of managers and engineers are complementary and not opposed.

Engineer managers have two major responsibilities – promoting and ethical climate and resolving conflicts.

Explain how Ethical Climate is promoted in organizations through examples.

There are highly ethical organizations, examples of some of which are given below:

Marilyn Hamilton, founded Quickie Designs in 1980, who was a teacher and athlete who was paralyzed in hang-gliding accident. A highly mobile and versatile wheel chair was designed weighing 26 pounds, half the weight of chairs that were currently produced. The company grew up within a decade to $65 millions in sales. It had a policy of customer sponsored sports events for young people in wheelchairs. It is relatively small (500 strong) and exceptionally committed.

Martin Mariette Corpn began an ethics program in 1985 emphasizing basic value like honesty and fairness and responsibility for environment and high product quality. They drafted a code of conduct, conducted and ethics workshop for managers and created effective procedures for employees to express their ethical concerns.

Texas Instruments (TI) is an example of an ethical large corporation emphasizing on trust, respect for other persons, etc. TI appointed a full time Ethics Director, Carl Skooglund. He surveyed to know the ethical concerns of employees and their awareness. He conducted workshops on ethics, wrote brochures and was directly to all employees through a confidential phone line. Even though they made it clear that unprofessional conduct would not be tolerated, the focus was on supporting ethical conduct than punishing wrong doers.

A large defense contractor started an ethics program that was not successful. Higher management viewed the program as a success but the professional employees considered it as a sham/farce for public relations and window dressing. The primary

difficulty was the gap between the intentions of top management and the unchanged behaviour of the Senior managers.

What steps can be taken to improve the ethical climate by managers?

Ethical values and their full complexity are widely acknowledged and appreciated by managers and engineers. Neither profits nor promoting the interests of the organization is neglected but the *moral limits* on profit-seeking *go beyond simply obeying the law* and avoiding fraud.

The sincere *use of ethical language* is recognized as a legitimate part of corporate dialogue. This is done either by formulating corporate code of ethics or by including ethical responsibilities in job descriptions at all levels.

Top management must *set a moral tone*, in words, in policies and by personal example. Everyone should be confident that management is serious about ethics.

There must be *procedures for conflict resolution*. Managers should be trained to resolve conflicts and on the other hand, a person should be exclusively made to have confidential discussions about moral concerns.

What are the most common conflicts?

Conflicts over schedules, depending mostly on support depts. but where managers do not have any control.

Conflicts over which is the most important dept or function at a given time

Conflicts over personnel resources

Conflicts over technical issues

Conflicts over administrative procedures

Personality conflicts

Conflicts over costs

Can conflicts be managed by force or authority? How are different conflicts resolved?

'I am in-charge - see it my way or I will fire you'. This is generally perceived as self-defeating.

Conflict arrangement sometimes means tolerating and even inviting some forms of conflict

Manager's task is to create climate in which conflicts are addressed constructively

Personality conflicts are ranked relatively low in intensity but they are most difficult to resolve.

They are generally woven with technical/communication problems

Properly managed technical and ethical conflicts are usually fruitful and not harmful. Differing views provide opportunity for improved creativity.

What are the 4 ways to resolve conflicts among persons suggested by Harvard Negotiation Project?

People: Separate people from the problem.

Even though both the people and the problem are important, the personal aspect of the conflict should be separated from the problem to deal with it better. On personality clashes, the focus should be on behaviour and not on people.

Interests: Focus on interests and not position\s

This principle applies most clearly to personnel matters and ethical views, rather than technical disputes. Positions are stated views but these may not really express their best interests.

Options: Generate a variety of possibilities before deciding what to do.

Create a wide range of options especially in technical and ethical issues and facilitate discussions.

Criteria: Insist that the result be based on some objective standard.

Beyond the goals of efficiency, quality and customer satisfaction, it is important to develop a sense of fair process in how the goals are met.

What is the nature of work for Engineers as Consulting Engineers?

Consulting engineers work in *private practice*.

They earn by getting their *fee for services* rendered.

They have greater *freedom in decision making* compared to salaried employees.

But they also *have a need to earn* a living.

What are the major areas of work for engineer consultants?

Advertising

Competitive bidding

Contingency fees

Safety and client needs

'Advertising, once thought to be unprofessional has now been accepted by law' – Explain.

Before 1976, advertising was thought to be '*unprofessional*', in U.S.A. The state felt that work should be won *through reputation* as engineer and *not through advertisement*. But in 1976, Supreme Court ruled that

Ban on professional advertising is an *improper restraint*

It *reduces* public *awareness* of available professional *services* They keep *prices higher* than they might otherwise.

Now the focus has been shifted to restrain *deceptive advertising* which is done through:

Outright lies

Half-truths

Exaggeration

Making false suggestions or implications

Obfuscation (confusion or not being clear) created by ambiguity, vagueness

Manipulation of the unconscious

When is advertising considered to be *deceptive*?

***Example 1*:** A consulting firm played actually a very minor role in a well-known project

Situation 1: Its brochure claims that it played a major role

Situation 2: It makes no claim but only shows the picture of the project

Situation 3: It shows the picture along with a footnote in fine print the true details about its role in the project

Situation 4: If the same statement is printed in larger type and not as footnote.

***Example 2*:** An ad shows an electronics device to convey that the item is routinely produced and available for sale. But actually the ad shows only the prototype or mock-up and the item is just being developed.

46. What are the norms to be followed by ethical consultants in advertising?

Generally consumer products can be advertised suppressing the negative aspects and even some exaggeration is allowed.

But *advertisement of professional services* like engineering services is governed by strict norms.

NSPE forbids the following:

"the use of statements containing a material misrepresentation of fact or omitting a material fact necessary to keep the statement from being misleading; statements intended or likely to create an unjustified expectation; statements containing prediction of future success; statements containing an opinion as to the quality of the showmanship including the use of slogans, jingles or sensational language format."

Some degree of solicitation may be useful in encouraging healthy competition

Or will it open the door to people who are not honest, who criticize unfairly or who exaggerate the merits of their services?

In any case, restrictions on misleading advertisement are a must.

Why was Competitive Bidding prohibited earlier and then why was it approved by courts?

Competitive bidding was prohibited for quite sometime due to the following reasons: Consulting jobs, unlike industrial and construction work, are not suitable for precise cost estimates and hence precise bids.

Here competitive bidding, would encourage cutting safety and quality, in case of lower bids and padding/over designing in the case of higher bids.

Later, Competitive bidding was approved by Courts of law on the reasoning that free trade is restrained in an unfair manner.

When consulting engineers reject competitive bidding, what can be the basis of their selection?

Consulting engineers, in the absence of competitive bidding can be selected only based on their reputation and proven qualification. But younger, competent engineers may be disadvantaged by this method.

49. What is your understanding of Contingency Fees?

Contingency fee is dependent on some specific conditions beyond normal, satisfactory performance in work.

A client may hire a consultant engineer to find methods of cost saving on an ongoing project to save a minimum of 10%. If consultant saves 10%, he will get his fee; otherwise no fee will be paid. The fee can be either an agreed amount or a %age of savings.

When the fee is a %age of saving, it becomes ‘contingency fee’. In many cases, consultants tend to be biased and in order to gain the fee, they may specify inferior design or process to cut costs.

50. How does NSPE address the issue of ‘Contingency Fee’?

NSPE has addressed this issue as follows:

“An engineer shall not request, propose, or accept a professional commission on a contingent basis under circumstances in which his professional judgement may be compromised, or when a contingency provision is used as a device for promoting or securing a professional commission.”

51. When does the ‘contingency fee’ become permissible?

To decide whether ‘contingency fee’ practice may be allowed or not, the potential gains should be weighed against the potential losses. Hence, this again calls for contextual reasoning based on ethical theories, which provide a framework for assessing morally relevant issues of the problem.

How ‘Safety and client needs’ should be addressed by consulting engineers?

Consulting engineers have greater *freedom with wider areas of responsible decision making* compared to salaried engineers.

This creates *special difficulties* for consulting engineers.

In ‘*design-only*’ projects, consultants do not have any role in the construction or implementation as per the design specs.

Ideally, only the designer would really know the areas of difficulty in execution.

Even when changes in design are required during execution, the consultant may not be around to effect the changes

Client may not have capable people for inspection of the work based on the consultant's design.

Does the consultant have a moral responsibility to follow through the design in execution

In any case, job safety is one prime responsibility of the consultant engineer

What are the reasons that cause 'Disputes'? Who is the major loser in any dispute?

Large projects involve owners, consultants and contractors and many participants at various levels in these three organizations.

Overlapping responsibilities, fragmented control, delays and inability to resolve disputes are some of the problems encountered during these projects.

Resolving disputes becomes especially difficult when projects last for several years and connected personnel also change during this period.

Owners have the most to lose in such situations.

Hence they try to shift the risks to others.

Consulting engineers are generally tied to the contract provisions and they do not try any innovative ideas (do not want to add risks)

All this have led to considerable litigation and any litigation is time consuming and costly.

What are the steps to be taken resolve disputes?

Define how risks are to be apportioned and payment of fees to be made

Make contractual provisions for dispute solving vehicles to avoid legal battles in lines of mediation – arbitration

Mediator attempts to resolve first and if it fails, the arbitrators' decision should be final.

National Joint Board for settlement of Jurisdictional Disputes will be called to provide a leaking board and appeals board.

The Consulting Engineer, from the "social experimentation" nature of engineering, has the obligation to include such clauses in contracts and should make sure that these clauses are adhered to by all.

What is the work done by Engineers as Experts?

Engineers, in their position as experts, explain the *happenings of the past in terms of* Causes of accidents, malfunctions of equipment and other technological events. They also help in *events of* the *future* like, public planning, potential of patents and policy making (in technology)

56. How should Expert Engineers function?

They should function as impartial seekers of facts & Communicators of truth but not as hired guns i.e. advocates for lawyers, officials, etc

What are the types of cases, expert witnesses are called upon to testify in court & what are the stakes?

57.1. Types Of Cases

I. Airplane crash
II. Defective products
Personal injury
IV. Property damage
V. Traffic accident

57.2. Stakes

I. Legal liabilities
II. Economic interests
Reputations of corpns. and professionals

What are the Expert engineers' responsibilities towards their hirers?

They should

Present their qualifications to the client

Investigate thoroughly the cases entrusted to them. Testify in court

How should the expert witness exhibit one's '*confidentiality responsibility*'?

The expert witnesses must

Not divulge their investigations *unless called* upon to do so by the court

Not volunteer evidence *favourable* to the *opponent*

Answer questions *truthfully* when opposing attorney puts forth pertinent questions But he should not *just be the client's mouthpiece*.

What are the *aims of a legal system?*

Aims Of A Legal System is

To *administer a complex system* of legal rights that define legal justice *achieved* through *adversarial relationships*, with rules about *admissible forms of evidence* and *permissible forms of testimony*

What is the role of an expert in a court system consistent with *Professional standards (codes of ethics)?*

Role of an Expert in a Court System

Experts must earnestly try to be *impartial* in identifying and interpreting complicated data thrown up by the complexity of modern science and technology *to help the courts*

Ideally, *if courts pay* the expert witness, the expert will become totally *unbiased*. But it is a very costly issue

So parties to the dispute are called upon to pay and hire them on both sides and also allow them to be cross examined by both sides

What is the difference between *Eye witness* and *Expert witness*?

Eye Witness

Is permitted to testify on *observed* and to some extent perceived facts.

Expert Witness

Is permitted to testify on *facts, perceptions and interpretations* of facts in the *area of their expertise*

To comment on opponent's expert witness' view

To report on applicable professional standards

What are the types of abuses of Engineers as Expert witnesses?

Expert witnesses are abused in the following ways:

Hired Guns

Financial Bias

Ego Bias

Sympathy Bias

64. Write short notes on: a) Hired Guns, b) Financial Bias, c) Ego Bias and Sympathy Bias **d)**

a) Hired Gun

An *unscrupulous* (unprincipled, crooked, immoral) engineer

Makes his *living* by helping lawyers to *portray facts in favour* of their clients

Never tries to be *objective*

Violates standards of honesty and care in conducting investigations

Overall a *shame on engineering community*

Financial Bias

The expert witness is biased to the party which pays more money

The bias increases substantially when payments are agreed as *Contingency Fee* to be *paid only* in case the *hirer wins the case*

Full time forensic engineers, being *dependent on lawyers for their living*, try to create a *reputation of a winning engineer*.

Ego Bias

Competitive attitudes, being on one side of the disputing parties makes an expert, *egoistic* and makes him *influence judgments*

They start *identifying themselves with* their side of the *dispute*

Sympathy Bias

The *plight* of the victims and their *sufferings* can *invoke sympathy* from the expert witness

This *upsets impartial* investigation of facts

What is needed of the Expert Engineers?

Engineer Experts should *maintain their integrity* in the face of all the above biases

Courts also must rely on balance provided by expert witnesses on *both sides* of the case and provide *opportunities* to lawyers to *remove the bias* by cross-examination

What is the work of Engineers as Advisers?

Engineers act as Advisers in Planning and Policy-Making like Economists, sociologists, urban planners, etc.

In Policy-Making they advise about the Cost benefit analysis of alternate solutions for transport, housing, energy, defense, etc.

In Planning they check the feasibility, risks and benefits of the specific technological projects which affect public in local communities

67. What are the Stakes for the engineer advisers?

Their stakes are:

Opposing political views

Social perspectives

Economic interests

And their individual values

like, Honesty

Public trust

Respect for common good

68. How should Engineer advisers act?

Advisers are to:

Chart *all realistic* options

Carefully *assess each* under different assumptions *about future* contingencies

Act *favourable to the client* by basing their studies on particular assumptions about future contingencies

What are the factors that influence Advisers?

Advisers are influenced by:

Large amounts of money involved

Direct and overt (obvious and unconcealed) pressure applied by pro or anti-people involved in that project

Hope of additional work in future

Their wish to get the respect of clients

What are the normative models of Advisers? Briefly explain each of them.

Normative Models of Advisers

Three types:

Hired Guns

Value Neutral Analysts

Value Guided Analysts

Hired Guns – This is the most undesirable role that can be played by the adviser.

Here the obligation to clients only is paramount and other values are not bothered about. Studies are made just conforming to the client's wish.

Adviser highlights only the favourable facts to the customer.

All the unfavourable facts are very much downplayed.

Value Neutral Analysts

Completely impartial engineers.

They identify all options and analyze factual issues of each option.

Cost-benefit analysis are made based on value criteria specified and made public

Value Guided Analysts

Responsibility to public paramount

Maintain honesty about technical facts and values

They can adopt partisan views for the good based on their professional judgment

71. What are the virtues of independent expert advisers?

Virtues of Independent Experts

Honesty- avoiding deception, being candid in stating relevant facts and truthful in interpreting facts

Competence- being well trained, adequately experienced in the relevant field and having relevant skills

Diligence- carrying out tasks carefully and promptly

Loyalty- avoiding conflicts of interest, maintaining confidentiality and concern for the interests of the client

List the roles of engineers as 'leaders'.

Engineers perform as *Leaders* in the roles of

Managers

Business Entrepreneurs

Consultants

Academics and

Govt officials.

73. What is leadership and who are moral leaders?

Leadership is *'Successfully moving a group towards its common goal'*.

But Moral leaders are those who move the group successfully *towards goals which do public good* and not evils i.e. the *goals must be 'morally valuable'*. Hence ***Moral Leaders*** can be defined as,

'The individuals, who direct, motivate, organize, creatively manage and move groups toward morally valuable goals'

'Technologists were best qualified to govern because of their technical expertise'. Discuss in detail.

Mussolini and Hitler were great leaders, but not 'Moral Leaders', since their goals were not morally valuable.

'An Utopian society shall be governed by a philosopher-king whose moral wisdom best qualifies him to rule' – *Plato*

'Technologists were best qualified to govern because of their technical expertise, as well as their logical, practical and unprejudiced minds'– *Frederick Taylor*

But no single profession has the only right to moral governance of society. Leadership is also moving away from any narrow professional interests.

Moral leadership is not 'dominance by elite', but stimulating groups toward morally desirable ends.

Explain *Moral Creativity*.

Moral creativity is

Identifying most important *values in particular situations*

Focusing on them through *effective communication* within the group.

Deep commitments *grounded in integrity* to implement them.

Creativity consists in *identifying new possibilities* for applying, extending and putting into practice, *rather than inventing values*.

76. How participation in Professional Societies will improve moral leadership?

Professional Societies

Promote continuing *education* for their members

Unify the profession, *speak and act* on behalf of them

Are a forum for communicating, organizing and mobilizing change within, a change which *has a moral dimension.*

Cannot take any *pro-employee or pro-management* stand since they have members in management, supervision and non-management.

But they can play a *role in resolving* moral issues

A moral responsibility as well as moral creativity is shared.

How can individuals *make a difference in leadership* of Professional Societies?

Stephen H. Unger, as an individual was mainly responsible for persuading IEEE to focus on supporting responsible engineers than punishing wrong doers. He was instrumental in IEEE presenting awards to the three BART engineers.

In 1988, NSPE created National Institute of Engineering Ethics with a mission to promote ethics within engineering. The focus was on education rather than propaganda.

But effective professional activity, requires a substantial trust from clients and the public.

Building and sustaining that trust is an important responsibility shared by all engineers.

- In this area also Moral Leadership within professional societies is important.

Write short note on 'Leadership in Communities'.

Leadership responsibilities of *engineers as citizens go beyond those of non-engineers.* They should *provide* greater leadership in social debates about

Industrial Pollution

Automobile Safety

Disposal of Nuclear Waste, etc.

79. What are the different views on 'leadership in communities'?

One view is that *no one is strictly obligated* to participate in public decision making. It may be a moral ideal for citizens.

An opposite view is that *all are obligated* to devote sometime and energy in public policy making.

Non-engineers should at least *stay informed* about public issues and *professionals have obligations* as experts in their areas.

Hence the need for identifying and expanding areas of possible good.

What are the arguments for and against Voluntary Service by engineering professionals?

Should engineering professionals offer engineering services to the needy, without charging fee or at reduced fee?

Voluntarism of this kind is already encouraged in Medicine, Law and Education.

But ABET code states "Engineers shall not undertake or agree to perform any engineering service on a free basis" and other codes also insist that engineers are obligated to adequate compensations (which means full fee)

Engineers find it difficult to donate their services individually compared to doctors and lawyers since their output is on a shared basis

But, as suggested by Robert Baum, engineers can volunteer their services in the following areas, in groups, either free or at cheaper than normal fee.

Environmental impact studies that is harmful to a community Health issues of polluted water and soil

Minimal needs of elderly and minorities like running water, sewage systems, electric power and inexpensive transportation.

What can engineers and engineering society do to public in terms of 'voluntary service'?

Engineers can

Urge Govt. to expand services of the Army Corps of Engineers

Encourage students to focus their projects on service for disadvantaged groups

Encouraging corporations to cut their fee by 5 to 10% for charitable purposes.

Morally concerned Engineering Profession-

Should recognize the rights of corporations and engineers to voluntarily engage in philanthropic engineering services.

