

UNIT II**ENGINEERING ETHICS****Learning Objectives**

After reading this unit, you will be able to

- ✓ Understand the term engineering ethics.
- ✓ Explain the types of inquiry.
- ✓ Understand the meaning of moral dilemmas.
- ✓ Understand the meaning of moral dilemmas and moral autonomy.
- ✓ Explain the theories of moral development Kohlberg and Gilligan.
- ✓ Describe the need of consensus and controversies.
- ✓ Understand the models of professional roles.
- ✓ Understand the roles of customs and religion.
- ✓ Explain the uses of ethical theories.

2.1. ETHICS

The term ethics is from the Greek word ethos refers to the philosophical science that deals with the rightness and wrongness of human actions.

2.1.1. Why People are unethical?

Individually most of us intuitively know what is good and what is bad. In spite of this people act unethically. Unethical acts are due to

- i. Un awareness
- ii. Insensitivity to issues
- iii. Selfishness
- iv. Faulty reasoning
- v. Pressure

Because of the above mentioned reasons, people, in spite of knowing ethics, become unethical in their acts. The ethical values break down when you are not aware of what is unethical or you feel that it is not very important and ignore by being insensitive to the issues. Sometimes self-interest over rules ethics and one feels that one has done right thing. Many a time people give wrong justification for an unethical act especially when done under pressure. For example, a student may copy when there is threat from the teacher or parents that he would be punished severely for failing in the examination..

Under pressure, he may copy. Similarly when there is strong requirement for money go for pick pocketing or defrauding. The person, in these cases is aware that what he did was wrong.

2.1.2. Why Study Ethics?

Study of ethics helps in

- a. Bringing clarity in thought and help in reasoning
- b. Reinforcement of ethics.
- c. People who want to be ethical
- d. People becoming virtuous
- e. Adjusting to and adhering to organisational values
- f. Reduce and avoid stress
- g. Build character
- h. Facing moral ethical dilemmas with confidence

2.2. PROFESSION

A profession is a type of job that requires specialized training and qualification in performing the required activities in order to earn a living.

The Oxford dictionary gives two definitions:

1. A job that needs training and formal education.
2. A body of people engaged in a type of job.

2.2.1. Characteristics of a Profession

Professionals can be defined by three characteristics they are in a chosen field they are expected to use their expertise responsibility and they identify themselves as professional, professing membership of a distinguished group.

i. Expertise

Theoretical and practical knowledge gained through education and training in the chosen field makes him/her an expert. It requires acquisition of special knowledge and skills through extensive formal education, systematic studies and training. It also involves continuous education and updation of knowledge.

ii. Use of knowledge and expertise for public good

Like medicine for promoting health, law is towards protecting the public's legal and engineering towards promoting the public's health, safety and welfare. This is the main plank of responsibility.

iii. Membership of an organization or society

The organizations are usually controlled by members of profession. They lay down the rules of standards, evolve and enforce a code of conduct and represent the profession to the public and government. Because of professional associational and rules governing their membership, public can assume that any certified professional be it a physician or an engineer or an account, he/she will have atleast a minimal degree of knowledge and skill competency.

2.2.2. Professionalism

Professionalism refers to the qualities, competencies and skills of professionals. It has behavioral connotations and refers to the manifestations of a professional. When the criteria of profession are applied to ones vocation or calling it makes for professionalism.

2.2.3. Characteristics of a Professional

Entering into a profession requires an extensive amount and period of intellectual training.

- ✓ A professional's skills and knowledge are based on theory.
- ✓ A professional's skills and knowledge are vital to the well of the society.
- ✓ Professionals have a commitment to do public good.
- ✓ They usually have an unusual degree of autonomy in the work place.
- ✓ They are regulated by ethical standards, generally by code of ethics of the professional society they belong to.
- ✓ They have a significant degree of self regulation.

2.2.4. Engineer

The dictionary defines an engineer as one who designs, makes or works with machinery.

2.2.5. Engineering

- a. The work, science or professions of an engineer.
- b. The practical application of scientific in the design, building and control of machines, roads, bridges, electrical apparatus, chemicals etc.

Engineering Ethics

Engineering ethics is concerned with rules and standards governing the conduct of engineering in their role as professionals. It is a body of philosophy guiding the ways that engineers should conduct themselves in their profession.

2.2.6. Micro Ethics and Macro Ethics

There can be two approaches to engineering ethics:

- a. The first one emphasizes the typical day to day problems in engineering practices, such as deciding upon the factor of safety. This is called micro ethics.
- b. The second approach emphasizes on the social problems like intentional or deliberate deviations often due to grafting or corruption. These ethical problems generally are dormant and are not addressed till they resurface unexpectedly in an high magnified form and becomes a regional or national or even an international issue. This is called macro ethics.

2.2.7. Why Ethics for Engineers?

Engineering as a profession creates products and process may only to satisfy the basis needs of man, but also enhance the conveniences, comforts, power and aesthetics of everyday life. These products and process are very much concerned with public life, more specifically with public health and safety. Engineers constantly involve themselves in the this process.

While making expert judgement, engineers constantly to choose. He may consider the alternative he chooses as the best. But others, his colleagues or his managers or his customers, may not agree with that alternative being the best. This is because every alternative appears equally good or bad to different persons.

