
Answer Question No.1 compulsorily.

(10X1=10Marks)

Answer ONE question from each unit.

(4X10=50 Marks)

1. Answer all questions

(10X1=10Marks)

(a). Define honesty.

(b). Justify how empathy is a necessary human value.

(c). List few work ethics?

(d). Define moral dilemma?

(e). list different tests to evaluate ethical theories?

(f). What is factual enquiry?

(g). What are the sort of complexity and murkiness that may be involved in complex situations ?

(h). What is collective bargaining?

(i). What is social experimentation?

(j). List any two confidentiality issues related to change in job?

UNIT-12.(a). By the work ethics, duties to the self, family, society, and nation are fulfilled. Justify Statement by writing the importance of work ethics.? **5M**(b). What are the means that one should adapt to live peacefully? **5M****(OR)**3.(a). What are the principles enunciated in 'respect for others'? **5M**(b). What are characteristics that a leader should develop in him to practice empathy? Give the benefits of Empathy. **5M****UNIT-II**4.(a).Mention and explain with examples "Types of inquiry" **5M**(b). What are the uses of Ethical theories? Explain in detail? **5M****(OR)**5.(a). Differentiate between the Gilligan's and Kohlberg's theory. **5M**(b). Explain in brief why Engineering Ethics is important . **5M****UNIT-III**6.(a). What is engineering as experimentation? Explain it briefly. **5M**(b). Discuss in detail about risk benefit analysis. **5M****(OR)**7.(a). Describe the advantages of collective bargaining. **5M**(b). Explain about professional rights and employee rights. **5M****UNIT-IV**8.(a). Explain the different types of problems found in computer ethics. **5M**(b). What are various issues and requirements for engineers who act as advisors for planning and policy making? **5M****(OR)**9.(a). Explain the code of ethics of IEEE in detail. **5M**(b). What are the ethical responsibilities of a consulting engineer? **5M**

18EI306

Scheme

II/IV B.Tech (Regular) DEGREE EXAMINATION

October, 2019
Third Semester

Professional Ethics and Human Values

Max Marks: 50
Time: 3 Hours

1. Answer all questions

(10X1=10Marks)

(a). Define honesty.

Honesty is a facet of moral character that connotes positive and virtuous attributes such as integrity, truthfulness, straightforwardness, including straightforwardness of conduct, along with the absence of lying, cheating, theft, etc. Honesty also involves being trustworthy, loyal, fair, and sincere.

(b). Justify how empathy is a necessary human value.

The benefits of empathy include:

1. Good customer relations (in sales and service, in partnering).
2. Harmonious labor relations (in manufacturing).
3. Good vendor-producer relationship (in partnering.) So , empathy is a necessary human value.

(c). List few work ethics?

(i) Dependability and Responsibility (ii) Possessing a Positive Attitude. (iii) Adaptability. (iv) Honesty and Integrity. (v) Self – Motivated. (vi) Motivated to Grow & Learn.(vii) Strong Self – Confidence.

(d). Define moral dilemma?

Dilemmas are situations in which moral reasons come into conflict, or in which the application of moral values are problems, and one is not clear of the immediate choice or solution of the problems.

(e). List different tests to evaluate ethical theories?

Different *criteria may be applied for evaluating various ethical theories and deciding upon the best.*

1. The theory must be clear and (coherent) formulated with concepts that are logically connected.
2. It must be internally consistent, i.e., none of its principles conflicts with any other
3. The theory and its defense must depend, only upon facts.
4. It must organize basic moral values in systematic and comprehensive manner.

It is to fix priority of values and provide guidance in all situations.

(f). What is factual enquiry?

It is aimed to obtain facts needed for understanding and resolving value issues. Researchers conduct factual inquiries using mathematical or statistical techniques. The inquiry provide important information on business realities, engineering practice, and the effectiveness of professional societies in fostering moral conduct, the procedures used in risk assessment, and psychological profiles of engineers.