Professional societies *should endorse* voluntary exercise as a *desirable ideal*.

Many engineers and some societies already are engaged in

Tutoring disadvantaged students

Advice local governments on their engineering problem.

******** ALL THE BEST*******

HUMAN VALUES & PROFESSIONAL ETHICS

Understanding the need, basic guidelines, content, process for Value Education

Need for Value Education:

- All the human beings continuously aspire for a happy life, a fulfilling and successful life, and the purpose of education is to provide adequate competence to actualize this aspiration.
- For this, first of all it is essential to understand- what is really VALUABLE for human being, and, what is really conducive to a happy and fulfilling life? - this is the VALUE DOMAIN

Then it is essential to know – How to actualize it? How to make it happen? – this is domain of SKILLS

The subject which enables us to understand 'What is valuable' for human happiness is called 'VALUE EDUCATION'.

Thus, Value Education enables us to understand our needs and visualize our goals correctly and also indicate the direction of their fulfillment.

The value of any unit in this existence is its participation in the larger order of which it is a part e.g. value of a pen is that it can write. Here writing is the participation of the pen in the bigger order in which pen, paper, human being, all are present.

Let us look at different aspect to appreciate the need for value education

- Correct identification of our aspiration
- Understanding universal human values to fulfill our aspiration in continuity
- Complimentary of values and skills
- Evaluation f our belief
- Technology and human values

Basic Guidelines for Value Education

- Universal – applicable to all human beings
- Rational – not based on blind belief
- Natural and Verifiable
- All Encompassing – aimed at transforming our consciousness and living. It cover all dimensions of our living – thought, behavior, work, and understanding as well as all levels – individual, family, society and nature.
- Leading to Harmony

The Process of Value Education

The process of Value Education has to be that of *Self Exploration,* and not of giving sermons or telling dos and don'ts. What ever is found as truth or reality may be stated as proposal and has to be verified at the own right.

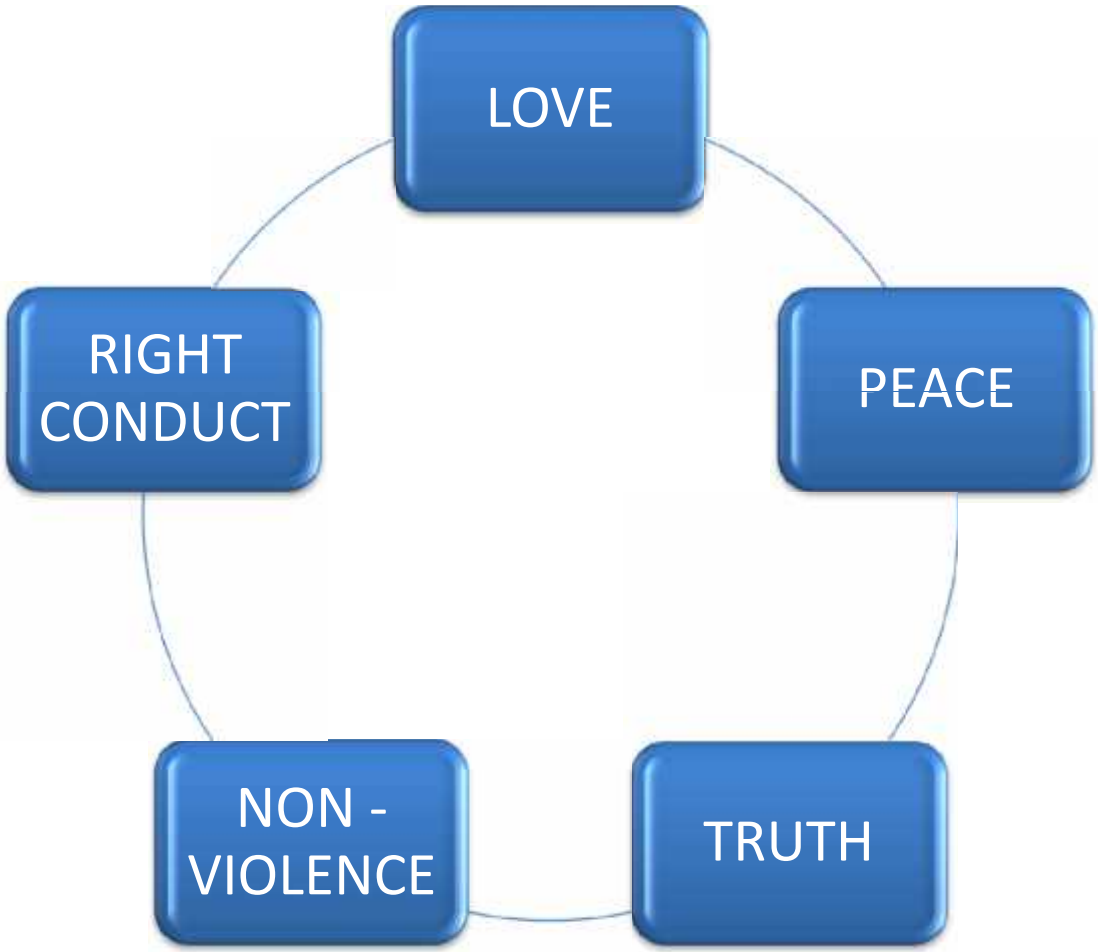
- It is process of dialogue between ' What you are' and ' What you really want to be'.
- It is a process of knowing oneself and through that knowing entire existence.
- It is a process of recognizing one's relation with every unit in existence and fulfilling it.

This process of self exploration helps you be in harmony within yourself and in harmony with everything around.

Human Values Vs Moral Values

- Moral values regard matters of right and wrong whereas Human values help a person to distinguish between right and wrong.
- Moral values are constant and unchanging whereas Human values change from person to person and from time to time.
- Moral values are for self development and self discipline whereas Human values is about how we treat others in society.
- Moral values can be taught whereas Human values are inherited values and are intact in all of us.

Core Human Values

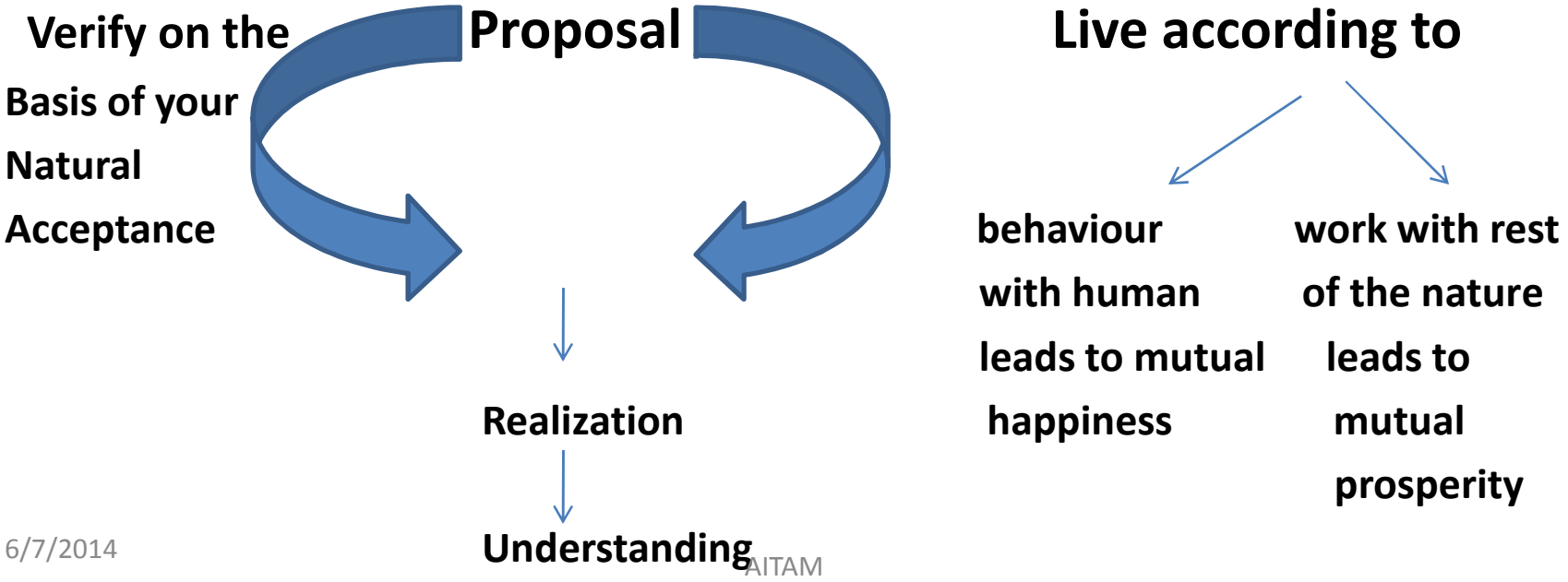


- Love: Unconditional and unselfish care
- Peace: Control the mind
- Truth: Indispensable ethical discipline
- Non- Violence: means respect for life and recognition of rights of others.
- Right Conduct: Truth in action is right conduct

" Thinking with Love is Truth, feeling wiyh Love is Peace, acting with Love is right conduct, understanding with love is non- violence."

Process of Self Exploration

-It is a proposal
. Don't assume it to be true
. Verify it at your own right
- Not on the basis of scriptures
- Not on the basis of reading from instrument
- Not on the basis of others
- Self verification



Basic Human Aspirations

We desire for many things in this world, say materialistic needs, respect, recognition, love, trust etc, but in the form of all these we aspire for true and continuous happiness and prosperity.

Happiness: " To be in a state of liking is happiness." " To be in a state of harmony is happiness."

Prosperity: Feeling of having more than required physical facility.

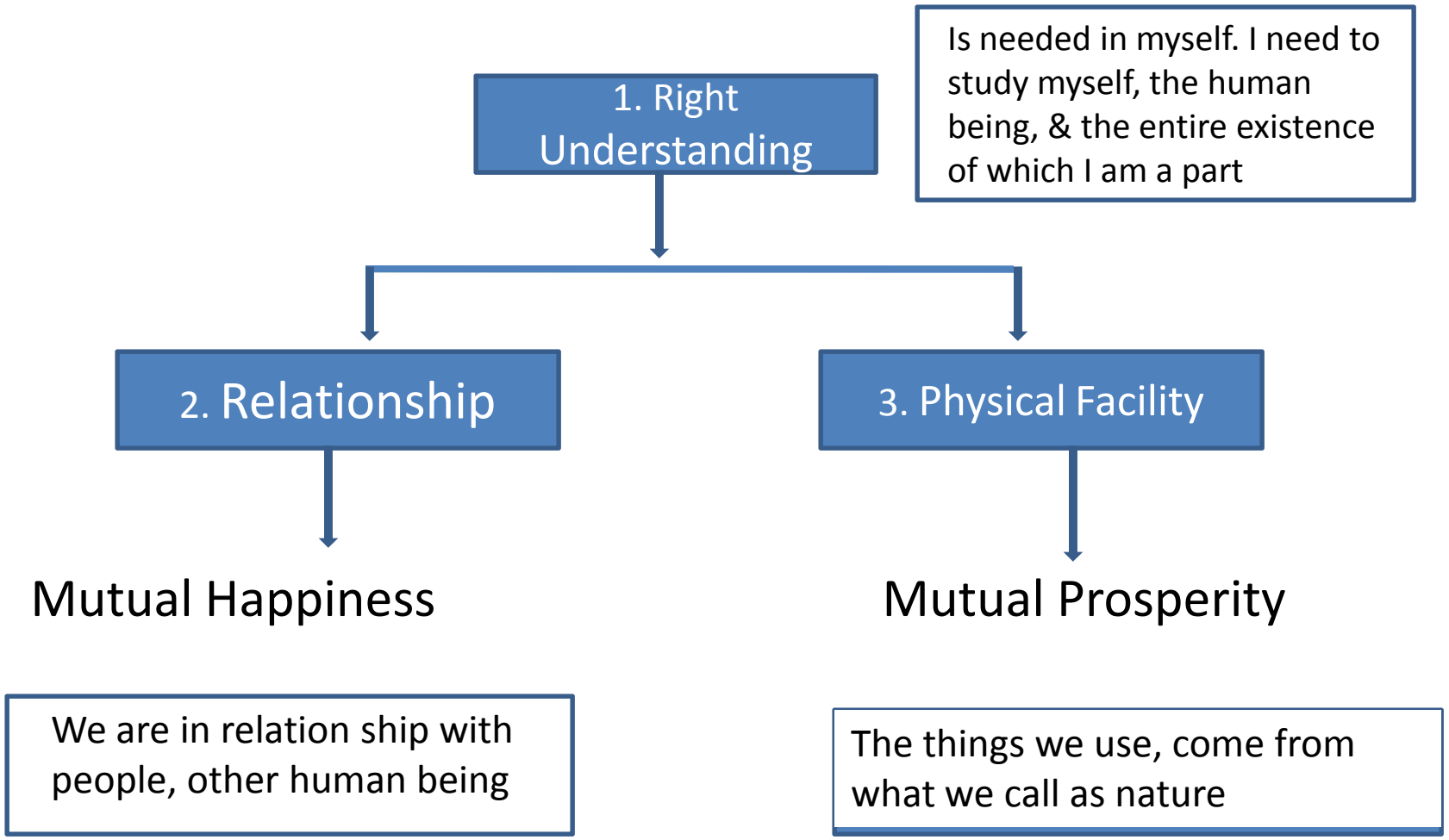
For prosperity two things are required –

1. Identification of the quantity required for physical needs &
2. Ensuring availability / production

List Of Wants

A big car	Take care of my parent
Happiness	A good laptop
A great House	Not get angry
Lot of Money	Knowledge
Respect	Become a politician
Good friends	Have a great food
A nice music system	Get good marks
Peace of mind	A good guitar
Do social work	Understanding the purpose of life
Satisfaction	Be healthy
Be loved	Protect nature

Basic requirement for fulfillment of human aspiration



Presently, as we look around, we find most of the people in the following two categories

- *SVDD – Sadhan Viheen Dukhi Darinda*
- *SSDD – Sadhan Sampan Dukhi Darinda*
- SSSS – Sadhan Sampan Sukhi Samridha

Before we explain these we should have a clear understanding of 'Desires'. Desires are of

1. Materialistic: Food, shelter, clothes and physical facilities which are quantifiable
2. Non- materialistic: It is qualitative in nature like respect, trust, happiness, recognition, peace etc

Where do we stand today

- *At the level of Individual:* rising problems of depression, psychological disorder, suicides, stress, insecurity, health problem
- *At the level of Family:* Breaking of joint family, mistrust and insecurity in relationship, divorce, legal suits
- *At the level of Society:* Terrorism, casteism, wars between nations, fear of nuclear and genetic welfare
- *At the level of nature:* Global warming, water, soil, air, noise pollution, resource depletion of minerals and oil, loss of fertility of soil

To live with continuous happiness and prosperity, the program is *'to understand & to live in harmony at all levels of our living / existence'.*

There are four levels of our living

1. *Self*
2. *Family*
3. *Society*
4. *Nature*

Continuous happiness is being in harmony within one self, being in harmony with others and being harmony with nature.

Understanding human being as the co-existence of the sentient 'Self' and the material 'Body'

Human =	**I (Self)** ⟺	**Body**
Need	(Respect, trust)	(Food)
	(Happiness)	(Physical Facility)
In Time	Continuous	Temporary
In Quantity	Qualitative	Quantitative
Fulfilled by	Right Understanding & Right feeling	Physico- Chemical Things (Food, Shelter etc.)
Activities	Desiring, thinking, selecting etc.	Eating, Breathing, etc
Activities	Knowing, Assuming, Recognizing, Fulfilling	Recognizing, Fulfilling
Type	Consciousness (Non- Material)	Material

The word 'Sentient' is defined as experiencing sensation or feeling.

The non- materialistic happiness needed for self is called SUKH while acquiring physical facilities can be called SUVIDHA.

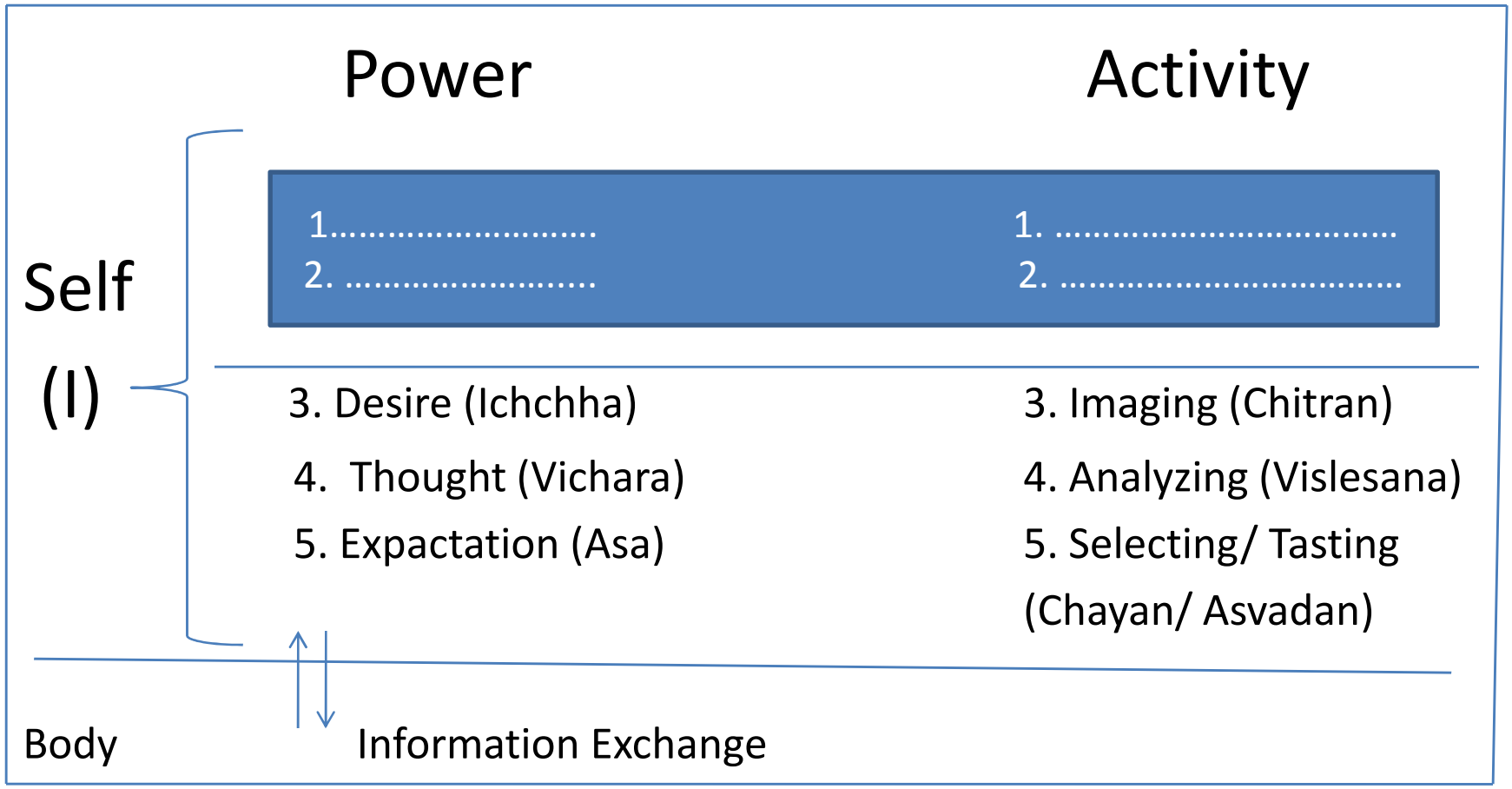
Distinguishing Needs of the self (I) and body