So the concept of ethics of ethics as well as understanding of the guidelines would help engineers identify the better alternative that would be good for all. The engineers would thus be able to respond appropriately to different ethical challenges during their career. Ethics would certainly show a lot of things that go wrong in the workplace, which have people's issues wrapped up in them.

2.3. SENSES OF ENGINEERING ETHICS

There are two different senses (meanings) engineering ethics, namely the normative and the descriptive senses.

1. The normative sense include:
 - a. Knowing moral values, finding accurate solutions to moral problems and justifying moral judgments in engineering practices,
 - b. Study of decisions, policies and values that are morally desirable in the engineering practice and research, and
 - c. Using code of ethics and standards, and applying them in their transactions by engineers.

2. The descriptive sense refers to what specific individual or group of engineers believe and act, without justifying their beliefs or actions.

2.4. VARIETY OF MORAL ISSUES

It would be relevant to know why and how moral issues arise in a profession or why do people behave unethically? The reasons for people including the employer and employees behaving unethically may be classified into three categories

a. Resource crunch

Due to pressure, short time, availability of money or budgetary constraints and technology decay or obsolescence. Pressure from the government to complete the project in time (e.g., before the elections), reduction in the budget because of sudden war or natural calamity (e.g., flood, earthquake, Tsunami) and obsolescence due technology innovation by the competitor lead to manipulation and unsafe and unethical execution of projects.

Involving individuals in the development of goals and values and developing policies that allow for individual diversity, dissent and input to decision making will prevent unethical activities.

b. Opportunity

- i. Double standards or behaviour of the employers towards the employees and the public. The unethical behaviors of world corn (in USA), Enron (in USA as well as India) executives in 2002 resulted in bankruptcy for those companies.
- ii. Management projecting their own interests more than that of their employees. Some organizations over emphasize short term gains and results at the expense of themselves and others.
- iii. Emphasis on results and gains at the expense of the employees.
- iv. Management by objectives, without focus on empowerment and improvement of the infrastructure.

This is best encountered by developing policies that allow 'conscience keepers' and whistle blowers and appointing ombudsman, who can work problems internally.

c. Attitude

Poor attitude of the employees are due to

- i. Low morale of the employees because of dissatisfaction and downsizing.
- ii. Absence of grievance redressal mechanism.
- iii. Lack of promotion or career development policies or denied promotions.
- iv. Absence of recognition and reward system.

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- v. Lack of transparency.
- vi. Poor working environments.

Giving ethics training for all, recognizing ethical conduct in work place, including ethics in performance appraisal, and encouraging open discussion on ethical issues, are some of the directions to promote positive among the employees.

To get firm and positive effect, ethical standards must be set and adopted by the top management with input from all personnel.

2.5. TYPES OF INQUIRY

Inquiry means an investigation. The three types of inquiries are

- i. Normative inquiry
- ii. Conceptual inquiry.
- iii. Factual or descriptive inquiry

Normative inquiry

It seeks to identify justify the morally desirable norms or standards that should guide individual and groups. It also has the theoretical goal of justifying particular moral judgments. Generally, normative questions are about what ought to be and what is good based on moral values for examples,

1. How far does the obligation of engineers to protect public safety extend in given situations?
2. When if ever, should engineers be expected to blow the whistle on dangerous practices of the employers for whom they work?
3. Why must some engineering information kept confidential?
4. When and why is government justified in interfering with true enterprise? 5. What are the reasons on which the engineers show their obligations to their employees or clients or the public?

Conceptual inquiry

It is directed toward clarifying the meaning of concepts, principles and issues in engineering ethics. For examples,

1. What is meant by safety?
2. How is it related to risk?
3. What is a bribe?
4. What is a professional?

Which moral concepts are discussed, normative and conceptual issues are closely interconnected.

Factual or descriptive inquiry

It seek to provide facts needed for understanding and resolving value issues. It seek to uncover information bearing upon value issues.

Where possible researches attempt to conduct factual inquiries using proven scientific techniques. They provide important information about the business realities of contemporary engineering practice, the history of the engineering profession, the effectiveness of professional societies in fostering moral conduct, the procedures used in making risks assessments, and psychological profile of engineers. The facts provide not only the reasons for moral problems but also us to develop alternative ways of resolving moral problems. For example,

1. How were the benefits assessed?
2. What are the procedures followed in risk assessment?
3. What are the short term and long term affects of drinking water being polluted?
4. Who conducted the tests on materials?

2.6. MORAL DILEMMAS

Moral dilemmas are situations in which two or more moral obligations, rights, goods, or, deal come into conflict with one another, and it appears that not all of them can be fully respected.

It is also possible for one moral principle to have two or incompatible applications in given situation.

Moral dilemmas occur frequently, although usually there is only moderate difficulty in seeing what should be done we make a promise to a friend, thereby creating an obligation to do what we have promised. Then our parents become ill and staying home to help them prevents us from keeping the promise. The dilemma, which consists of a conflict between the duty to keep promises and an obligation to one's parents, is usually resolved an apologetic phone call to the friend.

Or again, we make one promise to our employer and another to a colleague, and it turns out that we cannot keep both. Hence the general duty to keep promises has two incompatible applications. Once again, an apology to the offended party will often settle the matter.