(g).What are the sort of complexity and murkiness that may be involved in complex situations?

(i) Vagueness (ii) Conflicting Reasons (iii)Disagreement

(h). What is collective bargaining?

It is the bargain by the trade union for improving the economic interests of the worker members. The process includes negotiation, threatening verbally, and declaration of 'strike'.

(i). What is social experimentation?

Before manufacturing a product or providing a project, we make several assumptions and trials, design and redesign and test several times till the product is observed to be functioning satisfactorily. We try different materials and experiments. From the test data obtained we make detailed design and

retests . Thus, design as well as engineering is iterative process which we call it as social experimentation.

(j). List any two confidentiality issues related to change in job?

Two issues related to change in job: price fixing, industrial espionage.

UNIT-I

2.(a). By the work ethics, duties to the self, family, society, and nation are fulfilled. Justify Statement by writing the importance of work ethics.?	5M
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The importance of ‘Professional Ethics and Human Values’ are:

- (a) to understand the moral values that ought to guide the Engineering profession,
- (b) resolve the moral issues in the profession, and
- (c) justify the moral judgment concerning the profession. It is intended to develop a set of beliefs , attitudes, and habits that engineers should display concerning morality. The prime objective is to increase one’s ability to deal effectively with moral complexity in engineering practice.

Alternatively, the importance of the study on Professional Ethics may be listed as:

(A) Improvement of the cognitive skills (skills of the intellect in thinking clearly)

- 1. Moral awareness (proficiency in recognizing moral problems in engineering)
- 2. Cogent moral reasoning (comprehending(have as one's sphere or territory), assessing different views)
- 3. Moral coherence (forming consistent viewpoints based on facts)
- 4. Moral imagination (searching beyond obvious the alternative responses to issues and being receptive to creative solutions)

5. Moral communication, to express and support one’s views to others.

(B) To *act* in morally desirable ways, towards moral commitment and responsible conduct

- 6. Moral reasonableness i.e., willing and able to be morally responsible.
- 7. Respect for persons, which means showing concern for the well-being of others, besides oneself.
- 8. Tolerance of diversity i.e., respect for ethnic(distinctive of the ways of living built up by a group of people) and religious differences, and acceptance of reasonable differences in moral perspectives.
- 9. Moral hope i.e., believe in using rational dialogue for resolving moral conflicts.
- 10. Integrity, which means moral integrity, and integrating one’s professional life and personal convictions(a final judgment of guilty in a criminal case and the punishment that is imposed).

2.(b). What are the means that one should adapt to live peacefully?	5M
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To live peacefully, one should start install peace within (self). Charity begins at home.

Then one can spread peace to family, organisation where one works, and then to the world, including the environment. Only who are at peace can spread peace. You can not gift an article which you do not possess. The essence of oriental philosophy (Eastern part of the world; an Asiatic.is that one should not *fight* for peace. It is oxymoron. War or peace can be won only by peace, and *not by wars* !

One should adopt the following means to live peacefully, in the world:

Nurture

- 1. Order in one’s life (self-regulation, discipline, and duty).
- 2. Pure thoughts in one’s soul (loving others, blessing others, friendly, and not criticizing or hurting others by thought, word or deed).
- 3. Creativity in one’s head (useful and constructive).
- 4. Beauty in one’s heart (love, service, happiness, and peace).

Get

- 5. Good health/body (physical strength for service).

Act

- 6. Help the needy with head, heart, and hands (charity).
- Service to the poor is considered holier than the service to God.

- 7. Not hurting and torturing others either physically, verbally, or mentally.

The following are the factors that promote living, with internal and external peace:

1. Conducive environment (safe, ventilated, illuminated and comfortable).
2. Secured job and motivated with 'recognition and reward'.
3. Absence of threat or tension by pressure due to limitations of money or time.
4. Absence of unnecessary interference or disturbance, except as guidelines.
5. Healthy labor relations and family situations.
6. Service to the needy (physically and mentally-challenged) with love and sympathy.