Needs	Related to Body	Related to 'I'
Nice looking car		
Car for transport		
Food		
Tasty food		
Trust		
Happiness		
Knowledge		
50 Lac Rupees		
Good health		
MBA		

Understanding the body as an instrument of 'I'

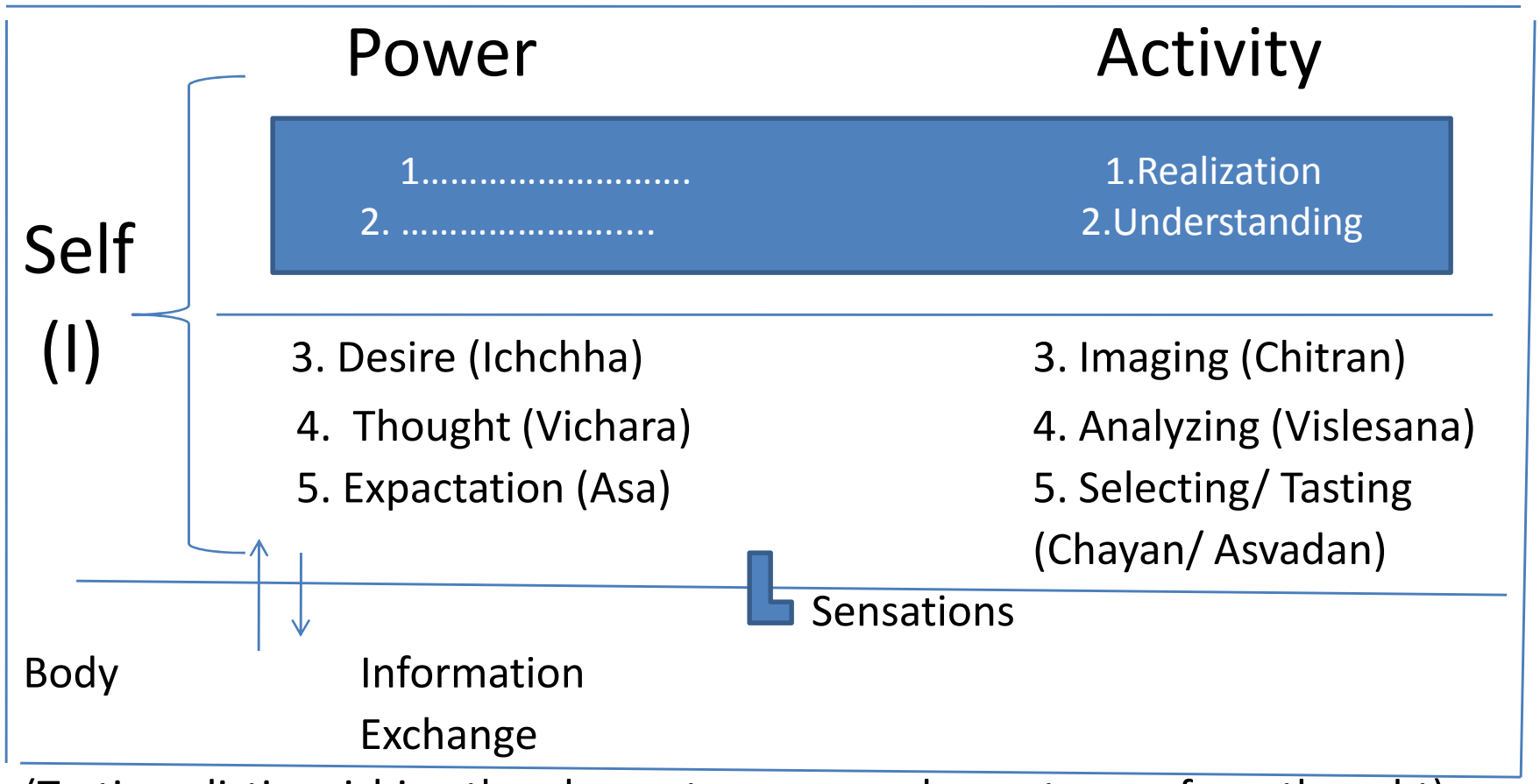
	I	Body
1	I am	My body is
2	I want to live	My body is used as an instrument (of I)
3	I want to live with happiness	For nurture of body ----> Food For protection of body ----> Clothing, Shelter etc For right utilization of body ----> Instruments/ equipments etc Are needed as physical facilities
4	To understand & to live in harmony at all 4 levels	Production, protection and right utilization of physical facilities is just a part of my program.
5	I am the seer, doer, and enjoyer DRASTA, KARTA, BHOKTA	Body is an instrument

Understanding Myself



Power is the basic capacity for that activity

How are the activities in (I) related



(Tasting: distinguishing the pleasantness or unpleasantness of any thought)

There are two possible flows of the activities, and both keep taking place.

From outside (the body) to inside (in 'I'):

- 'I' receives sensations from the body and this is tasted in 'I'
- Based on this taste, thought could be triggered
- Based on these thoughts, desire may be set

Ex: we may see a car

From inside (in 'I') to outside (the body):

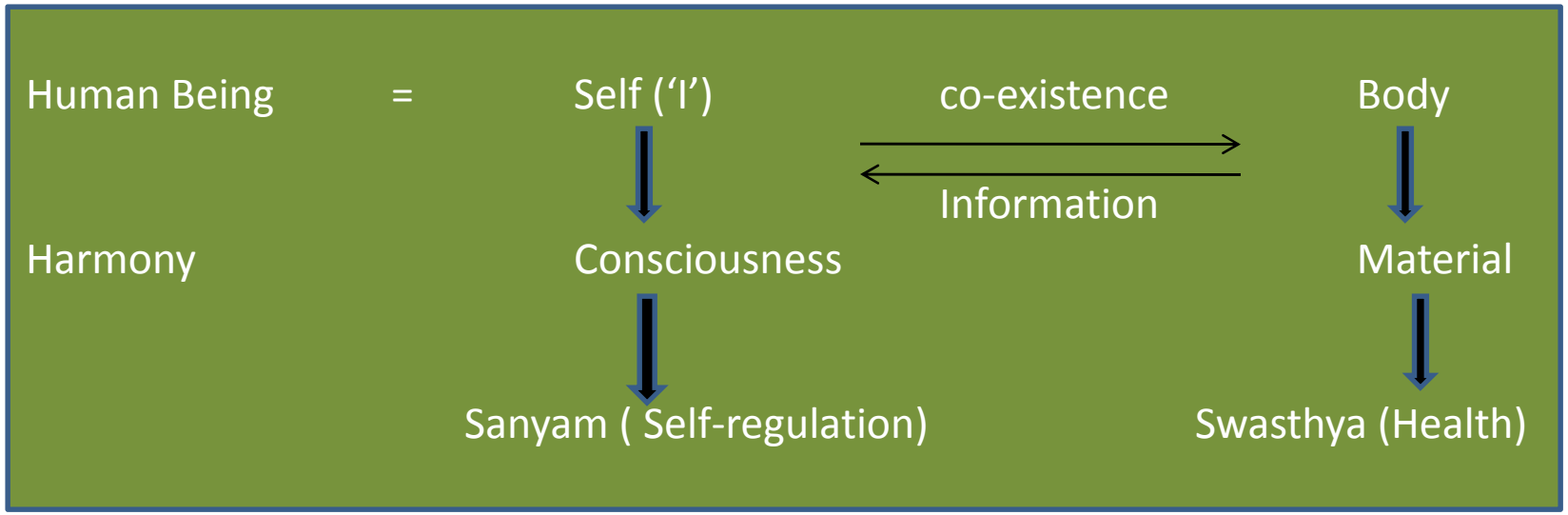
- We now have the desire of a good life via the car in us
- We start thinking about how to get a car, how we can have money, etc
- Based on that we make selection

Here these activities are operated on the basis Sensation, Preconditioning, or natural acceptance (listening to one's inner voice) .

If they are operating on the basis of sensation, preconditioning, I am dictated by others (PRATANTRA) and if they are operating on the basis of natural acceptance, I am self organized (SWATANTRA)

Understanding the harmony of 'I' with the body: Sanyam and Swasthya

The human body is a self- organised mechanism and made up of several organs and glands.



Sanyam: Sanyam is the feeling of responsibility in 'I' towards the body for its nurture, protection and right utilization

Swasthya: Swasthya has two elements – the body act according to me, and there is harmony in the body.

Program to ensure Sanyam and Swasthya

Sanyam: I take the responsibility of nurturing, protection & right utilization of body.

1. Nurturing of the body (POSAN)

- Ingestion (Grahan)
- Digestion (Pachan)
- Excretion (Nishkasan)

2. *Protection of the body (Sanraksahan)*

- Proper upkeep (Vihar) of the body
- Labour (Shram)
- Physical Exercise (Vyayam)
- Asan (Pranayam)
- Treatment (Upchar) of the body

3. *Right utilization of the body (Sadupyog)*

Swasthya: 1. The body is fit to act according to the self (I)

2. There is harmony among the various parts of the body.

Understanding the Harmony in the family and society

We live in a family. In family we have relationships where we interact with other human beings.

Family is the foundation of society, and provides the basis of continuity of human tradition on the earth.

Harmony in the family:

1. Relationship is - between I & I
2. There are feelings in relationship - of one I with other
3. These feelings can be recognized - they are finite
4. Their fulfillment and evaluation leads to Mutual Happiness.

These feelings (Emotions, Values) could be as follows:

1. Trust (Vishwas) ----> Foundation Value
2. Respect (Samman)
3. Affection (Sneha)
4. Care (Mamta)
5. Guidance (Vatsalya)
6. Reverence (Shraddha)
7. Glory (Gaurav)
8. Gratitude (Kritagyata)
9. Love (Prem) -------> Complete Value

All the feelings are already within you- understanding only makes you aware and once you are aware of it there is continuity of these feelings and you are able to fulfill them

Understanding the values in Human- Human relationship:

Justice (Nyaya) : Justice is the recognition of values in relationship, their fulfillment, right evaluation and ensuring mutual happiness (Ubhay- Tripti).

Thus there are four elements of justice: recognition of values, fulfillment, evaluation and mutual happiness ensured.

We want harmony at all levels of livings. Harmony in the family is the building block for harmony in the society. Harmony in the society makes an undivided society, which is the desire of each one of us.

Understanding the meaning of Vishwas : Differentiating between intention and competence

1. Trust: To be assured that the other human being wants to make me happy & prosperous.

Verify the following

1a. I want to make myself happy

2a. I want to make the other happy

3a. The others want to make himself happy/ herself happy

4a. The other wants to make me happy

What is the answer

1a. I am able to make myself happy

2a. I am able to make the other always happy

3a. The other is able to make himself always happy

4a. The other is able to make me always happy.

The first four questions are related to our natural acceptance i.e. intention and the next four to our competence.

"To be assured that the intention of the other is always correct is trust"

We generally evaluate ourselves on the basis of our intention and other on the basis of their competence.

If we have trust on intention, we have a feeling of being related to the other & we start helping the other to improve his competence, if he does not have.

2. Respect: Respect is right evaluation.

Need of 'I' is that 'I' should be evaluated as I am, I should evaluate others as they are. If I don't do this, it is disrespect.

Respect = right evaluation

Disrespect:

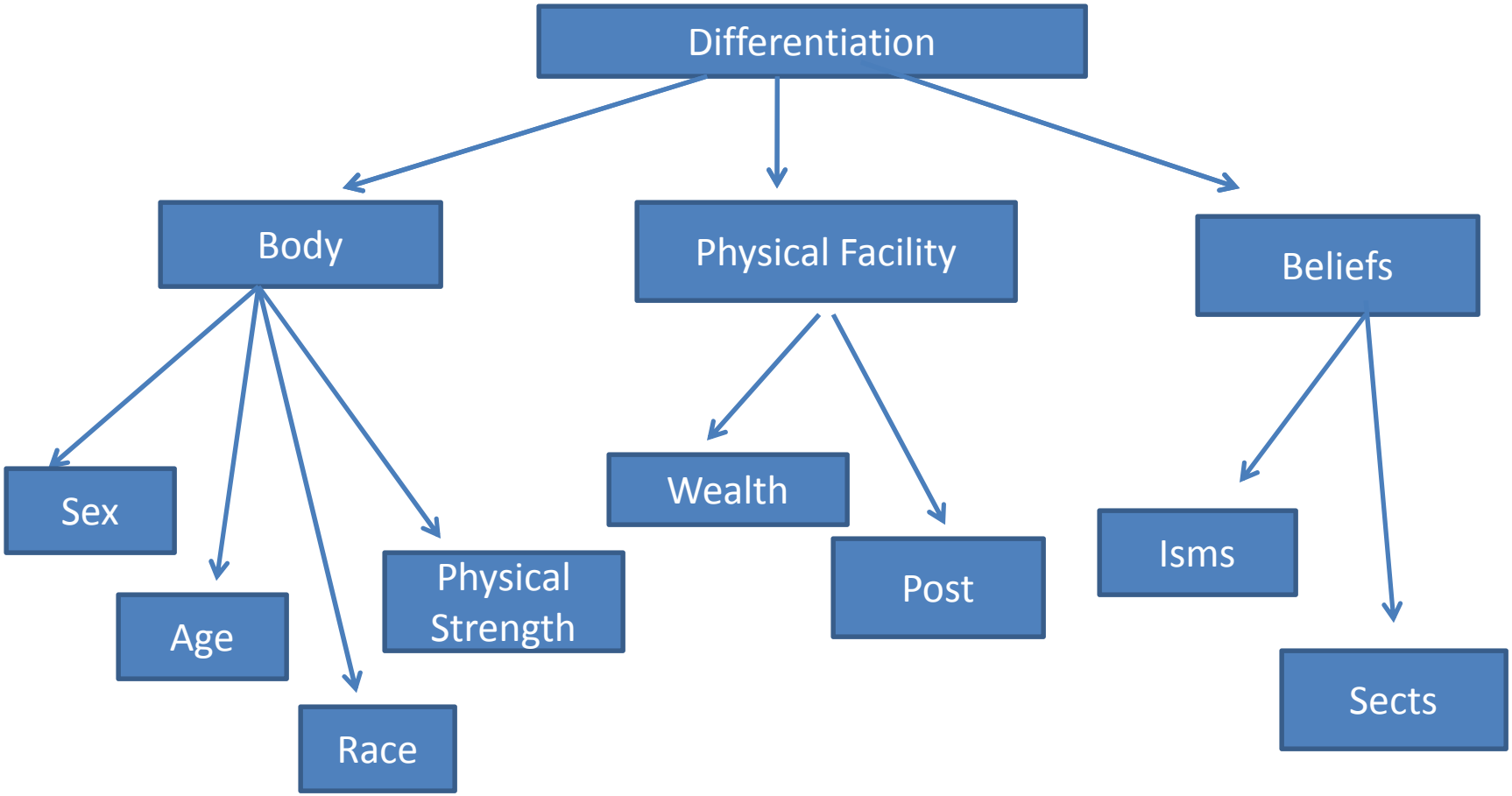
Over evaluation- To evaluate more than what it is

Under evaluation- To evaluate less than what it is

Otherwise evaluation- To evaluate other than what it is.

The other is similar to me and the difference could only be at the level of understanding.

Differentiation



3. Affection (Sneha): The feeling of acceptance of the other as one's relative (feeling of being related to the other)
4. Care (Mamta): The feeling of responsibility of nurturing and protecting the body of the relative.
5. Guidance (Vatsalya): The feeling of ensuring right understanding and feeling in the 'I' of the relative.
6. Reverence (Shradha): The feeling of acceptance for Excellence. Here excellence means - understanding of the harmony and living in that Harmony at all the levels
7. Glory (Gaurava): The feeling for someone who has made efforts for excellence.
8. Gratitude (Kritagyata): The feeling of acceptance for those who have made effort for my excellence.
9. Love (Prem): The feeling of being related to all, to every unit in existence, the entire existence

Understanding the harmony in the society (Society being an extension of family)

Harmony in the family is the building block for harmony in the society. Harmony in the society leads to an undivided society (Akhand Samaj) when we feel related with each other.

Identification of the comprehensive human goal:

1. Right Understanding (Samadhana)	2. Prosperity (Samridhi)	3. Fearlessness Trust (Abhay)	4. Co-existence (Saha- astitiva)
↓	↓	↓	↓
In every individual	in every family	in society	in nature

Program Needed To Achieve The Comprehensive Human Goal: The Five Dimensions Of Human Endeavour

The five dimensions of human order (Manaviya Vyavstha) are:

1. Education- Right living (Sikhsa- Sanskar)
2. Health – Self-regulation (Swasthya- Sanyam)
3. Justice – Preservation (Nyaya- Suraksha)
4. Production – Work (Utpadan – Karya)
5. Exchange – Storage (Vinimya – Kosh)

1a. Education = To understand harmony at all four levels

= To understand the harmony right from self to the whole existence

1b.Sanskar = To live in harmony at all four levels

= To live in harmony right from self to the whole existence

2a. Justice = Human- Human relation- its recognition, fulfillment, evaluation- leading to mutual happiness.

2b. Preservation = Human- Rest of nature – its recognition, fulfillment, evaluation- leading to mutual prosperity

= enrichment, Protection, Right Utilization of nature.

Ex: I cultivate wheat: this is enrichment, I protect it so that it fit to eat: this is protection; & I eat it (do not waste it) this is right utilization.

3. Swasthya & Sanyam

4. Production & Work

5a.Exchange = Exchange of produce for mutual fulfillment (not madness of profit)

5b. Storage = Storage of produce after fulfillment of needs (with a view of right utilization in future)

2014

Intellectual Property Rights and Patents

Saumendra Das

INTELLECTUAL PROPERTY RIGHTS AND PATENTS – II

INTELLECTUAL PROPERTY RIGHTS AND PATENTS – II

Unit 1 Intellectual Property Law Basics – Types of Intellectual Property – Agencies responsible for Intellectual Property Registration - Cyber crime and E-commerce – International Aspects of Computer and Online Crime

INTRODUCTION TO INTELLECTUAL PROPERTY:

Intellectual Property refers to creation of mind i.e. inventions, industrial designs for article, literary & artistic work, symbols etc. used in commerce.

Intellectual property is divided into two categories: industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source: and Copyright, which includes literary and artistic works such as novels, poems, plays, films and musical works etc. According to the TRIPS Agreement, the intellectual property has been classified into-Patents, Industrial Designs, Trade Marks, Copyright, Geographical Indications, Layout Designs of Integrated Circuits, Protection of Undisclosed Information/Trade Secrets. Different IP Rights vary in the protection they provide.