Dilemmas are not always so easily addressed

Resolving some of them can require searching, even agonizing, reflection contemporary engineering practice makes it virtually inevitable that most engineers will be confronted with moral dilemmas during their careers. Indeed, this is true for all professionals whether they be physicians, lawyer's or teachers.

There are some difficulties in arriving at the solution to the problems, in dilemma.

The three complex situations leading to moral dilemmas are

1. Vagueness:

One is unable to distinguish between good and bad (right or wrong) principle. For example, code of ethics specifies that one should obey the laws and follow standards. An engineer starting a new job, for example, may have doubts above whether it is morally permissible to accept an expensive desk as a gift from a salesperson with whom her company does business. Would this be regarded as accepting a bribe? Would it create a conflict of interest?

2. Conflicting reasons:

One is unable to choose between two good moral solutions. One has to fix priority though knowledge or value system.

3. Disagreement:

There may be two or more solutions and them mandatory. These solutions may be better or worse in some respects but not in all reasons, and analyze and rank the decisions.

Select the best suitable, under the existing and the most probable conditions.

2.6.1. Steps in Confronting Moral Dilemmas

The logical steps in confronting moral dilemma are

1. Identify the relevant moral factors and reasons. What are the conflicting responsibilities, competing rights and clashing ideals involved?
2. Gather all available facts that are pertinent to the moral factors involved.
3. If possible rank, the moral considerations in order of importance as they apply to the situation.
4. Generate alternative courses of action as ways of resolving the dilemma, tracking the full implications of each.
5. Discuss with colleagues, friends and obtain their perspectives, priorities and suggestions on various alternatives.

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

2.7. MORAL AUTONOMY

- ✓ Autonomy literally means self-determining or independent.
- ✓ It is the skill and attitude of thinking rationally about the ethical issues on the basis of moral considerations and the general response to moral issue.
- ✓ It is the ability to think critically and independently about moral issues and to apply this critical thinking to the situations that arise in course of professional practices.
- ✓ It is concerned with the independent attitude of an individual related to ethical issues.

2.7.1. Factors Influencing the Moral Concern

1. Atmosphere in which the person is brought up in his childhood.
2. One's relationship with friends and relatives.
3. One's interaction with peers, colleagues and neighbor's.
4. Novels, movies and inspiring teachers and other mentors.
5. Influence of media like newspaper, televisions etc.
6. Influence of family.
7. Influence of some social events.
8. Influence of religious institutions such as temples, churches, mosques etc.

2.7.2. Skill Required to Improve Moral Autonomy

1. Proficiency in recognizing moral problems and issues in engineering. This involves being able to distinguish them from, as well as relate them to, problems in law, economics, religious doctrine or descriptions of physical systems.
2. Skill in comprehending, clarifying, and critically assessing arguments on different aspects of moral issues.
3. Ability to form consistent and comprehensive view points based on facts.
4. Awareness of alternative responses to the issues and creative solutions for practical difficulties.
5. Sensitivity to genuine difficulties and subtleties. This includes willingness to undergo and tolerate some uncertainty in making troublesome moral judgments or decisions.
6. Using rational dialogue in resolving moral conflicts and developing tolerance of different perspectives among morally reasonable people, and
7. Maintaining moral integrity.

2.8. MORAL DEVELOPMENT

2.8.1. Kohlberg Theory

Moral development in human being occurs overage and experience. Lawrence Kohlberg suggested there are three levels of moral development.

- i. Pre conventional level
- ii. Conventional level
- iii. Post conventional level

They are distinguished based on the type of reasoning and motivation of the individuals in response to moral questions.

Pre conventional level

Most primitive is the pre-conventional level, in which right conduct is regarded as whatever directly benefits oneself. At this levels, individuals are motivated by obedience or the desire to avoid punishment or to satisfy their own needs or by the influence by power on them. This is the level of development of all young children and a few adults who never manage to go beyond it.

Conventional level

At the conventional level, people respect the law and authority. Rules and norms of one's family or group or society is accepted, as the standard of morality. Individuals at this level are motivated by the desire to please others and to meet the expectations of the social unit, regardless of immediate effects on their self interest. Loyalty and close identification with others have overriding importance. Kohlberg's studies reveal that most adults never mature beyond this stage.

Post conventional level

Finally, the post conventional level is attained when an individual comes to regard the standard of right and wrong as a set of principles concerning rights and the general good that are not reducible to self - interest or social conventions. Kohlberg calls these for themselves and do not assume that customs are always right. They follow the golden rule, 'Do unto others as to would have them do unto you' This maintain moral integrity, self respect and respect for others.

Kohlberg believed that individuals could only progress through those stages, one stage at a time.

He believed that most of the moral development occurs through social interactions.

2.8.2. Gilligan's Theory

One of Kohlberg's former students and colleagues has challenged his work on precisely this point and done so in a manner relevant to contemporary debates over male and female approaches to morality. In a different voice, Carol Gilligan charges that Kohlberg's studies are distorted by a male bias. Not only did he conduct his studies primarily with male subjects, but according to Gilligan he approached his studies with a typically male preoccupation with, general rules and rights. According to Gilligan's studies men had a tendency to solve problems by applying abstract moral principles. Men were found to resolve moral dilemma by choosing the most important moral rule, overriding other rules. In contrast, women gave importance to preserve personal relationships with all the people involved. The context oriented emphasis on monitoring personal relationships was called the ethics of care, in contrast with the ethics of rules and rights adopted by them.