(OR)

3.(a). What are the principles enunciated in 'respect for others'	5M
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This is a basic requirement for nurturing(help grow) friendship, team work, and for the synergy it promotes and sustains. The principles enunciated (express or state clearly))in this regard are:

1. Recognize and accept the existence of other persons as human beings, because they have a right to live, just as you have.
2. Respect others' ideas (decisions), words, and labor (actions). One need not accept or approve or award them, but shall listen to them first. One can correct or warn, if they commit mistakes. Some people may wait and watch as fun, if one falls, claiming that they know others' mistakes before and know that they will fall! Appreciate colleagues and subordinates on their positive actions. Criticize constructively and encourage them. They are bound to improve their performance, by learning properly and by putting more efforts.
3. Show 'goodwill' on others. Love others. Allow others to grow. Basically, the goodwill reflects on the originator and multiplies itself on everybody. This will facilitate collinearity, focus, coherence, and strength to achieve the goals.

3.(b). What are characteristics that a leader should develop in him to practice empathy? Give the benefits of Empathy.	5M
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Empathy is social radar. Sensing what others feel about, without their open talk, is the essence of empathy. Empathy begins with showing concern, and then obtaining and understanding the feelings of others, from others' point of view.

It is also defined as the ability to put one's self into the psychological frame or reference or point of view of another, to know what the other person feels. It includes the imaginative projection into other's feelings and understanding of other's background such as parentage, physical and mental state, economic situation, and association. This is an essential ingredient for good human relations and transactions.

To practice 'Empathy', a leader must have or develop in him, the following characteristics

1. *Understanding others*: It means sensing others feelings and perspectives, and taking active interest in their welfare.

2. *Service orientation*: It is anticipation, recognition and meeting the needs of the clients or customers.

3. *Developing others*: This means identification of their needs and bolstering their abilities.

In developing others, the one should inculcate in him the 'listening skill' first.

Communication = 22% reading and writing + 23% speaking + 55% listening

One should get the feed back, acknowledge the strength and accomplishments, and then coach the individual, by informing about what was wrong, and giving correct feedback and positive expectation of the subject's abilities and the resulting performance.

4. *Leveraging*(strategic advantage) *diversity* (opportunities through diverse people):

This leads to enhanced organizational learning, flexibility, and profitability.

5. *Political awareness*: It is the ability to read political and social currents in an organization.

The benefits of empathy include:

1. Good customer relations (in sales and service, in partnering).

2. Harmonious labor relations (in manufacturing).

3. Good vendor-producer relationship (in partnering.)

Through the above three, we can maximize the output and profit, as well as minimizing the loss. While dealing with customer complaints, empathy is very effective in realising the unbiased views of others and in admitting one's own limitations and failures. According to Peter Drucker, purpose of the business is not to

make a sale, but to make and keep a customer. Empathy assists one in developing courage leading to success!

UNIT-II

4.(a). Mention and explain with examples “Types of inquiry”
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5M

TYPES OF INQUIRIES

(**Enquiry** means to ask a question, and **inquiry** is a formal investigation.)

The three types of inquiries, in solving ethical problems are: normative inquiry, conceptual inquiry, and factual or descriptive inquiry.

The three types of inquiries are discussed below to illustrate the differences and preference.

1. Normative Inquiry

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

For example,

1. How far does the obligation of engineers to protect public safety extend in any given situation?
2. When, if ever, should engineers be expected to blow whistle on dangerous practices of their employers?
3. Whose values ought to be primary in making judgment about acceptable risks in design for a public transport system or a nuclear plant? Is it of management, senior engineers, government, voters or all of them?
4. When and why is the government justified in interfering with the organisations?
5. What are the reasons on which the engineers show their obligations to their employees or clients or the public?