The Evolutionary Past

Modern usage of the term *intellectual property* goes back at least as far as 1867 with the founding of the North German Confederation whose constitution granted legislative power over the protection of intellectual property (*Schutz des geistigen Eigentums*) to the confederation. When the administrative secretariats established by the Paris Convention (1883) and the Berne Convention (1886) merged in 1893, they located in Berne, and also adopted the term intellectual property in their new combined title, the United International Bureaux for the Protection of Intellectual Property. The organisation subsequently relocated to Geneva in 1960, and was succeeded in 1967 with the establishment of the World Intellectual Property Organization (WIPO) by treaty as an agency of the United Nations.

IPR is one of the components of GATT conditions which is to be implemented by all the member countries of the GATT. India is also a member of GATT and it is an obligation for India to honour and implement the IPR components.

GATT:

GATT stands for General Agreement on Tariffs and Trade.

The General Agreement on Tariffs and Trade (typically abbreviated GATT) was the outcome of the failure of negotiating governments to create the International Trade Organization (ITO). GATT concept was introduced with the idea for an organization to regulate trade as part of a larger plan for economic recovery after World War II. As governments negotiated the International Trade Organization(ITO), 15 negotiating states

began parallel negotiations for the GATT as a way to attain early tariff reductions. Once the ITO failed in 1950, only the GATI agreement was left. The GATT's main objective was the reduction of barriers to international trade. This was achieved through the reduction of tariff barriers, quantitative restrictions and subsidies on trade through a series of agreements. The GATT was a treaty, not an organization. The functions of the GATT were taken over by the World Trade Organization (WTO) which was established during the final round of negotiations in the early 1990s. The history of the GATT can be divided into three phases: the first, from 1947 until the Torquay Round, largely concerned which commodities would be covered by the agreement and freezing existing tariff levels. A second phase, encompassing three rounds, from 1959 to 1979, focused on reducing tariffs. The third phase, consisting only of the Uruguay Round from 1986 to 1994, extended the agreement fully to new areas such as intellectual property, services, capital and agriculture. Out of this round the WTO was born.

GATT and the World Trade Organization

In 1993 the GATT was updated (GATT 1994) to include new obligations upon its signatories. One of the most significant changes was the creation of the World Trade Organization (WTO). The 75 existing GATT members and the European Communities became the founding members of the WTO on January 1, 1995. The other 52 GATT members rejoined the WTO in the following two years . As of October 2007, there were a total of 151 member countries in the WTO. Whereas GATT was a set of rules agreed upon by nations, the WTO is an institutional body. The WTO expanded its scope from traded goods to trade within the service sector and intellectual property rights. Although it was designed to serve multilateral agreements, during several rounds of GATT negotiations (particularly the Tokyo Round plurilateral agreements created selective trading and caused fragmentation among members. WTO arrangements are generally a multilateral agreement settlement mechanism of GATT.

Rounds of GATT trade negotiations

GATT signatories occasionally negotiated new trade agreements that all countries would enter into. Each set of agreements was called a round. In general, each agreement bound members to reduce certain tariffs. Usually this would include many special-case treatments of individual products, with exceptions or modifications for each country.

1. Geneva Round (1947): 23 countries. GATT enters into force
2. Annecy Round (1949): 13 countries.
3. Torquay Round (1950): 38 countries.

4. Geneva Fourth Round (1956): 26 countries. Tariff reductions: Strategy set for future GATT policy toward developing countries, improving their positions as treaty participants.

5. Dillon Round (1960-1961): 26 countries. Tariff reductions: Named after C. Douglas Dillon. Then U.S. Undersecretary of State

6. Kennedy Round (1962-1967): 62 countries. Tariff reductions: This was an across-the board reduction rather than a product-by-product specification, for the first time. Anti-dumping agreement (which, in the United States, was rejected by Congress.)

7. Tokyo Round (1973-1979): 102 countries. Reduced non-tariff trade barriers. Also reduced tariffs on manufactured goods. Improvement and extension of GATT system.

8. Uruguay Round (1986-94): 123 countries. Created the World Trade Organization to replace the GATT treaty. Reduced tariffs and export subsidies, reduced other import limits and quotas over the next 20 years, agreement to enforce patents, trademarks, and copyrights (TRIPS), extending international trade law to the service sector (GATS) and open up foreign investment. It also made major changes in the dispute settlement mechanism of GATT.

9. Doha Round: see WTO.

Trade Related Aspects of Intellectual Property Rights (TRIPS)

The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) is an International Agreement administered by the World Trade Organization (WTO) that sets down minimum standards for many forms of intellectual Property (IP) regulation. It was negotiated at the end of the Uruguay round of the General Agreement on Tariffs and Trade (GATT) in 1994.

• Patents must be granted in all "fields of technology," although exceptions for certain public interests are allowed (Art. 27.2 and 27.3)

• Article 27 of the TRIPS Agreement defines which inventions governments are obliged to make eligible for patenting, and what they can exclude from patenting.

•Inventions that can be patented include both products and processes, and should generally cover all fields of technology.

What is covered under IPR…?

1. Patents,
2. Plant Variety Protection (PVP)
3. Geographical Indications
4. Traditional Knowledge
5. Copy Rights
6. Trade Marks

7. Trade Secrets

8. Industrial Designs

PATENTS:

A Patent is an intellectual property right relating to inventions and is the grant of exclusive right, for limited period, provided by the Government to the patentee, in exchange of full disclosure of his invention, for excluding others, from making, using, selling, importing the patented product or process producing that product for those purposes. The purpose of this system is to encourage inventions by promoting their protection and utilization so as to contribute to the development of industries, which in turn, contributes to the promotion of technological innovation and to the transfer and dissemination of technology. Under the system, Patents ensure property rights (legal title) for the invention for which patent have been granted, which may be extremely valuable to an individual or a Company. One should make the fullest possible use of the Patent System and the benefits it provides. Patent right is territorial in nature and a patent obtained in one country is not enforceable in other country. The inventors/their assignees are required to file separate patent applications in different countries for obtaining the patent in those countries.

LEGISLATION

The Patent System in India is governed by the Patents Act, 1970 (No. 39 of 1970) as amended by the Patents (Amendment) Act, 2005 and the Patents Rules, 2003, as amended by the Patents (Amendment) Rules 2006 effective from 05-05-2006.

ADMINISTRATION

The Patent Office, under the Department of Industrial Policy & Promotion, Ministry of Commerce & Industry, performs the statutory duties in connection with the grant of patents for new inventions and registration of industrial designs. Patent Offices are located at Kolkata , Mumbai, Chennai and Delhi to deal with the applications for patents originating within their respective territorial jurisdictions. Details of the locations of the above Patent Offices with their territorial jurisdiction have been shown in

Annexure I.

Patent Information System (PIS) located at Nagpur maintains a comprehensive collection of patent specifications and patent related literature, on a worldwide basis and provides technological information contained in patent or patent related literature through search services and patent document supply services.

Intellectual Property Training Institute (IPTI) located at Nagpur provides training to the officials of IP offices and other users of the system who are working in the field of Intellectual Property Rights.

INTERNATIONAL TREATIES

India is a member-state of Word Intellectual Property Organisation (WIPO), an International Organisation, responsible for the promotion of the protection of intellectual property throughout the world. India is a member of the following International Organisations and Treaties in respect of Patents:

a) World Trade Organization (WTO) with effect from 01-01 -1995.

b) Convention establishing World Intellectual Property Organisation, (WIPO).

c) Paris Convention for the protection of Industrial Property with effect from Dec.7, 1998.

d) Patent Co-operation Treaty (PCT) with effect from Dec.7, 1998.

e) Budapest Treaty with effect from 17th December, 2001.

TYPES OF PATENT APPLICATIONS

a) Ordinary Application

b) Application for Patent of Addition (granted for Improvement or Modification of the already patented invention, for an unexpired term of the main patent).

c) Divisional Application (in case of plurality of inventions disclosed in the main application).

d) Convention application , claiming priority date on the basis of filing in Convention Countries.

e) National Phase Application under PCT.

WHO MAY APPLY

The inventor may make an application, either alone or jointly with another, or his/their assignee or legal representative of any deceased inventor or his assignee.

GENERAL PRECAUTIONS FOR APPLICANT

The first to file system is employed, in which, among persons having filed the same invention, first one is granted a patent, therefore, a patent application should be filed promptly after conceiving the invention. It is common experience that through ignorance of patent law, inventors act unknowingly and jeopardize the chance of obtaining patents for their inventions. The most common of these indiscretions is to publish their inventions in newspapers or scientific and technical journals, before applying for patents. Publication of an invention, even by the inventor himself, would (except under certain rare circumstances)

constitute a bar for the subsequent patenting of it. Similarly, the use of the invention in Public, or the commercial use of the invention , prior to the date of filing patent application would be a fatal objection to the grant of a patent for such invention, thereafter. There is, however, no objection to the secret working of the invention by way of reasonable trial or experiment, or to the disclosure of the invention to others, confidentially.

Another mistake, which is frequently made by the inventors, is to wait until their inventions are fully developed for commercial working, before applying for patents. It is, therefore, advisable to apply for a patent as soon as the inventor's idea of the nature of the invention has taken a definite shape.

It is permissible to file an application for a patent accompanied by a "Provisional Specification" describing the invention. The application may, therefore, be made even before the full details of working of the invention are developed. The filing of an application for a patent disclosing the invention would secure priority date of the invention, and thereby, enable the inventor to work out the practical details of the invention and to file complete specification within 12 months from the date of filing of provisional specification.

WHAT IS PATENTABLE INVENTION

A new product or process, involving an inventive step and capable of being made or used in an industry. It means the invention to be patentable should be technical in nature and should meet the following criteria - 3

i) Novelty : The matter disclosed in the specification is not published in India or elsewhere before the date of filing of the patent application in India.

ii) Inventive Step: The invention is not obvious to a person skilled in the art in the light of the prior publication/knowledge/ document.

iii) Industrially applicable: Invention should possess utility, so that it can be made or used in an industry.

WHAT IS NOT PATENTABLE

The following are Non-Patentable inventions within the meaning of the Act: -

(a) an invention which is frivolous or which claims anything obviously contrary to well established natural laws;

(b) an invention the primary or intended use or commercial exploitation of which could be contrary to public order or morality or which causes serious prejudice to human, animal or plant life or health or to the environment;

(c) the mere discovery of a scientific principle or the formulation of an abstract theory (or discovery of any living thing or non-living substances occurring in nature);

(d) the mere discovery of a new form of a known substance which does not result in the enhancement of the known efficacy of that substance or the mere discovery of any new property or mere new use for a known substance or of the mere use of a known process, machine or apparatus unless such known process results in a new product or employs at least one new reactant;

Explanation- For the purposes of this clause, salts, esters, ethers, polymorphs, metabolites, pure form, particle size, isomers, mixtures of isomers, complexes, combinations and other derivatives of known substance shall be considered to be the same substance, unless they differ significantly in properties with regard to efficacy.

(e) a substance obtained by a mere admixture resulting only in the aggregation of the properties of the components thereof or a process for producing such substance;

(f) the mere arrangement or re-arrangement or duplication of known devices each functioning independently of one another in a known way;

(g) a method of agriculture or horticulture;

(h) any process for the medicinal, surgical, curative, prophylactic, diagnostic, therapeutic or other treatment of human beings or any process for a similar treatment of animals to render them free of disease or to increase their economic value or that of their products.

(i) plants and animals in whole or any part thereof other than micro-organisms but including seeds, varieties and species and essentially biological processes for production or propagation of plants and animals;

(j) a mathematical or business method or a computer programme per se or algorithms;

(k) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever including cinematographic works and television productions;

(I) a mere scheme or rule or method of performing mental act or method of playing game;

(m) a presentation of information

(n) Topography of integrated circuits;

(o) an invention which in effect, is traditional knowledge or which is an aggregation or duplication of known properties of traditionally known component or components.

(p) Inventions relating to atomic energy and the inventions prejudicial to the interest of security of India.

APPROPRIATE OFFICE FOR FILING AN APPLICATION & FOR OTHER PROCEEDINGS

Application is required to be filed according to the territorial limits where the applicant or the first mentioned applicant in case of joint applicants, for a patent normally

resides or has domicile or has a place of business or the place from where the invention actually originated. If the applicant for the patent or party in a proceeding having no business place or domicile in India, the appropriate office will be according to the address for service in India given by the applicant or party in a proceeding . The appropriate office once decided in respect of any proceedings under the Act shall not ordinarily be changed. The four patent offices are located at Kolkatta, Mumbai, Delhi & Chennai (Annexure 1).

PUBLICATION & EXAMINATION OF PATENT APPLICATIONS

i) Publication:

All the applications for patent, except the applications prejudicial to the defence of India or abandoned due to non-filing of complete specification within12 months after filing the provisional or withdrawn within 15 months of filing the application, are published in the Patent Office Journal just after 18 months from the date of filing of the application or the date of priority whichever is earlier. The publication includes the particulars of the date of the application, application number, name and address of the applicant along with the abstract. The applications for patent are not open for public inspection before publication. After the date of publication of the application, as stated above, the complete specification along with provisional and drawing, if any, abstract , application on any form or on plain paper and any correspondence between the office and applicant may be inspected at the appropriate office by making a written request to the Controller in the prescribed manner and on the payment of prescribed fee..

Early Request for Publication :

The applicant may also file a request for early publication in Form-9 with a prescribed fee of Rs 2500/- or Rs 10,000/- for natural person and other than natural person respectively.The above application is published ordinarily within one month from the date of the request on Form-9. The applicant shall have provisional Rights from the date of publication.

ii) Request for examination

No application for patent will be examined if no request is made by the applicant or by any other interested person in Form-18 with prescribed fee of Rs.2,500/- or Rs.10,000/- for natural person and other than natural person respectively, within a period of 48 months from the date of priority of the application or from the date of filing of the application ,whichever is earlier. Where no request for examination of the application for patent has been filed within the prescribed period, the aforesaid application will be treated as withdrawn and, thereafter, application cannot be revived.

iii) EXAMINATION

Application for patent, where request has been made by the applicant or by any other interested person, will be taken up for examination, according to the serial number of the requests received on Form 18. A First Examination Report (FER) stating the objections/requirements is communicated to the applicant or his agent according to the address for service ordinarily within six (06) months from the date of request for examination or date of publication whichever is later. Application or complete specification should be amended in order to meet the objections/requirements within a period of 12 months from the date of First Examination Report (FER). No further extension of time 5 is available in this regard. If all the objections are not complied with within the period of 12 months, the application shall be deemed to have been abandoned. When all the requirements are met the patent is granted, after 6 months from the date of publication, the letter patent is issued,entry is made in the register of patents and it is notified in the Patent Office, Journal ..

WITHDRAWAL OF PATENT APPLICATION

The application for patent can be withdrawn at least 3(Three) months before the first publication which will be 18(Eighteen) months from the date of filing or date of priority whichever is earlier. The application can also be withdrawn at any time before the grant of the patent. The application withdrawn after the date of publication, cannot be refiled as it is already laid open for public inspection. However, application withdrawn before the publication can be refiled provided it is not opened to public otherwise.

OPPOSITION PROCEEDINGS TO GRANT OF PATENTS

PREGRANT OPPOSITION

Where an application for a patent has been published but a patent has not been granted, any person may, in writing represent by way of opposition to the Controller against the grant of any Patent. The representation shall be filed at the appropriate office and shall include a statement and evidence, if any, in support of the representation and a request for hearing if so desired.

The above representation may be made on the following grounds

(a) that the applicant for the patent or the person under or through whom he claims, wrongfully obtained the invention or any part thereof from him or from a person under or through whom he claims;

(b) that the invention so far as claimed in any claim of the complete specification has been published before the priority date of the claim—

(i) in any specification filed in pursuance of an application for a patent made in India on or after the 1st day of January, 1912; or (ii) in India or elsewhere, in any other document: Provided that the ground specified in sub-clause (ii) shall not be available where such publication does not constitute an anticipation of the invention by virtue of sub-section (2) or sub-section (3) of section 29;

(c) that the invention so far as claimed in any claim of the complete specification is claimed in a claim of a complete specification published on or after the priority date of the applicant's claim and filed in pursuance of an application for a patent in India, being a claim of which the priority date is earlier than that of the applicant's claim;

(d) that the invention so far as claimed in any claim of the complete specification was publicly known or publicly used in India before the priority date of that claim.

Explanation —For the purposes of this clause, an invention relating to a process for which a patent is claimed shall be deemed to have been publicly known or publicly used in India before the priority date of the claim if a product made by that process had already been imported into India before that date except where such importation has been for the purpose of reasonable trial or experiment only;

(e) that the invention so far as claimed in any claim of the complete specification is obvious and clearly does not involve any inventive step, having regard to the matter published as mentioned in clause (b) or having regard to what was used in India before the priority date of the applicant's claim;

(f) that the subject of any claim of the complete specification is not an invention within the meaning of this Act, or is not patentable under this Act;

(g) that the complete specification does not sufficiently and clearly describe the invention or the method by which it is to be performed;

(h) that the applicant has failed to disclose to the Controller the information required by section 8 or has furnished the information which in any material particular was false to his knowledge;

(i) that in the case of convention application, the application was not made within twelve months from the date of the first application for protection for the invention made in a convention country by the applicant or a person from whom he derives title;

(j) that the complete specification does not disclose or wrongly mentions the source or geographical origin of biological material used for the invention;

(k) that the invention so far as claimed in any claim of the complete specification is anticipated having regard to the knowledge, oral or otherwise, available within any local or

indigenous community in India or elsewhere, but on no other ground. The Controller shall, if requested by such person for being heard, hear him and dispose of such representation. If the opposition is decided in favour of the applicant, the patent is granted and the grant of Patent is published in the Patent Office Journal thereby opening the application, specification and other related documents for public inspection on payment of prescribed fee.

GRANT OF PATENT

When all the requirements of the FER are met or in case of opposition under section 25(1),if the opposition is decided in favour of the applicant, the patent is granted, after 6 months from the date of publication under section 11 A, the letter patent is issued, entry is made in the register of patents and it is notified in the Patent Office, Journal, thereafter opening the application ,specification and other related documents for public inspection on payment of prescribed fee.

TERM AND DATE OF PATENT

Term of every patent will be 20 years from the date of filing of patent application, irrespective of whether it is filed with provisional or complete specification. Date of patent is the date on which the application for patent is filed.

POST_GRANT OPPOSITION:

Any interested person can file notice of opposition (along with written statement and evidence, if any) anytime after the grant of Patent but before the expiry of a period of one year from the date of publication of grant of a Patent in the Patent Office Journal .The above notice under Section 25(2) shall be filed on Form-7 along with a fee of Rs. 1500/ or Rs. 6000/- for natural person and other than natural person respectively, in duplicate at the appropriate office. The grounds of opposition under section 25 (2) are the same as given before in case of pre grant opposition. The post grant opposition is decided by an Opposition Board followed by a hearing and the reasoned decision by the Controller.