Gilligan revised the three levels of moral development of Kohlberg, as stages of growth towards ethics of caring.

Pre conventional level

This is same as Kohlberg's first level in that the person is preoccupied with self centered reasoning. Right conduct is viewed in a selfish manner as solely what is good for oneself.

Conventional level

Here there is the opposite preoccupation with not hurting others and willingness to sacrifice one's own interests in order to help or nurture other. Women are especially prone to fall prey to the cultural stereo types that pressure them always to be willing to give up their personal interests in order to serve the needs of others.

Post conventional level

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. The aim is to balance one's own needs with the needs of others, while maintaining relationships based on mutual caring. This is achieved through context oriented reasoning, rather than by applying abstract rules in a hierarchy of importance.

2.8.3. Heinz's Dilemma

The difference in Kohlberg theory and Gilligan's theory is explained through the well known example, Heinz's dilemma involves a woman living in Europe who will die from

cancer unless she obtains an expensive drug that the doctors think will help her. Heinz being poor could not buy the costly medicine for his sick wife, at ten times the normal cost. Initially he begged the pharmacist to sell at half the price or allow him to pay for it later. Pharmacist refused to oblige him either way. Finally he forcibly entered the pharmacy and stole the drug. Was the theft morally right or wrong?

According to Kohlberg study, men observed that the theft was morally wrong at the conventional level, because the property right was violated. But men at the post conventional level, concluded that the theft was right, as the life of the wife is more important than the property right of the pharmacist.

On the other hand in Gilligan's study, a majority of the women gave the conventional opinion that Heinz was wrong. They observed that instead of stealing he could have tried to find creative ways to raise the necessary money or payment in installments to convince the pharmacist.

2.9. CONSENSUS AND CONTROVERSY

Literally, consensus means 'agreement' and controversy means 'disagreement'. In the course of his duty, an engineer has to exercise his moral autonomy. Similarly, every engineer related to his duty also exercises his autonomy. The concept of moral autonomy is more subjective than objective, and even Aristotle says that the subject of morality is not a precise and clear cut one like arithmetic's.

Every engineer has his own interpretation and concept of morally on the performance of the same duty. Hence, there is always a possibility of two ethical persons disagreeing with the ethical conclusions of the other, which is due to the differential development of moral autonomy of each.

This agreement and disagreement, though each is right on his own, are called consensus and controversy respectively. Since this type of disagreements are inevitable, there should be some extent of tolerance among individuals. As per the principle of tolerance, the goal of practicing ethics is not only to produce an agreed conformity, but also to highlight and adobe ways of promoting tolerances to achieve moral autonomy.

The conclusion is many reasonable solutions are possible to a given ethical problem.

2.10. MODELS OF PROFESSIONAL ROLES

The profession of engineering is aimed at promoting the public good, or as is commonly said in code of ethics, the public safety, health and welfare. Engineers play several roles in their career.

1. Savior

The engineer as a savior, save the society from poverty, illiteracy, wastage, inefficiency, ill health, human dignity and lead it to prosperity through technological development and social planning.

2. Guardian

Engineers guards the interests of the poor and general public. Yet it is they who know best the directions in which, and pace at which, technology should develop. Accordingly, they should be given positions of high authority based on their expertise in determining what is in the best interests of society.

3. Bureaucratic servant

He serves the organization and the employers. Within the corporate setting in which engineers work, management should make the decisions about the directions of technological development. The proper role of the engineer is to be the servant or handmaiden who receives into concrete achievements.

4. Social servant

The role of engineers lies exclusively in obedient service to others, but their true master is society. Engineers, in receiving society's directives and satisfying society's desires.

5. Social enabler and catalyst

Engineer is one who changes the society through technology. The engineer must assist the rearrangement and the society to understand their needs and make informed decisions on the desirable technological development and minimize the negative effectives of technology on people and their living environment. Thus, he shines as a social enabler and a catalyst for further growth and development.

6. Game player

Engineers are neither servants and nor master of anyone. Instead they play by the economic game rules that happen to be in effect at a given time. He plays a unique role successfully within the organization, enjoying both the pleasures work of technological and the satisfaction of winning and moving ahead in a competitive world.

2.11. ETHICAL THEORIES (ABOUT RIGHT ACTION)

Ethical theories help one to approach moral dilemmas by providing frameworks to assess the relevant moral factors involved and try offering guidance. This session introduces four types of ethical theories that are prominent in contemporary philosophy. They are

- i. Virtue ethics
- ii. Right ethics
- iii. Duty ethics
- iv. Utilitarianism

2.11.1. Theories about Virtues

This theory emphasizes on the character rather than the rights or duties. The character is the pattern of virtues. The two basis theories about virtues are

- i. Aristotle virtue and the golden mean
- ii. Mac Intyre virtue and practices

Aristotle defined the virtues as acquired habits that enable us to engage effectively in rational activities that defined us as human beings. He regarded wisdom or good judgement as the most important virtue. Good judgment is necessary for successful rational activities that range from engineering to philosophical inquiry.