2. Conceptual Inquiry

It is directed to clarify the meaning of concepts or ideas or principles that are expressed by words or by questions and statements. For example,

- (a) *What is meant by safety?*
- (b) *How is it related to risk?*
- (c) *What is a bribe?*
- (d) *What is a profession?*

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

3. Factual or Descriptive Inquiry

It is aimed to obtain facts needed for understanding and resolving value issues. Researchers conduct factual inquiries using mathematical or statistical techniques. The inquiry provide important information on business realities, engineering practice, and the effectiveness of professional societies in fostering(వృద్ధి)

moral conduct, the procedures used in risk assessment, and psychological profiles of engineers.

The facts provide not only the reasons for moral problems but also enable us to develop alternative ways of resolving moral problems. For example,

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

4.(b). What are the uses of Ethical theories? Explain in detail?

5M

The ethical theories are useful in many respects.

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, and
3. In relating ordinary and professional morality.

Different *criteria may be applied for evaluating various ethical theories and deciding upon the best.*

1. The theory must be clear and (coherent) formulated with concepts that are logically connected.
2. It must be internally consistent, i.e., none of its principles conflicts with any other
3. The theory and its defense must depend, only upon facts.
4. It must organize basic moral values in systematic and comprehensive manner.

It is to fix priority of values and provide guidance in all situations.

5. It must provide guidance compatible with our moral convictions (judgments) about concrete situations. For example, if an ethical theory says that it is all right for engineers to make explosive devices without the informed consent of the public, we can conclude that the theory is inadequate.

Theories and judgments are continually adjusted to each other until we reach a reflective equilibrium. Most of the theories converge towards the welfare of the humanity.

The duty ethics and right ethics differ in great extent on their emphasis. But they remain complementary always.

(OR)

5.(a). Differentiate between the Gilligan's and Kohlberg's theory?

5M

The theories of moral development by Kohlberg and Gilligan differ in the following respects.

<i>Kohlberg's Theory</i>	<i>Carol Gilligan's Theory</i>
<i>A. Basic Aspects</i>	
1. Is based on the study on men. 2. Men give importance to moral rule. 3. Ethics of rules and rights.	1. Is based on the study on men and women 2. Women always want to keep up the personal relationships with all the persons involved in the situations. 3. Women give attention to circumstances leading to critical situations rather than rules: (context-oriented and ethics of care)

<i>B Characteristic Features</i>	
1. Justice 2. Factual 3. Right or wrong 4. Logic only 5. Logic and rule-based 6. Less of caring 7. Matter of fact (practical) 8. Present focus 9. Strict rules 10. Independence 11. Rigid 12. Taking a commanding role 13. Transactional approach	1. Reason 2. Emotional 3. Impact on relationships 4. Compassion too 5. Caring and concern 6. More of caring 7. Abstract 8. Future focus 9. Making exceptions 10. Dependence 11. Human-oriented 12. Shying away from decision-making 13. Transformational approach

5.(b). Explain in brief why Engineering Ethics is important .
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5M

Engineering Ethics is the activity and discipline aimed at

(a) *understanding the moral values that ought to guide engineering profession or practice,*

(b) *resolving moral issues in engineering, and*

(c) *justifying the moral judgments in engineering. It deals with set of moral problems and issues connected with engineering.*

Engineering ethics is defined by the codes and standards of conduct endorsed by engineering (professional) societies with respect to the particular set of beliefs, attitudes and habits displayed by the individual or group.

Another important goal of engineering ethics is the discovery of the set of justified moral principles of obligation, rights and ideals that ought to be endorsed by the engineers and apply them to concrete situations.

Engineering is the largest profession and the decisions and actions of engineers affect all of us in almost all areas of our lives, namely public safety, health, and welfare.

The scope of engineering ethics are twofold:

1. Ethics of the workplace which involves the co-workers and employees in an organization.

2. Ethics related to the product or work which involves the transportation, warehousing, and use, besides the safety of the end product and the environment outside the factory.