RIGHTS OF THE PATENTEE

Where a patent covers a product, the grant of patent gives the patentee the exclusive right to prevent others from performing, without authorisation, the act of making, using, offering for sale, selling or importing that product for the above purpose. Where a patent covers a process, the patentee has the exclusive right to exclude others from performing, without his authorisation, the act of using that process, using and offering for sale, selling or importing for those purposes, the product obtained directly by that process in India. These rights created by statute are circumscribed by various conditions and limitations as provided in the Patents Act, 1970 as amended by The Patents (amendment) Act, 2002.

REGISTER OF PATENT

The Register of Patents are kept in the Patent offices and can be inspected or extract from it can be obtained on payment of prescribed fee. Register of Patent contains the name and address of the patentee, notification of assignment etc., particulars in respect of validity or proprietorship of patent and payment of renewal fee.

RENEWAL FEE

To keep the patent in force, Renewal fee is to be paid every year. The first renewal fee is payable for the third year and must be paid before the expiration of the second year from the date of patent If the patent has not been granted within two years the renewal fees may be accumulated and paid immediately after the patent is granted, or within three months of it's recordal in Register of Patents or within extended period of 9 months ,by paying extension fees of six month on Form 4, from the date of recordal. If the renewal fees is not paid within the prescribed time, the patent will cease to have effect. However, provision to restore the patent is possible provided application is made within eighteen months from the date of cessation.

Renewal fee is counted from the date of filing of the Patent application. Six month's grace time is available with extension fee for payment of renewal fee. No renewal fees is payable on Patents of Addition, unless the original patent is revoked and if the Patent of Addition is converted into an independent patent; renewal fee, then, becomes payable for the remainder of the term of the main patent.

RESTORATION

Application for restoration of a patent that lapses due to non-payment of renewal fees must be made within 18 months of lapse. The application is to be filed in the appropriate office according to the jurisdiction.

DOCUMENTS REQUIRED FOR FILING AN APPLICATION

1) Application form in duplicate (Form 1).
2) Provisional or complete specification in duplicate. If the provisional specification is filed, it must be followed by the complete specification within 12 months.(Form 2).
3) Drawing in duplicate (if necessary).
4) Abstract of the invention in duplicate.
5) Information & undertaking listing the number, filing date & current status of each foreign patent application in duplicate (Form 3).

6) Priority document (if priority date is claimed) in convention application,when directed by the Controller. 8

7) Declaration of inventor-ship where provisional specification is followed by complete specification or in case of convention/PCT national phase application (Form 5).

8) Power of attorney (if filed through Patent Agent).

9) Fee (to be paid in cash/by cheque/by demand draft) (See ScheduleI).

(Note: The cheque or demand draft should be payable to the "Controller of Patents" drawn on any schedule bank at a place where the appropriate office is situated).

REQUEST FOR PERMISSION TO FILE ABROAD:

If any application is to be filed abroad ,without filing in India ,it should be made only after taking a written permission from the Controller .The request for permission for making patent application outside India shall be made in Form-25 along with a fee of Rs 1000/- or Rs 4000/- for natural person and other than natural person respectively. A gist of invention should also be filed along with the Form-25.

PROVISIONAL SPECIFICATION

Application for patent may be accompanied by the provisional specification. It should contain the description of invention with drawing, if required. It is not necessary to include Claim. However, the complete specification should be fairly based on the matter disclosed in the provisional specification and should be filed within 12 months. If the complete specification is not filed within 12 months the application is deemed to have been abandoned.

COMPLETE SPECIFICATION

The complete specification is an essential document in the filing of patent application along with the drawing to be attached according to the necessity. Complete specification shall fully describe the invention with reference to drawing, if required, disclosing the best method known to the applicant and end with Claim/Claims defining the scope of protection sought. The specification must be written in such a manner that person of ordinary skill in the relevant field, to which the invention pertains, can understand the invention. Normally, it should contain the following matter-

1) Title of invention, 2) Field of invention, 3) Background of invention with regard to the drawback associated with known art, 4) Object of invention, 5) Statement of invention, 6) A summary of invention, 7) A brief description of the accompanying drawing, 8) Detailed description of the invention with reference to drawing/examples, 9) Claim(s), 10) Abstract.

The specification must start with a short title, which describes the general nature of invention. The title should not contain anyone's name, a fancy name and trade name or personal name or any abbreviation etc.

Description:

The specification must be written in good and clear English or Hindi. The specification should indicate those features which are essential for the operation of the invention as well as those features for which a choice can be made. The description must be sufficiently detailed for someone who works in the same area of technology to be able to perform the invention from the information given in the description. The best method of putting the invention into effect is required to be

described.

In case of biological invention, it is required to mention the source or geographical origin of biological material used for the invention 9

Claim:

A set of properly drafted claims is an important part of complete specification. The complete specification must have at least one Claim. . The first claim is the main claim.. The subsidiary claims refer to the main claim and include qualifying or explanatory clauses on the various integers of the main claim or optional features. They may also contain independent claims. Although the claim clauses consist of a number of claims, the totality of the claims must relate to one invention only. It should be noted that a claim is a statement of technical facts expressed in legal terms defining the scope of the invention sought to be protected.

Abstract

The abstract is the concise summary of the invention preferably within 150 words and shall commence with the title of the invention. It should be prepared in such a way that one can understand the technical problem and solution with its usefulness. If necessary, most relevant drawing should also be included in the abstract, particularly, in mechanical type inventions. Each main feature mentioned in the abstract and illustrated by a drawing should be indicated by reference numerals. In case of Chemical invention, it should contain the Chemical Formula for understanding the invention. However, it cannot be used for the purpose of interpreting the scope of protection in legal proceeding.

DRAWING*

Drawing should be filed on standard A4 size sheet in duplicate. Drawing should be drawn on the sheet with margin of 4 cm on top and left hand and 3 cm at the bottom and right hand side. Figure should be shown clearly on sufficient scale in upright position with respect

to top and bottom position of the sheet. At left-hand top corner of the sheet, the name of applicant should be mentioned, with the application No. therebelow. No. of sheets and sheet no. should be mentioned at the right hand top corner. At the right-hand bottom, signature of the applicant/agent should be made mentioning the name there under. A reference letter/numerals as used in the description should also be used in denoting the corresponding component/part in the figure(s). No descriptive matter should appear on drawing except under certain cases such as flow sheet, chemical and other reactions etc. No drawing or sketch should appear in the specification.

*(See Specimen)

TECHNICAL LIBRARY OF PATENT OFFICES

1) The Patent Offices have Technical Library services, which are available to the public.

(Note: Xerox copies of the Patents and other documents can be obtained on payment of prescribed charge of Rs.4/- per page.) For further information, visit website **www.ipindia.nic.in**

CYBER LAW OF INDIA: INTRODUCTION

In Simple way we can say that cyber crime is unlawful acts wherein the computer is either a tool or a target or both. Cyber crimes can involve criminal activities that are traditional in nature, such as theft, fraud, forgery, defamation and mischief, all of which are subject to the Indian Penal Code. The abuse of computers has also given birth to a gamut of new age crimes that are addressed by the Information Technology Act, 2000.

We can categorize Cyber crimes in two ways The Computer as a Target:-using a computer to attack other computers e.g. Hacking, Virus/Worm attacks, DOS attack etc.

The computer as a weapon:-using a computer to commit real world crimes. e.g. Cyber Terrorism, IPR violations, Credit card frauds, EFT frauds, Pornography etc.

Cyber Crime regulated by Cyber Laws or Internet Laws.

Technical Aspects: Technological advancements have created new possibilities for criminal activity, in particular the criminal misuse of information technologies such as

a. Unauthorized access & Hacking:- Access means gaining entry into, instructing or communicating with the logical, arithmetical, or memory function resources of a computer, computer system or computer network. Unauthorized access would therefore mean any kind of access without the permission of either the rightful owner or the person in charge of a computer, computer system or computer network. Every act committed towards breaking into a computer and/or network is hacking. Hackers write or use ready-made computer programs

to attack the target computer. They possess the desire to destruct and they get the kick out of such destruction. Some hackers hack for personal monetary gains, such as to stealing the credit card information, transferring money from various bank accounts to their own account followed by withdrawal of money. By hacking web server taking control on another persons website called as web hijacking

b. Trojan Attack:- The program that act like something useful but do the things that are quiet damping. The programs of this kind are called as Trojans. The name Trojan Horse is popular. Trojans come in two parts, a Client part and a Server part. When the victim (unknowingly) runs the server on its machine, the attacker will then use the Client to connect to the Server and start using the trojan. TCP/IP protocol is the usual protocol type used for communications, but some functions of the trojans use the UDP protocol as well.

c. Virus and Worm attack:- A program that has capability to infect other programs and make copies of itself and spread into other programs is called virus. Programs that multiply like viruses but spread from computer to computer are called as worms.

d. E-mail & IRC related crimes:-

1. Email spoofing: Email spoofing refers to email that appears to have been originated from one source when it was actually sent from another source. Please Read.

2. Email Spamming: Email "spamming" refers to sending email to thousands and thousands of users - similar to a chain letter.

3 Sending malicious codes through email: E-mails are used to send viruses, Trojans etc through emails as an attachment or by sending a link of website which on visiting downloads malicious code.

4. Email bombing: E-mail "bombing" is characterized by abusers repeatedly sending an identical email message to a particular address.

5. Sending threatening emails

6. Defamatory emails

7. Email frauds

8. IRC related: Three main ways to attack IRC are: "verbalâ�³8218;?₮#8220; attacks, clone attacks, and flood attacks.

e. Denial of Service attacks:- Flooding a computer resource with more requests than it can handle. This causes the resource to crash thereby denying access of service to authorized users.

Examples include: attempts to "flood" a network, thereby preventing legitimate network traffic attempts to disrupt connections between two machines, thereby preventing access to a

service attempts to prevent a particular individual from accessing a service attempts to disrupt service to a specific system or person.

Electronic commerce: It is commonly known as e-commerce or e Commerce, is a type of industry where the buying and selling of products or services is conducted over electronic systems such as the Internet and other computer networks. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices, social media, and telephones as well.

Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of business transactions. This is an effective and efficient way of communicating within an organization and one of the most effective and useful ways of conducting business.

E-commerce can be divided into:

- E-tailing or "virtual storefronts" on websites with online catalogs, sometimes gathered into a "virtual mall"
- Buying or Selling on various websites and/or online marketplaces
- The gathering and use of demographic data through Web contacts and social media
- Electronic Data Interchange (EDI), the business-to-business exchange of data
- E-mail and fax and their use as media for reaching prospective and established customers (for example, with newsletters)
- Business-to-business buying and selling
- The security of business transactions

Computer crime:

It refers to any crime that involves a computer and a network. The computer may have been used in the commission of a crime, or it may be the target. Netcrime refers to criminal exploitation of the Internet.

Dr. Debarati Halder and Dr. K. Jaishankar (2011) defines Cybercrimes as: "Offences that are committed against individuals or groups of individuals with a criminal motive to intentionally harm the reputation of the victim or cause physical or mental harm to the victim directly or

indirectly, using modern telecommunication networks such as Internet (Chat rooms, emails, notice boards and groups) and mobile phones (SMS/MMS)".

Such crimes may threaten a nation's security and financial health. Issues surrounding these types of crimes have become high-profile, particularly those surrounding cracking, copyright infringement, child pornography, and child grooming. There are also problems of privacy when confidential information is lost or intercepted, lawfully or otherwise.

An Australian nationwide survey conducted in 2006 found that two in three convicted cyber-criminals were between the ages of 15 and 26.

Internationally, both governmental and non-state actors engage in cybercrimes, including espionage, financial theft, and other cross-border crimes. Activity crossing international borders and involving the interests of at least one nation state is sometimes referred to as cyber warfare. The international legal system is attempting to hold actors accountable for their actions through the International Criminal Court.

Cybercrime in the United States is estimated to cost $100 billion annually.

Computer crime encompasses a broad range of activities. Generally, however, it may be divided into two categories: (1) crimes that target computers directly; (2) crimes facilitated by computer networks or devices, the primary target of which is independent of the computer network or device.

Crimes that primarily target computer networks or devices include:

- Computer viruses
- Denial-of-service attacks
- Malware (malicious code)

Crimes that use computer networks or devices to advance other ends include:

- Cyber stalking
- Fraud and identity theft
- Information warfare
- Phishing scams
- Spam

The unsolicited sending of bulk email for commercial purposes is un-lawful in some jurisdictions. While anti-spam laws are relatively new, limits on unsolicited electronic communications have existed for some time.

Fraud: Computer fraud is any dishonest misrepresentation of fact intended to let another to do or refrain from doing something which causes loss. In this context, the fraud will result in obtaining a benefit by: Altering in an unauthorized way. This requires little technical

expertise and is not an uncommon form of theft by employees altering the data before entry or entering false data, or by entering unauthorized instructions or using unauthorized processes; Altering, destroying, suppressing, or stealing output, usually to conceal unauthorized transactions: this is difficult to detect; Altering or deleting stored data; Altering or misusing existing system tools or software packages, or altering or writing code for fraudulent purposes. Other forms of fraud may be facilitated using computer systems, including bank fraud, identity theft, extortion, and theft of classified information.

A variety of Internet scams target direct to consumers.

Obscene or offensive content: The content of websites and other electronic communications may be distasteful, obscene or offensive for a variety of reasons. In some instances these communications may be illegal. Over 25 jurisdictions within the USA place limits on certain speech and ban racist, blasphemous, politically subversive, libelous or slanderous, seditious, or inflammatory material that tends to incite hate crimes. The extent to which these communications are unlawful varies greatly between countries, and even within nations. It is a sensitive area in which the courts can become involved in arbitrating between groups with strong beliefs.

One area of Internet pornography that has been the target of the strongest efforts at curtailment is child pornography.

Harassment: Whereas content may be offensive in a non-specific way, harassment directs obscenities and derogatory comments at specific individuals focusing for example on gender, race, religion, nationality, sexual orientation. This often occurs in chat rooms, through newsgroups, and by sending hate e-mail to interested parties (see cyber bullying, cyber stalking, hate crime, Online predator, and stalking). Any comment that may be found derogatory or offensive is considered harassment. There are instances where committing a crime, which involves the use of a computer, can lead to an enhanced sentence. For example, in the case of United States v. Neil Scott Kramer, Kramer was served an enhanced sentence according to the U.S. Sentencing Guidelines Manual §2G1.3(b)(3)[9] for his use of a cell phone to “persuade, induce, entice, coerce, or facilitate the travel of, the minor to engage in prohibited sexual conduct.” Kramer argued that this claim was insufficient because his charge included persuading through a computer device and his cellular phone technically is not a computer. Although Kramer tried to argue this point, U.S. Sentencing Guidelines Manual states that the term computer "means an electronic, magnetic, optical, electrochemical, or other high speed data processing device performing logical, arithmetic, or storage functions,

and includes any data storage facility or communications facility directly related to or operating in conjunction with such device."

Connecticut was the first state to pass a statute making it a criminal offense to harass someone by computer. Michigan, Arizona, and Virginia have also passed laws banning harassment by electronic means. Harassment as defined in the U.S. computer statutes is typically distinct from cyber bullying, in that the former usually relates to a person's "use a computer or computer network to communicate obscene, vulgar, profane, lewd, lascivious, or indecent language, or make any suggestion or proposal of an obscene nature, or threaten any illegal or immoral act," while the latter need not involve anything of a sexual nature. Often it is confusing wondering why harassment occurs over the internet. The fact of the matter is that bullying over the internet may occur for no reason. These crimes can be considered "a computer harassment crime of convenience."

Threats: Although freedom of speech is protected by law in most democratic societies, (in US this is done by First Amendment) it does not include all types of speech. In fact spoken or written "true threat" speech/text is criminalized because of "intent to harm or intimidate", that also applies for online or any type of network related threats in written text or speech. The US Supreme Court definition of "true threat" is "statements where the speaker means to communicate a serious expression of intent to commit an act of unlawful violence to a particular individual or group".

Drug trafficking: Drug traffickers are increasingly taking advantage of the Internet to sell their illegal substances through encrypted e-mail and other Internet Technology. Some drug traffickers arrange deals at internet cafes, use courier Web sites to track illegal packages of pills, and swap recipes for amphetamines in restricted-access chat rooms. The rise in Internet drug trades could also be attributed to the lack of face-to-face communication. These virtual exchanges allow more intimidated individuals to more comfortably purchase illegal drugs. The sketchy effects that are often associated with drug trades are severely minimized and the filtering process that comes with physical interaction fades away.

Cyber terrorism: Government officials and Information Technology security specialists have documented a significant increase in Internet problems and server scans since early 2001. But there is a growing concern among federal officials[who?] that such intrusions are part of an organized effort by cyber terrorists, foreign intelligence services, or other groups to map potential security holes in critical systems. A cyber terrorist is someone who intimidates or coerces a government or organization to advance his or her political or social objectives by

launching computer-based attack against computers, network, and the information stored on them.

Cyber terrorism in general, can be defined as an act of terrorism committed through the use of cyberspace or computer resources. As such, a simple propaganda in the Internet, that there will be bomb attacks during the holidays can be considered cyber terrorism. As well there are also hacking activities directed towards individuals, families, organized by groups within networks, tending to cause fear among people, demonstrate power, collecting information relevant for ruining peoples' lives, robberies, blackmailing etc.

Cyber extortion is a form of cyber terrorism in which a website, e-mail server, or computer system is subjected to repeated denial of service or other attacks by malicious hackers, who demand money in return for promising to stop the attacks. According to the Federal Bureau of Investigation, cyber extortionists are increasingly attacking corporate websites and networks, crippling their ability to operate and demanding payments to restore their service. More than 20 cases are reported each month to the FBI and many go unreported in order to keep the victim's name out of the public domain. Perpetrators typically use a distributed denial-of-service attack.

Cyber warfare: The U.S. Department of Defense (DoD) notes that cyberspace has emerged as a national-level concern through several recent events of geo-strategic significance. Among those are included the attack on Estonia's infrastructure in 2007, allegedly by Russian hackers. "In August 2008, Russia again allegedly conducted cyber attacks, this time in a coordinated and synchronized kinetic and non-kinetic campaign against the country of Georgia. Fearing that such attacks may become the norm in future warfare among nation-states, the concept of cyberspace operations impacts and will be adapted by war fighting military commanders in the future.

Unit 2 **Introduction to Patent Law – Rights and Limitations – Rights under Patent Law –Patent requirements - Ownership - Transfer - Patents Application Process – Patent Infringement - Patent Litigation - International Patent Law – Double Patenting – Patent Searching – Patent Law Treaty - New developments in Patent Law - Invention Developers and Promoters**

Patent law:

Patent law is a specific area of law that encompasses the legal regulation, jurisprudence, and enforcement of specific intellectual property rights known as patent rights.

A patent law is a government issued right granted to individuals or groups that protects their original inventions from being made, used, or sold by others without their permission for a set period of time.

The word *patent* originates from the Latin *patere*, which means "to lay open" (i.e., to make available for public inspection).

History

In 500 BC, in the Greek city of Sybaris was held out to all who should discover any new refinement in luxury, the profits arising from which were secured to the inventor by patent for the space of a year.