Moral virtues are tendencies, acquired through habit formation, to reach a proper balance between extremes in conduct, emotion, desire and attitude. According to this theory, virtues are tendencies to find. The Golden mean between the extremes of too much (excess) and too little (deficiency). For example,

- i. courage is the appropriate middle ground between foolhardiness (the excess of rashness) and cowardice (the deficiency of self control and clear thought in the face of danger).
- ii. Truthfulness is the between revealing all information in violation of tact lacking in candor (deficiency).
- iii. Generosity is the virtue lying between wasting one's resources (excess) and being miserly (deficiency).
- iv. Friendliness is being agreeable and considerate without being annoyingly effusive (excess) or sulky and surly (deficiency).

Aristotle thought of each virtue as governing a particular aspect of our lives. Thus courage governs confrontations with danger and risk truthfulness governs truth telling generosity governs giving and friendliness governs personal relationships.

Mac Intyre virtues and practices

Mac Intyre stimulated with the idea of social practices cooperative activities aimed toward achieving public goods that could not otherwise be achieved, atleast not to the same degree. These goods are internal to the practices are all about. Hence they differ from external goods, like money different prestige which can be achieved through many different kinds of activities and be achieved through many different kinds of activities and do not define any specific practice. For example,

- i. The primary internal good of medicine is the promotion of health.
- ii. The primary internal good of law is social justice.
- iii. The internal good of teaching is learning and self development.

In this way, moral aims concerning the good of persons are built into very meaning of professions and hence professionalism. Professionalism is defined by service to some important aspect of the public good in addition to the exercise of advanced theoretical and practical knowledge

2.11.2. Right Ethics

Rights are entitlement to act or to have another individual act in a certain way. Minimally, rights serve as a protective barrier, shielding individuals from unjustified infringement of their moral agency by others. For every right, we have a corresponding duty of non interference. The two basic theories are

- i. Locke Liberty Rights
- ii. Melden Liberty and Welfare Rights

Locke Liberty Rights

John Locke argued that to be a person entails having rights human rights to life liberty, and the property generated try one's labor. Locke's own version of human rights was highly individualistic. He viewed rights primarily as 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.

Melden Liberty and Welfare Rights

This second version of right ethics conceives of human rights as intimately related to communities of people. A. J. melden argued that having moral rights pre supposes the

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capacity to show concern for others and to be accountable within a moral community. The extent of right, in his view, always has to be determined in terms of interrelationships among persons. Mill's account allows for more positive welfare rights, which he defined as rights to community benefits needed for living a minimally decent human life.

2.11.3. Duty Ethics

Duty ethics states that there are moral duties such as being honest, being fair to others etc that should be formed regardless of whether these acts lead to the most good. The two versions of duty ethics are,

- i. Kant's Theory of Duty Ethics
- ii. John Rawl's Theory of Duty Ethics

Kant's Theory of Duty Ethics

Immanuel Kant is the most famous of the ethicists who regard duties, rather than good consequences, as fundamental. In his view, right actions are those required by a list of duties such as be honest, keep your promises, don't inflict suffering on other people, be fair, make reparation when you have been unfair, show gratitude for kindness extended by others. There are also duties to ourselves: seek to improve one's own intelligence and character, develop one's talents, don't commit suicide.

According to Kant, it is because they meet three interwoven conditions

- i. They express respect for persons.
- ii. They are universal principles.
- iii. They express an unqualified command for autonomous moral agents.

Rawl's Two Principles

John Rawls, whom many people regard as the leading ethicist of our time, has developed Kant's ideals in fresh directions. According to Rawls, valid principles of duty are those that would be voluntarily agreed upon by rational persons in an imaginary contracting situation.

Rawls believes that placing ourselves (in imagination) in this hypothetical contracting situation helps us to reason more easily and honestly about moral principles. It enables us to check our intuitions and to set aside our biases. His view is Kantian in that in forming agreements with other rational people.

All rational people, Rawls argues, will agree in this hypothetical situation to abide by two basic moral principles applicable to societies and social institutions like professions:

- 1) Each person is entitled to the most extensive amount of liberty compatible with an equal amount for others, and
- 2) Differs in social power and economic benefit are justified only when they are likely to benefit everyone, including members of the most disadvantaged groups.

The first principle is most important and should be satisfied first. Without basis liberties no other economic or social benefits can be sustained in the important, however. It insists that allowing some people great wealth and power is justified only when all other groups benefit. Thus it must be argued that allowing differences of this sort within the free enterprise system is permissible in so far as it provides the capital needed for businesses to prosper, thereby providing job opportunities and to found a welfare system to help the poor.

2.11.4. Utilitarianism

- ✓ Utilitarianism is the view that we ought to produce the most good for the most people giving equal consideration to everyone affected.
- ✓ The standard of right conduct is maximization of goodness.
- ✓ Emphasizing, but maximizing the well being of society.
- ✓ Emphasizing is not maximizing the well-being of individual, but maximizing the well-being of society.

For example consider the construction of dams across the rivers Dams often lead to great benefits to society by providing stable supply of drinking water, flood control, irrigation etc. But these benefits often come at the expense of people who live in that area that will floods by dam and they have to find new of horns.