There are conventionally two approaches in the study of ethics:

1. Micro-ethics which deals with decisions and problems of individuals, professionals, and companies.

2. Macro-ethics which deals with the societal problems on a regional/national level. For example , global issues, collective responsibilities of groups such as professional societies and consumer groups.

There are two different senses (meanings) of engineering ethics, namely the Normative and the Descriptivesenses. 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 codes of ethics and standards and applying them in their transactions by engineers.*

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

UNIT-III

6.(a). What is engineering as experimentation? Explain it briefly
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5M

Before manufacturing a product or providing a project, we make several assumptions and trials, design and redesign and test several times till the product is observed to be functioning satisfactorily. We try different materials and experiments. From the test data obtained we make detailed design and retests . Thus, design as well as engineering is iterative process as illustrated in Fig. 3.1.

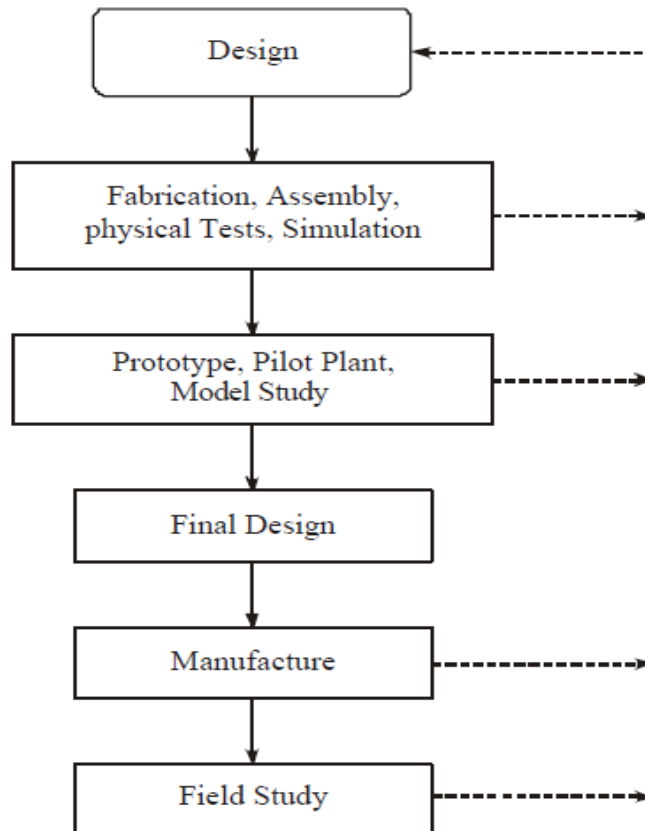


Fig. 3.1 Design as an interactive process

Several redesigns are made upon the feedback information on the performance or failure in the field or in the factory. Besides the tests, each engineering project is modified during execution, based on the periodical feedback on the progress and the lessons from other sources. Hence, the development of a product or a project as a whole may be considered as an experiment.

Engineering Projects VS. Standard Experiments

We shall now compare the two activities, and identify the similarities and contrasts.

A. Similarities

1. *Partial ignorance: The project is usually executed in partial ignorance. Uncertainties exist in the model assumed. The behavior of materials purchased is uncertain and not constant (that is certain!). They may vary with the suppliers, processed lot, time, and the process used in shaping the materials (e.g., sheet or plate, rod or wire, forged or cast or welded)..*

There may be variations in the grain structure and its resulting failure stress. It is not possible to collect data on all variations. In some cases, extrapolation, interpolation, assumptions of linear behavior over the range of parameters, accelerated testing, simulations, and virtual testing are resorted.