Patents in the modern sense originated in 1474, when the Republic of Venice enacted a decree that new and inventive devices, once put into practice, had to be communicated to the Republic to obtain the right to prevent others from using them.

In the United States several states adopted patent systems of their own. The first Congress adopted a Patent Act, in 1790, and the first patent was issued under this Act on July 31, 1790.

THE INVENTIONS & DESIGNS ACT 1888

Act V of 1888 replaced Act XV of 1859 and its amendments

Reasons: 1) Patent applications: 33 applications under the 1856 Act and 3417 under the 1859 Act; of which 234 were from Indians

2) No design application

Changes

1) Cheap and graduated fee to correspond with increasing value as the invention becomes popular

2) Compulsory licences

3) Provisions for protection of ,New or Original Designs.

THE INDIAN PATENTS & DESIGNS ACT, 1911

- Act II of 1911
- Incorporated provisions of 1907 Act of United Kingdom
- Substituted the expression 'exclusive privileges' with 'patent'
- Made duration of Indian patent independent of duration of UK patent
- Established Patent Office under a Controller of Patents and Designs.

1970 Act

1. No product patent for chemicals, food and medicine
2. No patents for agriculture and horticulture products
3. Compulsory licences
4. Patents to be worked in India.

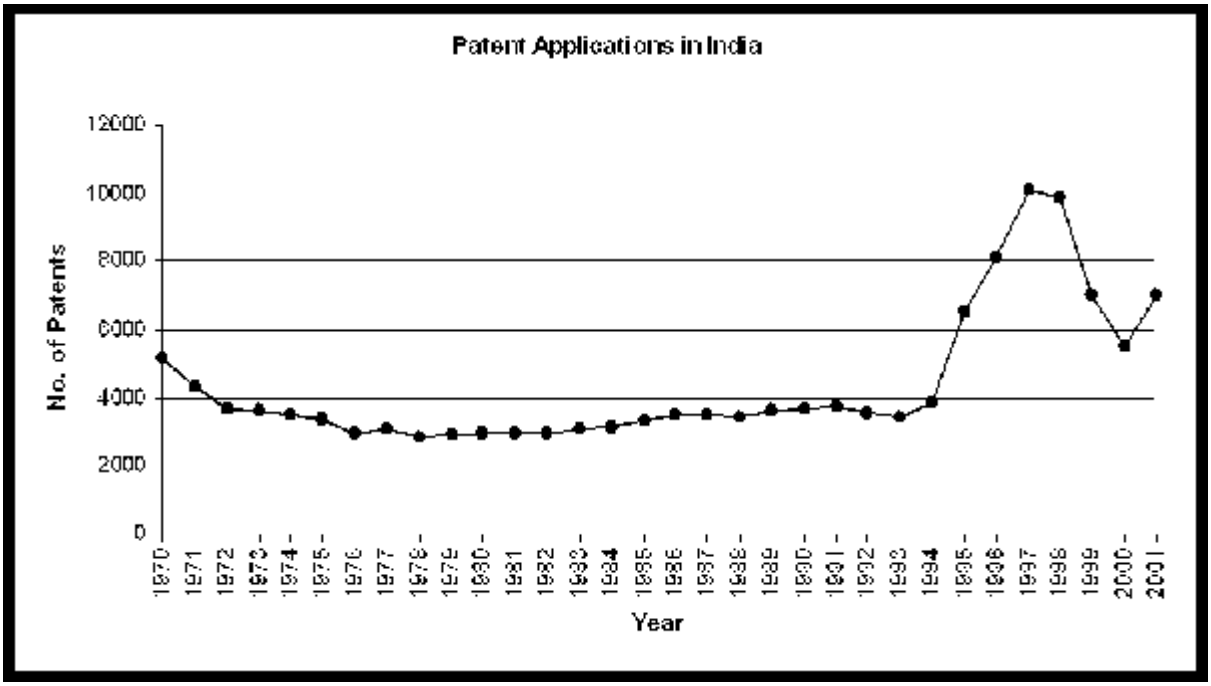
Patents Enquiry Committee 1948-1950

1. Invention' to include processes
2. No product patent for chemicals, food, medicine except when made by the invented process
3. 'Novelty' to be based on prior knowledge or prior user in India
4. 'Inventive step' to be an essential prerequisite
5. 'Usefulness' to be judged on technical advancement also

Towards Patents Law 1970

- Based on the Ayyangar Committee recommendations, a Patents Bill introduced on 21 September 1965
- Referred to a Joint Parliamentary Committee (JPC) on 25 November1965
- Amended Bill introduced in November 1966
- Lok Sabha passed, but lapsed in Rajya Sabha
- Revised Bill introduced in 1967
- Passed in 1970.

Patent Applications in India 1970-2001



Why one should go for a getting a patent ?

- To enjoy the exclusive rights over the invention.

- The patent is to ensure commercial returns to the inventor for the time and money spend in generating a new product.

What can be patented?

In order to be patentable, an invention must pass four tests;

1. The invention must fall into one of the five ‚statutory classes': Processes, Machines Manufactures Compositions of matter, and New uses of any of the above

2. The invention must be, useful'

3. The invention must be, novel'

4 The invention must be, no obvious'

An invention which claims anything obvious contrary to well established natural laws

- An invention the intended use of which can be injurious to public health.
- The mere discovery of a scientific principle or the formulation of an abstract theory.
- The mere discovery of any new property of new use for a known substance or of the mere use of a known process, machine or apparatus unless such known process results in a new product or employs at least one new reactant.

- A substance obtained by a mere admixture resulting only in the aggregation of the properties of the components thereof or a process for producing such substance;
- A patent can be made by any person whether a citizen of India or not, claiming to be the true or first inventor of the invention or by his ‚assignee' or legal representative.
- Application may be made alone or jointly with any other person.
- A company or firm cannot be named as the true inventor. The term person includes the Government.

What is the term of patent?

In respect of a invention claiming process of manufacture of a substance intended to be used as food or medicine - 5 yrs from the date of sealing or 7 yrs from the date of patent whichever is shorter. In case of any other invention -14 yrs from the date of patent.

How does a patent get expire?

A patent can expire in the following ways:

- The patent has lived its full term.
- The patentee has failed to pay the renewal fee.
- The validity of the patent has been successfully challenged by an opponent by filing an opposition either with the patent office or with the courts.
- As soon as the patent expires, it pass to the general public domain and now anybody can use it without the permission of the original inventor

What Does Patent System Do ?

- It encourages RESEARCH.
- Induces an inventor to disclose his inventions instead of keeping them as secret.
- Provides inducement for capital investment Encouraging technological development.
- It encourages establishment of new industries.

Why one should access the patent literature?

Before the start of the research and development project, one should scan the patent literature to stop re-inventing the wheel. or During the development phase, when stuck up with a technical problem, to find a technical solution. or Once the research is complete i.e. at the time of filing the patent application, to narrow down or broaden the claims and/or to draft the application for getting a patent.

National Patent offices, International Information vendors like Dialog, Orbit, Questel STN, free or charge based patent web sites on Internet. Which are the main sources for patent information?

Patent application

A patent application is a request pending at a patent office for the grant of a patent for the invention described and claimed by that application.

Type of Patent application

- ✓ Standard application
- ✓ Provisional applications
- ✓ Continuation applications
- ✓ Divisional applications

Three Amendments

First Amendment in 1999

1. Introduced transitional facility to receive and hold patent applications of pharmaceutical and agricultural chemical products (mail box) till 1 January 2005 and for grant of Exclusive Marketing Rights for 5 years or till grant of patent.

Second Amendment

1. Bill introduced on 20 December 1999
2. Referred to a JPC on 22 December 1999
3. Report submitted on 19 December 2001
4. Bill passed in 2002
5. Major changes
6. 20 year patent period
7. Reversal of burden of roof on the infringer
8. Establishment of an Appellate Board
9. Public interest safeguards and measures for protecting Traditional Knowledge.

Third Amendment

1. 2005
2. Based on Observations of JPC
3. Widespread consultations through country wide interactive sessions with interest groups
4. Extensive inter ministerial consultations
5. Removed transitory provisions
6. Introduced various flexibilities provided in the TRIPS Agreement including the Doha Round.

Patent Law - Salient Features

- Both product and process patent provided.
- Term of patent – 20 years.
- Examination on request.
- Both pre-grant and post-grant opposition.
- Fast track mechanism for disposal of appeals.
- Provision for protection of bio-diversity and traditional knowledge.
- Publication of applications after 18 months with facility for early publication.

Safeguards in the Patent Law

- Compulsory licences to ensure availability of drugs at reasonable prices
- Bolar Provision for early manufacture of generics
- Parallel, import to check prices.
- Provision to deal with public health emergency.
- Revocation of patent in public interest and also on security considerations.
- Provisions to prevent grant of patents based on frivolous or trivial inventions.
- Provisions to prevent misappropriation of Genetic Resources and Traditional Knowledge.

Patent Protection: Policy Trends

1. **Become** part of the Global Patent Regime
2. **Meet** International Obligations.
3. **Safeguard** the Rights of Patent Holders as also Protect Public Interest.
4. **Modernise** the Patent Administration.
5. **Create** Awareness regarding Patents.

India: Global Player

- India acceded to the Paris Convention on Industrial Property on 7 December 1998.
- India acceded to Patent Cooperation Treaty also on same date.
- Plays active role in World Trade Organisation and World Intellectual Property Organisation
- Doha Round and Public Health Concerns
- Development Agenda in WIPO
- Mandatory Disclosure of Source in Patent applications.

Modernization of Patent Administration

- Four state-of-the-art integrated IP Office buildings constructed.
- Rs. 153 crore project implemented.

- Number of Patent Examiners increased four-fold
- Patent search facilities improved.
- IT enabled efficient systems established.
- E-filing facility for patent applications launched on 18 July 2007.

Foundation Stone for a National Institute of Intellectual Property Management laid in Nagpur on 20 August, 2007. Indian Patent Office recognized as an International Searching Authority (ISA) and an International Preliminary Examining Authority (IPEA) under the Patent Cooperation Treaty by the World Intellectual Property Organization in early October 2007.

45,000 patent documents uploaded on Patent Office website, viz. http://ipindia.nic.in in November 2007.

Impact

- ✓ Time lines for patent and trademark processing reduced.
- ✓ Possible to obtain a patent in 8 months as against 6-8 years earlier and a trade mark in 10-12 months as against 8-10 years earlier.
- ✓ Backlog of over 44,000 patent applications liquidated in the last three years.
- ✓ International Cooperation for Improving Patent Administration Cooperation with WIPO.
- ✓ EU –India Technology and Investment Development Programme.

Bilateral Agreements signed with

- ✓ **UK Patent Office**
- ✓ **France**
- ✓ **European Patent Office**
- ✓ **USPTO**
- ✓ **Japan Patent Office**
- ✓ **Switzerland**
- ✓ **Germany.**

Main Elements of Co-operation

- ✓ Human Resource Development.
- ✓ Public awareness programmes.
- ✓ Development of IP- profession.
- ✓ Joint studies and research.
- ✓ Exchange of experience in the area of protection of traditional knowledge.
- ✓ Capacity building.

Future Milestones

- Commencement of International Searching Authority (ISA) and an International Preliminary Examining Authority (IPEA) functions.
- Setting up of the National Institute of Intellectual Property Management – training, education, research and IP think tank functions.

Unit 3 Introduction to Transactional Law: Creating Wealth and Managing Risk – The Employment Relationship in the Internet and Tech Sector – Contact for the Internet and Tech Sector - Business Assets in Information Age – Symbol and Trademark – Trolls and Landmines and other Metaphors

Introduction to Transactional Law:

Law is a term which does not have a universally accepted definition, but one definition is that law is a system of rules and guidelines which are enforced through social institutions to govern behavior. Laws can be made by legislatures through legislation (resulting in statutes), the executive through decrees and regulations, or judges through binding precedents (normally in common law jurisdictions). Private individuals can create legally binding contracts, including (in some jurisdictions) arbitration agreements that exclude the normal court process. The formation of laws themselves may be influenced by a constitution (written or unwritten) and the rights encoded therein. The law shapes politics, economics, and society in various ways and serves as a social mediator of relations between people.

All legal systems deal with the same basic issues, but jurisdictions categorise and identify its legal subjects in different ways. A common distinction is that between "public law" (a term related closely to the state, and including constitutional, administrative and criminal law), and "private law" (which covers contract, tort and property). In civil law systems, contract and tort fall under a general law of obligations, while trusts law is dealt with under statutory regimes or international conventions. International, constitutional and administrative law, criminal law, contract, tort, property law and trusts are regarded as the "traditional core subjects", although there are many further disciplines.

International law: International law can refer to three things: public international law, private international law or conflict of laws and the law of supranational organisations.
Public international law concerns relationships between sovereign nations. The sources for public international law development are custom, practice and treaties between sovereign nations, such as the Geneva Conventions. Public international law can be formed by international organisations, such as the United Nations (which was established after the failure of the League of Nations to prevent the Second World War), the International Labour Organisation, the World Trade Organisation, or the International Monetary Fund. Public international law has a special status as law because there is no international police force, and

courts (e.g. the International Court of Justice as the primary UN judicial organ) lack the capacity to penalise disobedience. However, a few bodies, such as the WTO, have effective systems of binding arbitration and dispute resolution backed up by trade sanctions.

Conflict of laws (or "private international law" in civil law countries) concerns which jurisdiction a legal dispute between private parties should be heard in and which jurisdiction's law should be applied. Today, businesses are increasingly capable of shifting capital and labour supply chains across borders, as well as trading with overseas businesses, making the question of which country has jurisdiction even more pressing. Increasing numbers of businesses opt for commercial arbitration under the New York Convention 1958.

European Union law is the first and, so far, only example of an internationally accepted legal system other than the UN and the World Trade Organisation. Given the trend of increasing global economic integration, many regional agreements—especially the Union of South American Nations—are on track to follow the same model. In the EU, sovereign nations have gathered their authority in a system of courts and political institutions. These institutions are allowed the ability to enforce legal norms both against or for member states and citizens in a manner which is not possible through public international law. As the European Court of Justice said in the 1960s, European Union law constitutes "a new legal order of international law" for the mutual social and economic benefit of the member states.

Constitutional and administrative law: The French Declaration of the Rights of Man and of the Citizen, which principles still have constitutional value Constitutional and administrative law govern the affairs of the state. Constitutional law concerns both the relationships between the executive, legislature and judiciary and the human rights or civil liberties of individuals against the state. Most jurisdictions, like the United States and France, have a single codified constitution with a bill of rights. A few, like the United Kingdom, have no such document. A "constitution" is simply those laws which constitute the body politic, from statute, case law and convention. A case named Entick v Carrington illustrates a constitutional principle deriving from the common law. Mr Entick's house was searched and ransacked by Sheriff Carrington. When Mr Entick complained in court, Sheriff Carrington argued that a warrant from a Government minister, the Earl of Halifax, was valid authority. However, there was no written statutory provision or court authority. The leading judge, Lord Camden, stated that,

The great end, for which men entered into society, was to secure their property. That right is preserved sacred and incommunicable in all instances, where it has not been taken away or abridged by some public law for the good of the whole ... If no excuse can be found or

produced, the silence of the books is an authority against the defendant, and the plaintiff must have judgment.

The fundamental constitutional principle, inspired by John Locke, holds that the individual can do anything but that which is forbidden by law, and the state may do nothing but that which is authorised by law. Administrative law is the chief method for people to hold state bodies to account. People can apply for judicial review of actions or decisions by local councils, public services or government ministries, to ensure that they comply with the law. The first specialist administrative court was the Conseil d'État set up in 1799, as Napoleon assumed power in France.

Criminal law: Criminal law, also known as penal law, pertains to crimes and punishment. It thus regulates the definition of and penalties for offences found to have a sufficiently deleterious social impact but, in itself, makes no moral judgment on an offender nor imposes restrictions on society that physically prevent people from committing a crime in the first place. Investigating, apprehending, charging, and trying suspected offenders are regulated by the law of criminal procedure. The paradigm case of a crime lies in the proof, beyond reasonable doubt, that a person is guilty of two things. First, the accused must commit an act which is deemed by society to be criminal, or actus reus (guilty act).

Second, the accused must have the requisite malicious intent to do a criminal act, or mens rea (guilty mind). However, for so called "strict liability" crimes, an actus reus is enough. Criminal systems of the civil law tradition distinguish between intention in the broad sense (dolus directus and dolus eventualis), and negligence. Negligence does not carry criminal responsibility unless a particular crime provides for its punishment.

Criminal law offences are viewed as offences against not just individual victims, but the community as well. The state, usually with the help of police, takes the lead in prosecution, which is why in common law countries cases are cited as "The People v ..." or "R (for Rex or Regina) v ...". Also, lay juries are often used to determine the guilt of defendants on points of fact: juries cannot change legal rules. Some developed countries still condone capital punishment for criminal activity, but the normal punishment for a crime will be imprisonment, fines, state supervision (such as probation), or community service. Modern criminal law has been affected considerably by the social sciences, especially with respect to sentencing, legal research, legislation, and rehabilitation. On the international field, 111 countries are members of the International Criminal Court, which was established to try people for crimes against humanity.

Contract law: The famous Carbolic Smoke Ball advertisement to cure influenza was held to be a unilateral contract Contract law concerns enforceable promises, and can be summed up in the Latin phrase pacta sunt servanda (agreements must be kept). In common law jurisdictions, three key elements to the creation of a contract are necessary: offer and acceptance, consideration and the intention to create legal relations. In Carlill v Carbolic Smoke Ball Company a medical firm advertised that its new wonder drug, the smokeball, would cure people's flu, and if it did not, the buyers would get £100. Many people sued for their £100 when the drug did not work. Fearing bankruptcy, Carbolic argued the advert was not to be taken as a serious, legally binding offer. It was an invitation to treat, mere puff, a gimmick. But the court of appeal held that to a reasonable man Carbolic had made a serious offer. People had given good consideration for it by going to the "distinct inconvenience" of using a faulty product. "Read the advertisement how you will, and twist it about as you will", said Lord Justice Lindley, "here is a distinct promise expressed in language which is perfectly unmistakable".

U/S 10, of Indian contract Act defined all agreements are contracts when they are enforceable by law.

Property law: A painting of the South Sea Bubble, one of the worlds first ever speculations and crashes, led to strict regulation on share trading. Property law governs ownership and possession. Real property, sometimes called 'real estate', refers to ownership of land and things attached to it. Personal property, refers to everything else; movable objects, such as computers, cars, jewelry or intangible rights, such as stocks and shares. A right in rem is a right to a specific piece of property, contrasting to a right in personam which allows compensation for a loss, but not a particular thing back. Land law forms the basis for most kinds of property law, and is the most complex. It concerns mortgages, rental agreements, licences, covenants, easements and the statutory systems for land registration. Regulations on the use of personal property fall under intellectual property, company law, trusts and commercial law. An example of a basic case of most property law is Armory v Delamirie [1722]. A chimney sweep's boy found a jewel encrusted with precious stones. He took it to a goldsmith to have it valued. The goldsmith's apprentice looked at it, sneakily removed the stones, told the boy it was worth three halfpence and that he would buy it. The boy said he would prefer the jewel back, so the apprentice gave it to him, but without the stones. The boy sued the goldsmith for his apprentice's attempt to cheat him. Lord Chief Justice Pratt ruled that even though the boy could not be said to own the jewel, he should be considered the rightful keeper ("finders keepers") until the original owner is found. In fact the apprentice and

the boy both had a right of possession in the jewel (a technical concept, meaning evidence that something could belong to someone), but the boy's possessory interest was considered better, because it could be shown to be first in time. Possession may be nine tenths of the law, but not all.