Utilitarianism tries to balance the need of individual with what will provide the most benefit to most people. The branches of utilitarianism are

- i. Act utilitarianism
- ii. Rule utilitarianism

Act utilitarianism

The act utilitarianism concept was developed by John Stuart Mill. Act-utilitarianism says we should focus 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. Everyday maxims like "Keep your promises", "Don't deceive", and not to give and get bribe are only rough guidelines. According to him, these maxims are useful rules of thumb that summarize past human experience about the types of actions that usually

maximize utility. But, the rules should be broken whenever doing so will produce the most good in a specific situation

Mill believed that happiness is the only intrinsic good, that is, something good in and of itself, or desirable for its own sake. All other good things are instrumental goods in that they provide means for happiness. A trip to the dentist, for example, is an instrumental good that promotes happiness by avoiding or removing the pain of toothache.

In Mill's view, a happy life is composed of many pleasures in great variety, mixed with some inevitable brief pains. The happiest life is also rich in higher pleasures. Higher pleasures are preferable in quality or in kind of other pleasures. For example, Mill contended that the pleasures derived through intellectual inquiry, creative accomplishment, appreciation of beauty, friendship and love, are inherently better than the bodily pleasures derived from eating, sex and exercise.

Rule utilitarianism

The rule utilitarianism developed by Richard Brandt focuses on moral rules as primary. According to it, we ought always to act on those rules that if generally followed would produce the most good for the most people.

Individual actions are right when they conform to such rules. Thus, we ought to keep promises and avoid bribes, even when those acts do not have the best consequences in a particular situation, because the general practices of promising and not bribing produce the most overall good.

2.11.5. Uses of Ethical Theories

The ethical theories are useful in many ways.

- 1) In understanding moral dilemma. They provide clarity, consistency, systematic and comprehensive understanding.
- 2) It provides helpful practical guidance in moral issues towards the solution.
- 3) Justifying professional obligations and decisions.
- 4) In relating ordinary and professional morality.

2.12. SELF INTEREST

Self interest is being good and acceptable to oneself. It is pursuing what is good for oneself. It is very ethical to possess self interest. Each of the ethical theories recognizes the importance of self interest. Utilitarians take into account one's own good, as well as the good of others. Duty ethicists emphasize duties to ourselves, including the duty to respect ourselves and care privately for our own well-being. Rule ethicists accent our

rights to pursue our own good. And virtue ethicists emphasize the importance of self respect, which implies looking after one's own needs.

At the same time, each of these theories insists that the pursuit of self interest must be balanced and restrained by moral responsibilities to other people.

Self interest is what is good for oneself in the long run. In general, people should always and only pursue their self interest, but in doing so they should be careful to assess that interest in the light of facts.

2.13. ETHICAL EGOISM

Ethical egoism is a theory that deals with self interest. Ethical egoism says that the sole duty of each of us is to maximize his or her own good.

It attempts to reduce moral reasons to matters of self interest. According to this theory, one's actions are ethical if they promote the interest of the person who acts. An obvious inference is that ethical egoism does not respect the rights of others.

According to the critics of this theory, ethical egoism will not give permanent happiness to the persons following this theory. The pursuit of self interest resulting in detrimental effects on others is not generally acceptable, and goes against the ethical principles outlined earlier. Proponents of ethical egoism believe that even if a person takes interest in others, his/her own good and self interest predominate his/her actions. Each individual is in the best position to judge what will promote his/her self interest. He/she should take actions that promote it. Critics of ethical egoism over that it is nothing but pure selfishness and will not lead to what the individual aspires for. This theory also goes against promotion of relationships and comradeship.

2.14. CUSTOMS

Ethical pluralism

We live in an increasingly diverse society in which tolerance for different customs and outlooks is enormously important. Ethical pluralism is the view that there may be alternative moral perspective that are reasonable, but no one of which must be accepted completely by all rational and morally concerned persons.

It allows that customs have great moral significance in deciding how we should act.

There are many varied moral values, which allow variation in the understanding and application of values by the individuals in their everyday transactions. It

means that even reasonable persons can have reasonable disagreements on moral issues including issues in engineering ethics.

Ethical relativism

Ethical relativism says that actions are morally right when they are approved by law or custom, they are wrong when they violate laws or customs.

Descriptive relativism

Descriptive relativism is a statement that beliefs about values differ from culture to culture.

Moral relationalism or contextualism

Moral relationalism (or contextualism) states that the view that moral judgments should be made in relation to factors that may vary from case to case, usually making it impossible to formulate rules that both simple and absolute. In particular, customs and laws are usually morally relevant factors that should be taken into account.

Ethical pluralism

Ethical pluralism is the view that there may be alternative moral perspectives that are reasonable, but no one of which must be accepted completely by rational and morally concerned persons.

2.15. RELIGION

Religion is very difficult to define. The Oxford Advanced Learner's Dictionary defines it as the belief in existence of a God or Gods, and the activities that are connected with the worship of them. Religion is important to ethics because our actions are in many cases, governed by religious doctrines or divine commands as they may sometimes be called. Religion has great influence, to a large extent positive, in shaping our ethical behaviour. Further, there is a strong psychological link between the moral and religious beliefs of people following various religions and faiths. Religions support moral responsibility. They have set high moral standards. Faith in the religions provides trust and this trust inspires people to the moral. The religions insist on tolerance and moral concern for others. Many professionals who possess religious beliefs are motivated to be morally responsible.

2.15.1. Divine Command Ethics

Divine command ethics says that an act is right means it is commanded by God and to say it is wrong means it is forbidden by God.