2. *Uncertainty: The final outcomes of projects are also uncertain, as in experiments. Some times unintended results, side effects (bye-products), and unsafe operation have also occurred.*

Unexpected risks, such as undue seepage in a storage dam, leakage of nuclear radiation from an atomic power plant, presence of pesticides in food or soft drink bottle, an new irrigation canal spreading water-borne diseases, and an unsuspecting hair dryer causing lung cancer on the user from the asbestos gasket used in the product have been reported.

3. *Continuous monitoring: Monitoring continually the progress and gaining new knowledge are needed before, during, and after execution of project as in the case of experimentation.*

The performance is to be monitored even during the use (or wrong use!) of the product by the end user/beneficiary.

4. *Learning from the past: Engineers normally learn from their own prior designs and infer from the analysis of operation and results, and sometimes from the reports of other engineers.*

But this does not happen frequently.

The absence of interest and channels of communication, ego in not seeking information, guilty upon the failure, fear of legal actions, and mere negligence have caused many a failure, e.g., the Titanic lacked sufficient number of lifeboats—it had only 825 boats for the actual passengers of 2227, the capacity of the ship being 3547! In the emergent situation, all the existing life boats could not be launched.

Forty years back, another steamship Arctic met with same tragedy due to the same problem in the same region. But the lesson was learned. In most of the hydraulic systems, valves had been the critical components that are least reliable. The confusion on knowing whether the valve was open or closed, was the cause of the Three-Mile Island accident in 1979. Similar malfunctioning of valves and mis-reading of gauges have been reported to have caused the accidents else where in some power plants. But we have not learnt the lesson from the past . The complacency that it will not happen again and will not happen 'to me' has lead to many disasters.

6.(b). Discuss in detail about risk benefit analysis.	5M
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The major reasons for the analysis of the risk benefit are:

- 1 To know risks and benefits and weigh them each
- 2 To decide on designs, advisability of product/project
- 3 To suggest and modify the design so that the risks are eliminated or reduced .There are some limitations that exist in the risk-benefit analysis.

The economic and ethical limitations are presented as follows:

1. Primarily the benefits may go to one group and risks may go to another group. Is it ethically correct?
2. Is an individual or government empowered to impose a risk on some one else on behalf of supposed benefit to some body else? sometimes, people who are exposed to maximum risks may get only the minimum benefits. In such cases, there is even violation of rights.
3. The units for comparison are not the same, e.g., commissioning the express highways may add a few highway deaths versus faster and comfortable travel for several commuters. The benefits may be in terms of fuel, money and time saved, but lives of human being sacrificed.

How do we then compare properly?

4. Both risks and benefits lie in the future. The quantitative estimation of the future benefits, using the discounted present value (which may fluctuate), may not be correct and sometime misleading.

Personal Risks

Assessing the involuntary personal risk is not an easy task. For example, a group residing near the cement plant is exposed to a lot of risk. If suppose a cement plant or refinery was to come up in the area where this group already reside. They will object the proposal. The adequacy of compensation amount payable can not be fixed reasonably. How to estimate the rupee value of an individual human being For example, a person may be a father to his young ones, husband to his beloved wife, son to his aged parents, friend to the needy, and as well a guardian for his pet dogs.

There are persons who dared to serve people in dire straits, in spite of the risky situations where their lives were in stakes. For example, Mahathma Gandhi served people during Navakali yatra, when dangers were present all over. For such saviors, there was no personal risk.

1. Assess the voluntary activities e.g..life insurance policy taken
2. Assess the degree of occupational hazard e.g..dust , radiation , and asbestosis and its effect on health.
3. Loss of senses such as sight eyes ,hearing ears and loss of limbs immobility by the loss/damage to organs or disfigurement of the limbs or body .
4. Loss of earning capability, especially due to physical disability, and
5. Get assistance by trained arbiters .

Public Risk

Assessing the public risk is relatively easy, as in the societal value system the cost of disability can be averaged out. For example, the U.S National Safety Council 1 adopts an equivalent of 6000 days 16.42 years . For death, as per the personal value system for social costs of disability.