Beside these laws transactions can be made with respect to the labour law, industrial disputes law and the law related to employers and employee relations. In India the constitution prevailed all international law relevant to use the common laws.

The Employment Relationship in the Internet and Tech Sector

The technological progress over the last century has undergone a slow but definite transformation. This can be categorized into three different stages viz craftsmanship, mechanization and automation. Each of the stages had an influence on the nature of work and the skill level required to perform a job. The early craftsmanship was characterized by the worker/craftsman having control over the entire production process, from procuring the raw materials to the finished goods. This required end-to-end knowledge, where the worker got involved in activities right from pitching to potential customers to delivering the final product/ service. Each product/service could be characteristically unique as each reflected the skills of the employee. This model of operation can still be found in some of the present day service firms, what are termed as Service Complexes and Service Shops.

The second stage of mechanization was brought about by the application of principles of scientific management where tasks were broken down to simpler and specialized ones for large-scale production of standard goods, and methods of estimating a `proper day's work' for the worker were developed. This required a complete reorganization of the methods of production. The role of the individual worker transitioned from a highly skilled one in the craftsmanship era to being considered one of the `factors of production'. Mechanization also created a new portfolio of occupations such as engineers to design and produce the mass production machinery, the machine builders and tool makers and a wide range of skilled machine operators.

The third stage of automation not only carried forwards many of the features of mechanization but also qualitatively changed the way the worker undertook his/her job. The worker no longer directly got involved in the production process but monitored and maintained machines and helped in trouble shooting.

This necessitated the worker understand the production process and the machinery rather than using his skill to turn out a product. Technological change especially through automation has both advantages and disadvantages.

Automated systems allow few skilled individuals to do the work, which previously required numerous unskilled and semi-skilled workers. They also allow tasks that are beyond human capabilities or those dangerous or monotonous jobs that would be considered in human for people to perform. Further the labour intensive ways of production are expensive and restrict the market for the product, which has a negative effect on the employment in the long run. Automated systems tolerate few or no errors and hence lack the inherent human flexibility in production. Technology need not be restricted to just technical automation but can also involve a whole package of resources like capital, entrepreneurship and management. Further, technology as such is not quantified but what is quantified are those relating to its manifestations like a particular technique of production, productivity of a particular input, scale economics etc technological change at the firm level is operationalized in terms of R& D expenditure, technical collaborations and quality certifications.

With the liberalization of Indian economy in 1991 a number of private players started carving a major role in the economic output and simultaneously governments both at the centre and state levels started assuming a smaller role i n running businesses . Increased domestic and foreign competition resulting from the economic reforms induced domestic manufacturers to improve efficiency and bring into use advanced technologies on a larger scale. This is supported by the fact that during the period 1991-98 there were about 3250 technical approvals in India with the top five technical collaborators. The subsequent break down of trade barriers, globalization, advancements in Information and Communications Technology (ICT) and well accepted management ideas such as TQM on quality, JIT, Computer Integrated Manufacturing(CIM) & Lean Production (LP) have served to magnify the impact of technology on employment relationship globally and India in particular.

Trademark:

The Indian law of trademarks is enshrined the new Trade Marks Act, 1999 came into force with effect from September 15, 2003. The old Trade and Merchandise Marks Act, 1958 was repealed at the same time. The new Trademarks Act of 1999 is in line with the WTO recommendations and is in conformity with the TRIPS Agreement to which India is a signatory.

MAIN FEATURES OF NEW LEGISLATION IN INDIA

Under the new Trademarks Act of 1999: Registration of Service Marks allowed in addition to Trademarks for goods. No separate application necessary for each category/class of goods or services; a single application would do, however filing fee will be charged separately for each class of goods/services. The term of registration of trademark is ten years, subject to renewal

thereafter. The system of maintaining registration of trademark in Part A and Part B with different legal rights, dispensed away. Registration of trademarks which are imitations of well known trademarks not permitted. Registration of Collective Marks owned by associations allowed. Offences relating to trademark made cognizable.

- Filing Fees enhanced by more than 8 times.
- Extension of application of convention countries.

WHAT IS A TRADEMARK

A 'Mark' may consist of a word or invented word, signature, device, letter, numeral, brand, heading, label, name written in a particular style, the shape of goods other than those for which a mark is proposed to be used, or any combination thereof or a combination of colors and so forth. Subject to certain conditions, a trademark may also be symbolized by the name of a person, living or dead. Under the new law, service marks can be registered as well as trademarks.

For the purpose of registration, a mark chosen should be capable of distinguishing goods or services of one person from those of the others. Further it should not be deceptively similar to an existing mark of another person and not the one expressly prohibited under the Act.

The marks devoid of any distinctive character, or which are only indicative of the kind, quality, quantity, purpose, value or geographical origin of the goods, or which are marks already in vogue in the trade due to their customary use may not be registered. But these disqualifications do not apply to marks, which have already acquired distinction due to their popularity and consistent use. Internationally acclaimed brand names are freely available for use in India.

WHAT IS COVERED UNDER TRADEMARKS

A trademark is a mark used in relation to goods or services so as to indicate a connection in the course of trade between the goods or services and some person having the right as proprietor to use the mark.

WHAT IS THE FUNCTION OF A TRADEMARK

- ✓ It identifies the goods / or services and its origin.
- ✓ It guarantees its unchanged quality
- ✓ It advertises the goods/services
- ✓ It creates an image for the goods/ services.

HOW TO SELECT A TRADEMARK

- ✓ If it is a word it should be easy to speak, spell and remember.

- ✓ The best trademarks are invented words or coined words.
- ✓ Please avoid selection of a geographical name. No one can have monopoly right on it.
- ✓ Avoid adopting laudatory word or words that describe the quality of goods (such as best, perfect, super etc)
- ✓ It is advisable to conduct a market survey and a search at Trademark office to ascertain if same/similar mark is used in market.

WHAT ARE THE TYPES OF TRADEMARKS THAT CAN BE REGISTERED

Under the Indian trademark law the following are the types of trademarks that can be registered:

1. Product trademarks: are those that are affixed to identify goods.
2. Service trademarks: are used to identify the services of an entity, such as the trademark for a broadcasting service, retails outlet, etc. They are used in advertising for services.
3. Certification trademarks: are those that are capable of distinguishing the goods or services in connection with which it is used in the course of trade and which are certified by the proprietor with regard to their origin, material, the method of manufacture, the quality or other specific features
4. Collective trademarks: are registered in the name of groups, associations or other organizations for the use of members of the group in their commercial activities to indicate their membership of the group.

WHAT ARE DIFFERENT TYPES OF TRADEMARKS AVAILABLE FOR ADOPTION

Any name (including personal or surname of the applicant or predecessor in business or the signature of the person), which is not unusual for trade to adopt as a mark. An invented word or any arbitrary dictionary word or words, not being directly descriptive of the character or quality of the goods/service. Letters or numerals or any combination thereof. The right to proprietorship of a trade mark may be acquired by either registration under the Legislation or by use in relation to particular goods or service. Devices, including fancy devices or symbols Monograms Combination of colors or even a single color in combination with a word or device Shape of goods or their packaging Marks constituting a 3- dimensional sign. Sound marks when represented in conventional notation or described in words by being graphically represented.

WHO CAN APPLY FOR A TRADEMARK

1. A person who claims to be the proprietor of the trademark can apply for the registration of its mark for goods as well services.

2. A person may apply for registration of a trade mark to the Trademark office under whose jurisdiction the principal place of the business of the applicant in India falls.
3. In case, the principal place of business is outside India, then the application can be filed in the Trademark office under whose jurisdiction the office of the lawyer appointed by you is located.
4. In case of a company about to be formed, anyone may apply in his name for subsequent assignment of the registration in the company's favor.

Before making an application for registration it is prudent to conduct a trademark search in the Trademark office in context of the already registered trademarks to ensure that registration may not be denied in view of resemblance of the proposed mark to an existing one or prohibited one.

WHO CAN USE A TRADEMARK

The right to use a mark can be exercised either by the registered proprietor or a registered user.

WHAT ARE LEGAL REQUIREMENTS FOR REGISTRATION OF TRADEMARK IN INDIA

The legal requirements to register a trade mark under the Legislation are:

1. The selected mark should be capable of being represented graphically (that is in the paper form).
2. It should be capable of distinguishing the goods or services of one undertaking from those of others.
3. It should be used or proposed to be used mark in relation to goods or services for the purpose of indicating or so as to indicate a connection in the course of trade between the goods or services and some person have the right to use the mark with or without identity of that person.

WHAT IS THE DURATION OF A TRADEMARK IN INDIA?

Term of registration of a trademark is ten years, which may be renewed for a further period of ten years on payment of prescribed renewal fees. Non-user of a registered trademark for a continuous period of five years is a ground for cancellation of registration of such trademark at the behest of any aggrieved party.

CONVENTION APPLICATION AND INTERNATIONAL TREATIES

India has declared certain countries as convention countries, which afford to citizens of India similar privileges as granted to its own citizens. A person or company from a convention country, may within six months of making an application in the home country, apply for

registration of the trademark in India. If such a trademark is accepted for registration, such foreign national will be deemed to have registered his or her trademark in India, from the same date on which he or she made application in the home country.

Where the applications have been made for the registration of trademark in two or more convention countries, the period of six months would be reckoned from the date on which the earlier or earliest of those applications was made.

Although the recovery of damages for infringement of a trademark is possible only if the infringement takes place after the date of filing application for registration with the concerned trademark office in India, yet the deemed seniority in making application in home country may entitle the applicant to initiate an action in India for injunction, delivery of impugned labels and so on.

WHAT ARE BENEFITS OF TRADEMARK REGISTRATION

The registration of a trade mark confers upon the owner the exclusive right to the use of the registered trade mark and indicate so by using the symbol (R) in relation to the goods or services in respect of which the mark is registered and seek the relief of infringement in appropriate courts in the country. The exclusive right is however subject to any conditions entered on the register such as limitation of area of use etc. Also, where two or more persons have registered identical or nearly similar mark due to special circumstances such exclusive right does not operate against each other.

REMEDIES FOR INFRINGEMENT OF TRADEMARK IN INDIA AND PASSING-OFF

Two types of remedies are available to the owner of a trademark for unauthorized use of his or her mark or its imitation by a third party. These remedies are: an action for infringement' in case of a registered trademark; and an action for passing off' in the case of an unregistered trademark While former is a statutory remedy, the latter is a common law remedy. In an action involving infringement or passing off, a court may grant relief of injunction and/or monetary compensation for damages for loss of business and/or confiscation/destruction of infringing labels and tags etc.

Although registration of trademark is prima facie an evidence of validity of a trademark, yet the registration can not upstage a prior consistent user of trademark, for the rule is ‘priority in adoption prevails over priority in registration`.

HOW TO APPLY FOR REGISTRATION OF A TRADEMARK IN RESPECT OF PARTICULAR GOODS OR SERVICES

Goods and services are classified according to the International Classification of goods and services. Currently schedule IV of the Legislation provides a summary of list of such goods

and services falling in different classes which is merely indicative. The Registrar is the final authority in the determination of the class in which particular goods or services fall. The Schedule IV of the Legislation is annexed at the end of this questionnaire on trade marks.

WHAT PURPOSE THE TRADEMARK SYSTEM SERVES

- It identifies the actual physical origin of goods and services. The brand itself is the seal of authenticity.
- It guarantees the identity of the origin of goods and services.
- It stimulates further purchase.
- It serves as a badge of loyalty and affiliation.
- It may enable consumer to make a life style or fashion statement.

WHO BENEFITS FROM TRADEMARK REGISTRATION

- The Registered Proprietor: The Registered Proprietor of a trade mark can stop other traders from unlawfully using his trade mark, sue for damages and secure destruction of infringing goods and or labels.
- The Purchaser and ultimately Consumers of trademarks goods and services.
- The Government: The Trademarks Registry is expected to earn a substantial annual revenue, which is perpetually on the rise.

WHAT DOES THE REGISTER OF TRADEMARK CONTAIN

The register of trade mark currently maintained in electronic form contains inter alia the trade mark the class and goods/ services in respect of which it is registered including particulars affecting the scope of registration of rights conferred or disclaimers, if any; the address of the proprietors; particulars of trade or other description of the proprietor; the convention application date (if applicable); where a trade mark has been registered with the consent of proprietor of an earlier mark or earlier rights, that fact.

CAN ANY CORRECTION BE MADE IN THE APPLICATION OR THE REGISTER OF TRADEMARKS

Yes. But the basic principle is that the trade mark applied for should not be substantially altered affecting its identity. Subject to this changes are permissible according to rules detailed in the subordinate legislation.

CAN A REGISTERED TRADEMARK BE REMOVED FROM THE REGISTER

It can be removed on application to the Registrar on prescribed form on the ground that the mark is wrongly remaining on the register. The Registrar also can suo moto issue Notice for removal of a registered trade mark. Non use of a registered trademark for continuous period of 5 years is also a ground of removal.

CAN I APPLY FOR A DESIGN/LOGO REGISTRATION FOR SAME GOODS AND SERVICES IN BLACK & WHITE AS WELL AS COLOR

Yes. You can do so in one application as India recognizes the system of series application.

WHAT RECOURSE I HAVE IF A COMPETITOR HAS ALREADY REGISTERED MY MARK IN INDIA

The Indian trademark law provides for invalidation proceedings and you have the right to initiate a cancellation action should a competitor have registered your trademark in India. You also have the right to initiate either a civil or a criminal action against any party that is violating your mark in India.

WHO CAN USE SYMBOL ® IN INDIA

Only the proprietor of a trademark whose trademark has been registered in India can use the symbol ® in India. Using the symbol ® unless your mark has been registered in India is unlawful.

WHEN CAN THE SYMBOL ™ BE USED IN INDIA

Using this symbol with your trademark simply implies that you claim to be the proprietor of the trademark. There is no prohibition on the use of the symbol ™ in India.

WHAT IS THE PENALTY PRESCRIBED UNDER CRIMINAL LAWS FOR INFRINGEMENT OF A TRADEMARK IN INDIA

The penalty for selling or providing services using a false trademark is a minimum of six months and maximum of three years and with fine not less than Rupees fifty thousand but which may extend to Rupees two lakh.

AS A FOREIGN INVESTOR HOW CAN I REGISTER MY TRADEMARK IN INDIA

Registration of trademarks is one of the important protections that businesses should avail in India. Many foreign and domestic Applicants have been able to successfully register their marks in India. Indian courts have upheld many of those registrations and granted favorable decisions to rights holders.

In addition to the registering of their trademarks in India, businesses need to adopt other strategies for protecting their trademarks. Some of them are mentioned below:

Get trademark searches conducted in the Indian Trade Marks Registry in the classes that are of interest to you including the ancillary classes. Get common law searches (this includes the internet, market surveys, yellow pages and directories) conducted to ascertain whether third parties are using your trademarks and if so, the extent of such use.

Based on this information and after seeking the local counsel’s opinion decide if the trademark is available for use or not. Should the trademark be available for use, immediately

apply for the registration. The rights holder should also consider hiring a watching service to monitor the trademark journals in order to alert them to any published, deceptively similar trademarks or descriptive trademarks that might be of concern.

Should the rights holder own a trademark that has been used and has acquired goodwill and reputation, it is advisable that along with filing of the trademark application in India, they should also make press releases, publish cautionary notices and advertise the mark to ensure that the relevant section of the public is aware that they are entering the Indian market and are protecting their trademark from any kind of third party violation.

The rights holder should also take immediate steps to register their domain names including country coded top level domain names in India, as there have been many instances of third parties registering domains for certain well known marks with the intention of extracting money by selling these domain names to the rights holders.

Should the rights holder discover that their trademark is being infringed, they should take immediate steps to protect their trademark, either by the means of filing oppositions, cancellations, conducting investigations, sending cease and desist notices or initiating appropriate civil and criminal actions.

AS A FOREIGN CORPORATION CAN I FILE A SINGLE APPLICATION FOR USE OF MY MARK ON MORE THAN ONE GOOD OR IN ASSOCIATION WITH MORE THAN ONE SERVICE IN INDIA

Yes. India recognizes the system of multi-class applications and follows the International Classification. There are 42 classes in which the goods and services have been divided in India and you can file for multi-class applications both for goods and services.

BEING A FOREIGN CORPORATION, MUST I SELL MY PRODUCTS OR SERVICES IN INDIA BEFORE SEEKING TRADEMARK REGISTRATION

No, Indian trademark law allows filing of a trademark application in India on an ‘intent-to-use’ basis. However the registered proprietor of the trademark in India has to commence use of the mark within 5 years and 3 months of the date of registration. Otherwise the registered trademark is open to invalidation proceedings.

WHAT ARE THE SOURCES OF TRADEMARK LEGISLATION

(1) The national statute i.e., the Trade Marks Act,1999 and rules made there under .

(2) International multilateral convention.

(3) National bilateral treaty.

(4) Regional treaty.

(5) Decision of the courts.

(6) Office practice and rulings

(7) Decision of Intellectual Property Appellate Board.

(8) Text books written by academician and professional experts.

WHAT ARE THE FORMALITIES FOR MAJOR TRADEMARK TRANSACTIONS

For filing new applications there are prescribed forms depending on the nature of application such as Form TM-1, TM-2, TM-3, TM-8, TM-51 etc.

To file a Notice of Opposition to oppose an application published in the Trade Marks Journal (FormTM-5).

For Renewal of a Regd. trademark (Form TM-12).

Surcharge for belated renewal (Form -10)

Restoration of removed mark (Form TM-13)

Application for rectification of a registered trade mark (Form TM-26)

Legal Certificate (Form TM-46)

(Providing details of entries in the Register)

Official search request (Form TM-54).

Preliminary advise of the Registrar as to the registrability of a mark (Form TM-55).

Copyright search request and issuance of certificate (Form TM-60)

Unit 4 Regulatory, Compliance and Liability Issues – State Privacy Law - Date Security – Privacy issues - Controlling Over use or Misuse of Intellectual Property Rights

Regulatory, Compliance and Liability Issues IPR:

Intellectual property describes a wide variety of property created by musicians, authors, artists, and inventors. The law of intellectual property typically encompasses the areas of Copyright, Patents, and trademark law. It is intended largely to encourage the development of art, science, and information by granting certain property rights to all artists, which include inventors in the arts and the sciences. These rights allow artists to protect themselves from infringement, or the unauthorized use and misuse of their creations. Trademarks and service marks protect distinguishing features (such as names or package designs) that are associated with particular products or services and that indicate commercial source.