There are some difficulties in this approach, namely

- a) Whether God exists or not is not clear.
- b) How to know what are the God's commands?
- c) How to verify the genuineness of the commands?

Further, religions such as Hinduism, Islam, and Christianity accept the existence of God.

But Buddhism, Taoism and Confucianism adopt only faith in a right path and do not believe in God.

2.16. SELF RESPECT

It is defined as valuing oneself in morally suitable ways. Self respect includes (a) recognition which means respect to others, their ideas, decisions, ability, and rights (b) appraisal, which means properly valuing ourselves as to how well we face moral standards and our personal commitments. An intensive but balanced feeling of self respect is sense of honor. This means intense agony and guilt for wrong doing. Self control is a virtue of maintaining personal discipline. Courage is a by product of self respect, which makes a persons face the hardship in a rational way.

Self respect is different from self esteem in the following manner.

S.NO.	Self respect	Self-esteem
1.	A moral concept	A psychological support
2.	Valuing oneself in morally suitable ways	Having a positive attitude towards oneself. It may be excessive or unwarranted or normal.
3.	It includes virtues of recognition and appraisal. It promotes virtues of sense of honor, self control and courage.	

Two marks questions and answers.**1. What is ethics?**

The term ethics is from the Greek word ethos, refers to the philosophical science that deals with the rightness and wrongness of human actions.

2. Why do people behave unethically?

- i. Unawareness
- ii. Insensitivity to issues
- iii. Selfishness
- iv. Faulty reasoning
- v. Pressure

3. Define engineering ethics.

Engineering ethics is concerned with rules and standards governing the conduct of engineers in their role as professionals. It is a body of philosophy guiding the ways that engineers should conduct themselves in their profession.

4. What are the two approaches to engineering ethics?

- i. Micro ethics
- ii. Macro ethics

5. What is the need to study ethics?

- i. Bringing clarity in thought and help in reasoning.
- ii. Reinforcement of ethics.
- iii. People who want to be ethics.
- iv. People becoming virtuous.
- v. Adjusting to and adhering to organizational values.
- vi. Reduce and avoid stress.
- vii. Build character.
- viii. Facing moral ethical dilemmas with confidence.

6. What is micro ethics?

Micro ethics emphasizes the typical day to day problems in engineering practices, such as deciding upon the factor of safety in workplace, decisions and problems of individuals, professionals.

7. What is macro ethics?

Macro ethics deals with the societal problems on a regional/ national level. For example corruption, pollution issues in global fall under this category.

8. State the sense of engineering ethics.

- i. Normative sense
- ii. Descriptive sense

9. What is the scope of engineering ethics?

- i. Ethics of the workplace which involves the co workers and employees in an organization.
- ii. Ethics related to the product or work which involves the transportation, warehousing, and use, besides the safety of the final product and the environment outside the industry.

10. Mention the situations that will lead to moral dilemma.

- i. Problem of vagueness
- ii. Problem of conflicting reasons
- iii. Problem of disagreement

11. Name the three types of inquires.

- i. Normative inquiry
- ii. Conceptual inquiry
- iii. Descriptive inquiry

12. What are normative inquiries? Give examples.

Normative inquires seek to identify and justify the morally desirable norms or standard that should guide individuals and groups

It also has the theoretical goal of justifying particular moral judgment. Generally, normative questions are about what ought to be and what is good based on moral values. For example,

- i. Why must some engineering information kept confidential ?
- ii. When and why is government justified in interfering with free enterprise?

13. What are conceptual inquires? Give examples.

Conceptual inquiry is directed toward clarifying the meaning of concepts, principles and issues in engineering ethics. For example,

- i. What is meant by safety?
- ii. What is a bribe?

14. What are factual inquiries? Give examples.

Factual inquiry is aimed to obtain the facts needed for understanding and resolving value issues. For example,

- i. How were the benefits assessed? binils.com

ii. What are the procedures followed in risk assessment?

15. Define the term 'moral dilemma'.

Moral dilemmas are situations in which two or more obligations, duties, rights, goods or ideals come into conflict with one another, and it appears that not all of them can be fully respected. It is also possible for one moral principle to have two or more incompatible applications in a given situation.

16. What are the steps in confronting moral dilemma?

- i. Identification of relevant moral factors
- ii. Gathering information
- iii. Ranking
- iv. Generate alternatives
- v. Discussion with colleagues, friends
- vi. Decision

17. Define moral autonomy.

Autonomy literally means self determinant or independent. Moral autonomy is the skill and attitude of thinking rationally about the ethical issues on the basis of moral considerations and the general response to moral issue.

18. What are the three different levels of moral development suggested by Kohlberg?

The three levels of moral development suggested by Kohlberg are:

- i. Pre conventional level
- ii. Conventional level
- iii. Post conventional level

19. Differentiate between Kohlberg theory and Gilligan theory of moral development.

S.NO.	Kohlberg's Theory	Gilligan's Theory
1.	It is based on the study on men.	It is based on the study on men and women
2.	Men give importance to moral rule.	Women always want to keep up the personal involved in the situations
3.	Ethics of rules and rights	Context oriented and ethics of care.

20. What is a profession?

A profession is a type of job that requires specialized training and qualifications in performing the required activities in order to earn a living.