To assess the public risk, the loss on the assets and the correction costs are estimated. For example,

1. Loss of or reduction in future income or earning capacity due to loss of limbs or their capability.

2. Costs associated with accident , which includes the transplantation or reinforcement of body parts/limbs, and medical treatment and
3. Costs of welfare, which includes rehabilitation, provision of less demanding .Both risks and benefits may have uncertainties. The estimated probability may differ.
5. from time to time, and region to region.

Reducing risk (Improving safety)

6. Several techniques adopted to risks (or improve safety)in a product or process are listed as follows;
7. 1.Application of inherent safety concept in design . E, g., LPG cylinder is provided with frame to product the valve while handing and facilitate cryogenic storage .
8. A magnetic door catch provides an easy escape for children caught inside the fridge accidentally .
9. 2. Use of redundancy principle in the instrument protection / design . For example . Use of stand bye device , and back up for computer storage .
10. 3. Periodical monitoring (inspection) and testing of safety system to ensure reliability, e.g., fire extinguishers, 'earth' system in electric circuits are checked periodically.
11. 4. Issue of operation manuals, training of the operating personnel and regular audits are adopted to ensure that the procedures are understood, followed and the systems are kept in working condition.
12. 5. Development of well-designed emergency evacuation plan and regular rehearsal/drills to ensure preparedness, in case of emergency.

(OR)

7.(a). Describe the advantages of collective bargaining.	5M
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It is the bargain by the trade union for improving the economic interests of the worker members. The process includes negotiation, threatening verbally, and declaration of 'strike'. It is impossible to endorse fully the collective bargaining of unions or to condemn. There exist always conflicting views between the professionalism and unionism.

A. Faithful Agent or Trustee?

Professional societies such as NSPE(National Society of Professional Engineers) and IEI(Institution of Engineers (India)) refuse to accept the 'collective coercive action' of unionism , holding the principles of professional integrity as right, e.g., as per NSPE code III, i.e., engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.

The engineers are said to exhibit a higher standard than self-interest ; and that are expected to perform an ethical duty to their employer as their employer as faithful agent or trustee. The actions of unions are usually against the interest of the employers and they use coercion and force against the employers . These actions are interpreted as unprofessional and disloyal.

but in certain cases ,the safety of the workers has been ignored for a long period or the employees were under-paid for years. Can we still hold the action as unethical ?

It can be concluded from this discussion ,that

- (a) The duty of the employee to one's employer does not mean sacrifice of monetary self interests and
- (b) Trustee or faithful agent means executing the assigned tasks and safeguarding the property. It does not nullify the right to negotiate for safe and hygienic working conditions , and economic benefits collectively.
- (c) The codes insists that the paramount obligation is to the society , as compared to their employers. The duty to the employers is also limited by considerations such as workers safety, and right to disobey illegal and unethical activities . After all the employees are also parts of the society , and
- (d) Can collective and coercive action be resorted , when all other efforts have failed?

7.(b). Explain about professional rights and employee rights.	5M
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Professional rights

1. *Right to form and express professional judgment: It is also called the right of professional conscience. In pursuing professional responsibilities, this empowers one to form and exercise the professional judgment. Both technical and moral judgments are included. This right is bound by the responsibilities to employers and colleagues.*

2. *Right to refuse to participate in unethical activities: It is also called the right of conscientious refusal. It is the right to refuse to engage in unethical actions and to refuse to do so solely because one views that as*

unethical. The employer can not force or threaten the employee to do something that is considered by that employee as unethical or unacceptable.

For example , unethical and illegal activities that can be refused are: falsifying data, forging documents, altering test results, lying, giving or taking bribe etc. There may be situations, when there is a disagreement or no shared agreement among reasonable people over whether an act is unethical. Medical practitioners have a right not to participate in abortions. Similarly, the engineers must have a right to refuse assignments that violate their personal conscience, such as when there exists a threat to human life or moral disagreement among reasonable people.