Copyright laws have roots in eighteenth-century English Law. Comprehensive patent laws can be traced to seventeenth-century England, and they have been a part of U.S. law since the colonial period. The copyright and patent concepts were both included in the U.S. Constitution. Under Article I, Section 8, Clause 8, of the Constitution, "The Congress shall have Power … To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." The first trademark laws were passed by Congress in the late nineteenth century, and they derive their constitutional authority from the Commerce Clause.

Intellectual property laws give owners the exclusive right to profit from a work for a particular limited period. For copyrighted material, the exclusive right lasts for 70 years beyond the death of the author. The length of the right can vary for patents, but in most cases it lasts for 20 years. Trademark rights are exclusive for ten years and can be continually renewed for subsequent ten-year periods.

Intellectual property laws do not fall in the category of Criminal Law, per se. Some copyright laws authorize criminal penalties, but by and large, the body of intellectual property law is concerned with prevention and compensation, both of which are civil matters. This means that the owner, not the government, is responsible for enforcement.

Intellectual property laws provide owners with the power to enforce their property rights in civil court. They provide for damages when unauthorized use or misuse has occurred. They also provide for injunctions, or court orders, to prevent unauthorized use or misuse.

The property protected by copyright laws must be fixed in a tangible form. For example, a musician may not claim copyright protection for a melody unless it has been written down or somehow actualized and affixed with a recognizable notation or recorded. A formula or device may not receive patent protection unless it has been presented in whole to the U.S. Patent and Trademark Office; even then, it must satisfy several tests in order to qualify. A symbol may not receive trademark protection unless it has been placed on goods or used in connection with services.

Copyright laws grant to authors, artists, composers, and publishers the exclusive right to produce and distribute expressive and original work. Only expressive pieces, or writings, may receive copyright protection. A writing need not be words on paper: In copyright law, it could be a painting, sculpture, or other work of art. The writing element merely requires that a work of art, before receiving copyright protection, must be reduced to some tangible form. This may be on paper, on film, on audiotape, or on any other tangible medium that can be reproduced (i.e., copied).

The writing requirement ensures that copyrighted material is capable of being reproduced. Without this requirement, artists could not be expected to know whether they were infringing on the original work of another. The writing requirement also enforces the copyright rule that ideas cannot be copyrighted: Only the individualized expression of ideas can be protected.

Copyrighted material must be original. This means that there must be something sufficiently new about the work that sets it apart from previous similar works. If the variation is more than trivial, the work will merit copyright protection.

Functionality can be a factor in copyright law. The copyrights to architectural design, for example, are generally reserved for architectural works that are not functional. If the only purpose or function of a particular design is utilitarian, the work cannot be copyrighted. For instance, a person may not copyright a simple design for a water spigot. However, if a person creates a fancy water spigot, the design is more likely to be copyrightable.

Copyrighted material can receive varying degrees of protection. The scope of protection is generally limited to the original work that is in the writing. For example, assume that an artist

has created a sculpture of the moon. The sculptor may not prevent others from making sculptures of the moon. However, the sculptor may prevent others from making sculptures of the moon that are exact replicas of his own sculpture.

Copyright protection gives the copyright holder the exclusive right to (1) reproduce the copyrighted work; (2) create derivative works from the work; (3) distribute copies of the work; (4) perform the work publicly; and (5) display the work. The first two rights are infringed whether they are violated in public or in private. The last three rights are infringed only if they are violated in public. Public showing is defined under the Copyright Act of 1976 as a performance or display to a "substantial number of persons" outside of friends and family (17 U.S.C.A. § 101).

Infringement of copyright occurs whenever someone exercises the exclusive rights of the copyright owner without the owner's permission. The infringement need not be intentional. Copyright owners usually prove infringement in court by showing that copying occurred and that the copying amounted to impermissible appropriation. These showings require an analysis and comparison of the copyrighted work and the disputed work. Many general rules also relate to infringement of certain works. For example, a character created in a particular copyrighted work may not receive copyright protection unless he or she is developed in great detail and a character in the disputed work closely resembles that character.

The most important exception to the exclusive rights of the copyright holder is the "fair use" doctrine. This doctrine allows the general public to use copyrighted material without permission in certain situations. To varying extents, these situations include some educational activities, some literary and social criticism, some Parody, and news reporting. Whether a particular use is fair depends on a number of factors, including whether the use is for profit; what proportion of the copyrighted material is used; whether the work is fictional in nature; and what economic effect the use has on the copyright owner.

The rise in electronic publication in the late twentieth century, particularly the widespread use of the Internet since the mid 1990s, caused new concerns in the area of copyright. A web site called Napster, which provided a file-sharing system whereby users could trade electronic music files, became one of the most popular sites on the Internet. The company had an estimated 16.9 million worldwide users, and the system accommodated about 65 million downloads. The Recording Industry Association of America sued Napster, eventually causing Napster to close down.

During the late 1990s, Congress enacted a series of laws that had significant impacts on the law of copyright. In 1998, Congress enacted the Sonny Bono Copyright Term Extension Act, Pub. L. No. 105-298, 112 Stat. 2827 (17 U.S.C.A. §§ 101 et seq.), which extended the terms of existing and new copyrights by 20 years, against the protests of several Lobbying groups. Also in 1998, Congress approved the Digital Millennium Copyright Act (DMCA), Pub. L. No. 105-304, 112 Stat. 2860 (17 U.S.C.A. §§ 101 et seq.), a broad-based piece of legislation that was designed to bring copyright law into the digital age.

Patent laws encourage private investment in new technologies by granting to artists the right to forbid all others to produce and distribute technological information that is new, useful, and non-obvious. The statutory requirements for patent protection are more stringent than those for copyright protection. Furthermore, because patent protection for commercial products or processes can give a tremendous market advantage to businesses, those seeking patents often find opposition to their applications. Patent protection can be obtained only through the U.S. Patent and Trademark Office.

The novelty requirement focuses on events that occur prior to the invention. Under Section 102 of the Patent Act, an invention is not novel if it is publicly used, sold, or patented by another inventor within 12 months of the patent application. This definition implements the public policy that favors quick disclosure of technological progress.

Often, two inventors apply for a patent for the same product or process within the same 12-month period. Three factors determine who wins the patent: the date and time that the product or process was conceived; the date and time that the product or process was reduced to practice; and the diligence that was used to pursue patent protection and to perfect the discovery. Generally, the first inventor to conceive the product or process has priority in the application process. However, if the second inventor is the first to reduce the product or process to practice, and the first inventor does not use diligence to obtain patent protection, the second inventor is given priority in the application process.The utility requirement ensures that the product or process receiving patent protection will have some beneficial use. The inventor must specify in the application a specific utility for the invention. If the application is for a patent on a process, the process must be useful with respect to a product. A process that is new and non-obvious, yet useless, does not increase knowledge or confer any benefit on society.

Non-obviousness is not the same as novelty. Not everything that is novel is non-obvious. Anything that is non-obvious is novel, however, unless it already has been patented. The non obviousness requirement focuses on existing technology, or "prior art." In determining whether an invention is non-obvious, the U.S. Patent and Trademark Office analyzes the prior art, examines the differences between the invention and the prior art, and determines the level of ordinary skill in the art. Generally, if an invention is obvious to a person of ordinary skill in the relevant art, it is not patentable.

When an inventor claims that his or her patent has been infringed, the court generally engages in a two-step process. First, it analyzes all of the relevant patent documents. It then reads the patent documents and compares them with the device or process that is accused of infringement. If each element of the accused device or process substantially duplicates an element in the patented device or process, the court may declare that the patent has been infringed. Infringement can occur only if another person uses, makes, or sells the patented device or process without the permission of the person who has received the patent.

When a patented device or process is infringed, the patent holder, or patentee, may recover in damages an amount equal to a reasonable royalty. If the infringement was willful, the infringing party may be forced to pay three times the reasonable royalty. If successful in court, the patent holder also may recover court costs and attorneys' fees. If the patent holder anticipates infringement, he or she may apply for an Injunction, which would prohibit a certain party from infringing the patent. An injunction may also issue after a finding of infringement, to prevent repeat infringement.

Trademark laws allow businesses to protect the symbolic information that relates to their goods and services, by preventing the use of such features by competitors. To receive trademark protection, a mark usually must be distinctive. Distinctiveness generally applies to any coined or fanciful word or term that does not closely resemble an existing mark. A mark generally will not receive trademark protection if it is a common or descriptive term used in the marketplace.

To receive trademark protection, a mark must be used in commerce. If two or more marketers claim ownership of a certain mark, the first user of the mark will usually receive the

protection. When the mark is known to consumers only in a limited geographic area, though, it may not receive protection in areas where it is unknown.

Infringement occurs if a mark is likely to cause confusion among consumers. In determining whether confusion is likely, the court examines a number of factors, including the similarity between the two marks in appearance, sound, connotation, and impression; the similarity of the goods or services that the respective marks represent; the similarity of the markets; whether the sale of the goods or services is inspired by impulse or only after careful consideration by the buyer; the level of public awareness of the mark; whether shoppers are actually confused; the number and nature of similar marks on similar goods or services; the length of time of concurrent use without actual confusion on the part of shoppers; and the variety of goods or services that the mark represents (In re E. I. du Pont de Nemours & Co., 476 F.2d 1357, 177 U.S.P.Q. 563 [1973]).

Defenses to infringement include fair use and collateral use. Fair use occurs when the second user, or repossessor, uses a protected mark in a non-conspicuous way to identify a component of a good or service. For example, a restaurant may use a protected mark to advertise that it serves a particular brand of soft drink, without infringing the mark. However, the restaurant may not identify itself by the mark without infringing the mark.

Collateral use is use of the same mark in a different market. For example, assume that a tree surgeon has received trademark protection for the mark Tree Huggers. This protection might or might not prevent a business that sells logging boots from using the same mark. However, if the mark for the boots is written or otherwise appears with the same defining characteristics as the mark for the tree surgeon, it risks being denied trademark protection, depending on whether it can be confused by consumers.

Remedies for infringement of a protected trademark consist of damages for the profits lost owing to the infringement; recovery of the profits realized by the infringer owing to the infringement; and attorneys' fees. A trademark holder also may obtain injunctive relief to prevent infringement.

Other Forms of Intellectual Property: The body of intellectual property law also includes laws relating to trade secrets, Unfair Competition, and the right of publicity. Trade Secret laws protect any formula, pattern, device, or compilation of information that provides a business advantage over competitors who do not use or know of it. A strategy to increase

worker productivity, for example, is a trade secret. Trade secrets do not receive patent protection because they are not inventive. Trade secret laws are included in intellectual property laws because, like other intellectual property laws, they prevent the unauthorized use of certain intangible subject matter.

The right of publicity is the right of a person to control the commercial value and exploitation of his or her name, voice, or likeness. Because right-of-publicity laws promote artistic and commercial pursuits, they are included among intellectual property law. These laws are usually reserved for celebrities and other public figures whose name and image are important to their career. By allowing celebrities the right to control the commercial use of their name, voice, and image, right-of-publicity laws protect the commercial potential of entertainers.

Developments Artists face problems protecting their property in other countries because not all countries subscribe to international agreements regarding intellectual property. This has led to widespread unauthorized copying. In the 1990s, China and Mexico were identified as especially serious offenders. In both countries, music and films are copied and sold openly without compensation to the creators. The United States threatened to impose trade sanctions against China if it did not observe international copyright treaties. Such threats illustrate that the United States places a high priority on protecting the right of artists to profit from their work.

Controlling Over use or Misuse of Intellectual Property Rights

Intellectual Property Rights (IPR) founded with the purpose of achieving economic development, technological advancement and consumer welfare. IPR are legal rights governing the use of such creations. This term covers a bundle of rights, such as patents, trademarks or copyrights, each different in scope and duration with a different purpose and effect. In short run, IPR encourages innovation and new products in the market.

During the late 19th century, the demand for Intellectual property rights increased due to high-tech development and expansion of international trade. Meanwhile Intellectual Property transactions in the international market increased which gave rise to contradictions regarding IPRs and regional restrictions. In order to resolve these contradictions, various international conventions were enacted. The convention of “Paris convention for protection of Industrial Property” was the first convention came up in 1883 established by Germany, France, Belgium and 10 other countries for the protection of Industrial Property, followed by “Berne Convention for the protection of Literary and arts” first of its kind for the protection of

Copyright. It was in 1993 when WTO adapted these international conventions. WIPO (World Intellectual Property Rights Organization) was established in 1970 and it was in charge of 20 international conventions relating to protection of intellectual property rights. TRIPS (Trade Related Aspects of Intellectual Property Rights) agreement in 1994 achieved the goal to link international trade with people's intellectual property rights. It succeeded in providing a more unified higher platform.

Intellectual Property Rights basically deals with:

Intellectual property (IP) refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. An Intellectual Property Right (IPR) is, an intangible right "protecting commercially valuable products of the human intellect"; it may comprise patents, copyrights, trademarks and other similar rights. An IPR includes the right to exclude others from exploiting the non corporeal asset.

IP is divided into two categories: Industrial property, which includes inventions patents, trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs.

Commission of India to penalise the IPR holders who misuse their dominant position. Furthermore, of the Act the Commission is also authorized to penalise the parties to an anti-competitive agreement, which is in contravention of Section 3 of the Act.9.

Innovation for future

The Shift…

- *The traditional wealth creation is through land, labor, and capital.*
- *The ability to create ,access and use of knowledge is the fundamental determinant of global competitiveness of enterprises and economics.*
- *The surge in patent applications is significant in knowledge based industries.*

The Few Reasons…

- *The shift towards knowledge-based industries placing importance on IPR assets*
- *The outsourcing of manufacturing activities*
- *The expansion of subject matter of patents*
- *The Bayh-Dole Act in US*

SMEs as Potential Growth Engines for countries economic growth…

- *They contribute to national economy in terms of GDP, employment generation export performance and achieving sustainable national economic Development*
- *SMEs require constant creativity and innovation to adapt to fast changing market conditions, short product cycles and intense completion*

SMEs competitiveness

To be internationally competitive

- *Need to constantly improve their efficiency and reduce their production costs*
- *This is by acquiring new technology Developing creative and appealing designs*

WHY IP PROTECTION TO SMEs

- *Without IP protection there is strong risk of infringement.*
- *It helps in creating the international brand and competitiveness.*
- *Patent the invention and commercialize or enter into license agreement,*
- *Keep the process a secret and commercialize the product.*

The Barriers

- *The limited knowledge and deficit information about patent system*
- *The cost of filing*
- *Time required to grant a patent*
- *Limited access to expert advice and human resource*
- *The success rate*
- *Many SMEs do not apply for patent protection at abroad*

- *In Us the enforcement of IP rights is more of problem for small enterprises than for larger firms.*
- *The less use of patent data base by SME*
- *The NTBs can not use IP assets as collateral*
- *High costs not only for acquiring but maintain monitoring and enforcing the IP assets*

Other than patents …..

- *The trade marks*
- *The trade secrets*
- *Copy rights*
- *Industrial designs…They can differentiate their products segment markets, create brand image find niche market*
- *Thus creating the exclusivity over the commercial use of the mark*

Continue…

The SMEs use other informal means of protection of IPRs

- *Secrecy*
- *Exploitation of lead –time*
- *Moving down the learning curve*
- *Use of complementary sales service capabilities*
- *Relationships on trust and confidence*

IPRs as Key Assets

Full name of the company	***Sensitive objects***
Location	*Paris*
No of employees	*26*
Main business activity	*Development , manufacture and sales of acoustic based human interface products*
Turnover In the last year	*$ i million*
Primary customers	*In all industries in which human machine interface are required*
	Company using IPR to get venture capital

IPR as a defense tool

Name of the company	***Vierling GERMENY***
Main business	*Production of devices to telecom industry also production and development of net work gateways between mobile wired line networks*
Focus of case	*management of full IPR potfolio*
Market	*Germany and Europe,*
Year of foundation	*1941*
No of employees	*230*
Management of full IPR portfolio ie 7 patents 22 pending, trademarks 4nos, and copy rights	

How are IPR adding value ?

Full name of the company	***Net insightAB***
Location	*stockholm*
No of employees	*90*
Turnover in last financial year	*$14.57 million*
Main business activity	*Next generation IP,TV and cable TV and media transport solutions*
Main markets	*US and EUROPE*
Reasons for applying the patents	*For licensing, protective mechanism from the competitors who would be entering into market with similar products*
Year of foundation	*1997*
Focus	*IPRs as necessity than an strategic option*

Measures for encouraging more effective use of IP System by SMEs

- *An integrated approach.*
- *To meet the immediate requirements of SMEs such as marketing , new product development, exporting and finance.*
- *Providing Value added technical information service turning into more workable knowledge.*
- *Mexico model of decentralizing sub- offices.*

The cross sector Cooperation

- *The increasing cooperation and coordination between R&D centers IP offices, universities, incubators, chambers of commerce, industry ,SMEs, inventers, and venture capitalists…….Korean model*

WIPO Initiatives

- *SMEs division is established in october2000*
- *Substantial new program of activities focusing on ip related needs of SMEs worldwide*
- *SME policy guidelines*
- *Distance learning programs ect..*

SMEs Development Policy

- *Inclusion of I P modules in training programs of entrepreneurs*
- *Inclusion of IP in sectoral programs for the development of SMEs specific target industries*
- *R&D funds to promote the Commercialization of R&D results….etc*

IP system by SMEs fall into five categories…

- *Awareness Raising and training on IP*
- *Technological information*
- *Customized advisory service*
- *Assistance for IP exploitation and technology transfer*

They can facilitate …

- *Awareness-raising and training on IP*
- *Technological information service*
- *Customized advisory service on IP*
- *Assistance for IP exploitation and technology transfer*

Pilot study by WIPO….

- *Most of the pilot survey done on High-tech incubators consider they are very important.*
- *They also of the opinion that having their IP rights or having a licensing technology with other firms would help them to position them in global markets.*
- *Close links with universities and other R&D institutions and clear rules on ownership of inventions.*

The initiatives by MSME in INDIA

- *The MSMED Act 2006 passed to provide legal frame work to address the developmental concern of SMEs*
- *Need for national IPR program for India*

1. *Awareness programs*
2. *Pilot studies*
3. *Interactive seminars*
4. *Setting up of IP advisory cell*
5. *Finical assistance on grant of patents etc…*

Categories of Best Practices

- *Awareness-raising and Training…Ex. IP Australia, India,*
- *Technological information, Canada*
- *Financial Assistance... Ex. Tax reduction for Technology acquisition interest free loan, Spain*
- *Assistance on IP Exploitation and commercialization. Japan patent office, data base of licensable technology preparation of patent maps*

The Enforcements Includes

- *The settlement of IPR disputes through Arbitration and mediation.*
- *Ensuring fast and efficient procedures for settlement of IP related disputes and preferably out of court settlements.*

The recent trends…

- *The introduction electronic filing by IP office*
- *The in built mechanisms in patent legislations*
- *Recognition of petty patents*

The Vision …

- *IP Empowerment. The policy frame work and business environment conducive to SMEs to use IP System*
- *Full Exploitation of innovative and creative potential through effective use of IP system*
- *And wealth creation through IP – oriented Knowledge by SMEs*