21. What is the professional?

It relates to a person or any work which requires skills and knowledge, self regulation and result in public good. It means a 'person' as well as a 'status'.

22. What is professionalism?

Professionalism refers to the qualities, competencies and skills of professionals.

23. List the different models of professional roles.

- i. Savior
- ii. Guardian
- iii. Engineers as Bureaucratic servant
- iv. Social servant
- v. Social enabler and catalyst
- vi. Game player

24. What are the characteristics of a profession?

- i. Expertise.
- ii. Use of knowledge and expertise for public good.
- iii. Membership of an organization or society.

25. Classify ethical theories.

- i. Virtue ethics
- ii. Right ethics
- iii. Duty ethics
- iv. Utilitarianism

26. What is meant by virtues?

Virtue means moral goodness. It refers to the moral excellence of one's behaviour.

27. What is vice?

Vice means immoral conduct or an evil practice

28. List the uses of ethical theories.

1. Understanding moral dilemma.
2. In justifying obligations and ideas in relating ordinary and professional morality.

29. Define self respect.

Self respect is valuing oneself in morally suitable ways.

30. Define self control.

Self control is a virtue of maintaining personal discipline.

31. Differentiate self respect and self esteem.

- i. Self respect is a moral concept refers to the virtue properly valuing oneself.
- ii. Self esteem is a psychological concept means having a positive attitude toward oneself, even if the attitude is excessive or otherwise unwarranted.

32. What is ethical pluralism?

Ethical pluralism is the view that there may be alternative moral perspectives that are reasonable, but no one of which must be accepted completely by all rational and morally concerned persons.

33. What is ethical relativism?

Ethical relativism says that actions are morally right when they are approved by law or custom, they are wrong when they violate laws or customs.

34. What is ethical egoism?

Ethical egoism says that the sole duty of each of us is to maximize his or her own good. It attempts to reduce moral reasons to matters of self interest.

35. What is descriptive relativism?

Value, beliefs and attitudes differ from culture to culture.

36. What is moral relationalism? (Or) What is contextualism?

Moral judgment should be made in relation to factors that vary from case to case, usually making it impossible to formulate rules that are both simple and absolute. In particular, customs and laws are usually relevant factors that should be taken into account.

37. What are the virtues fulfilled under professional responsibility?

- i. Self direction virtues
- ii. Public spirited virtues
- iii. Team work virtues
- iv. Proficiency virtues

38. State the specific virtues relating to honesty.

- i. Truthfulness
- ii. Trustworthiness

39. Define a 'right'.

Entitlement to act in a certain way. Rights serve as a protective barrier, shielding individuals from unjustified intrusions. For every right, a complementary duty of non-interference exists.

40. What is divine command ethics?

Divine command ethics maintains that to say an act is right means it is commanded by God, and to say it is wrong means it is forbidden by God.

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Anna University Questions**Part A**

1. State Gillilgans theory (May/June 16)
2. What is meant by consensus? (May/June 16)
3. What is meant by engineering as experimentation? (Apr/May 17)
4. State the importance of ethical theories. (Apr/May 17)
5. What are the merits of moral autonomy? (Apr/May 18)
6. Write the uses of ethical theories. (Apr/May 18)
7. What are Moral Dilemma? (Apr/May 19)
8. State any two methods that can be applied when testing appropriate? (Apr/May 19)
9. State the three types of Inquiry (Nov/Dec 17)
10. What are the two important versions of utilitarianism? (Nov/Dec 17)
11. Define the term moral autonomy (Nov/Dec 18)
12. List the theories about right action. (Nov/Dec 18)
13. What is meant by moral autonomy (Nov/Dec 19)
14. Give classification of ethical theories. (Nov/Dec 19)
15. What is moral dilemma? (Apr/May 21)
16. Write the need of engineering ethics. (Apr/May 21)

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Part B

1. Explain in details about the senses of Engineering Ethics. (May/June 16)
2. Discuss in details the various ethical theories and their uses (May/June 16)
3. Describe Kohlberg and Gilligan's theories on moral autonomy (Apr/May 17)
4. i. Name and describe the theories of right action. (Apr/May 17)
ii. Discuss the role of self interest with an example (Apr/May 17)
5. what is moral autonomy? Compare and contrast the theories of moral autonomy by Kohlberg and Gilligan. (Apr/May 18)
6. What is professionalism? Discuss the motives for professionalism and the models for professional engineers. (Apr/May 18)
7. Enumerate on Moral issues and types of inquiry (Apr/May 19)
8. Discuss any two theories on Ethics. (Apr/May 19)
9. What is meant by Moral Autonomy? Discuss the factors influencing a person's concern and the skills required to improve Moral Autonomy. (Nov/Dec 17)
10. Describe the professional roles played by an Engineer. (Nov/Dec 17)
11. Discuss the theories of moral autonomy by Kohlberg and Gilligan. (Nov/Dec 18)

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12. Discuss the motives for professionalism and the models for professional engineers.
(Nov/Dec 18)
13. Explain the three levels of moral developments with respect to Gilligan Views.
(Nov/Dec 19)
14. What is Duty Ethics? Explain in detail. (Nov/Dec 19)
15. Write the various moral theories and discuss in detail the Gilligen's theory
(Apr/May 21)
16. Discuss in detail the Kohlberg's theory. (Apr/May 21)

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