3. *Right to fair recognition and to receive remuneration for professional services:* Engineers have a right to professional recognition for their work and achievements. This includes fair monetary and non-monetary forms of recognition. It is related to morality as well as self interest .They motivate them to concentrate their energy on jobs and to update their knowledge and skills through continuing education. This will prevent the engineers from diversion such as moonlighting or bother on money matters. Many times, the engineers who have labored to get patents on the organizations are not adequately remunerated. Based on the resources of the organization and the bargaining power of the engineers, the reasonable salary or remuneration for patent discovery can be worked out.

4. Right to warn the public about dangers : It should be done without damaging the reputation of the employer . The views can be expressed through the professional society to get a backing.

5. Right to talk publicly about the job: This should be done within the limits of decency , confidentiality , and loyalty .

6. Right to engage in the activities of professional societies: Attend ending membership campaign and seminars are typical activities to promote the professional society.

EMPLOYEE RIGHTS

Employee rights are the moral and legal rights that are obtained by the status of being an employee.

The provision made to the employees under this category are:

1. Professional rights(discussed already)
2. Basic human right(discussed already)
3. Instructional rights or contractual employee rights. this include the rights to the institution due to the organizational policies or contracts , right to receive specified salary and annual increments ,and profit sharing .The quantumof such benefits , scale of pay etc , are fixed and reviewed periodically by the employers and employees.

4. Non-contractual employee rights: These are the rights provided in common ,besides the contractual ones . They include

1. Right to Privacy

It is the right to control the access to and use of information about oneself . This right is limited in certain situations by employers rights . But who among the employers can access the personnel information is again restricted . Only duly authorized persons can get the personnel information. For example,

(a) The Pay Bill Section can access the information on insurance premium paid , medical reimbursement etc . but one's immediate boss need not get this data.

(b) Persons who have applied for the jobs of cashier are required to report if there are any criminal or civil cases pending against them . Those persons may mishandle the money. Hence that information may be sought from them.

(c) A supervisor might suspect a worker and conduct a search in his cupboard when the worker is absent . But the supervisor is to have another officer as witness , in such cases .Otherwise the supervisor main plan in some evidences against the worker.

2. Right to choose Out Side Activities

This is also interpreted as a right to personal privacy as that means a right to have a private life outside the job . There are some situations when this right can be curbed . For example,

1. When those activities lead to violation or found detrimental to the duties of their job.
2. When the activities of the employees form a conflict or interest (e.g., when moonlighting).
3. When the interest of the employer is getting damaged (if the employee transfers some vital information on plans or strategies to the competitor).

3. Right to Due Process from Employer

It is the right to fair process or procedures in firing, demotion and in taking any disciplinary actions against the employees. Written explanation should be initially obtained from the charged employee and the orders

are given in writing, with clearly-stated reasons. Simple appeal procedures should be framed and made available to all those affected. Fairness here is specified in terms of the process rather than the outcomes.

4. Right to Equal Opportunity—Non-discrimination

Discrimination because of caste, sex, religion, creed, and language are regressive actions. Discrimination which means a morally unjust treatment of people in the workplace is damaging to the human dignity.

For example,

(a) *A senior manager post is vacant. There is competent and proven candidate from outside the state. A local engineer with lesser competence is promoted.*

(b) *Prize amounts for the winners in the world sport events are not the same for men and women.*

5. Right to Equal Opportunity—Sexual Harassment in the Workplace

The sexual harassment is a display of arrogance and misuse of power through sexual means. It is against the moral autonomy i.e., freedom to decide on one's own body. It is also an assault on one's human dignity and trust.

Sexual harassment may be defined as the unwanted compulsion or attack on sexual requirements (gratification) in the context of unequal power. It includes physical as well as psychological attack or coercion and indecent gestures by men shown on women or by women on men.

Two such forms of harassment are found to exist. In one type called 'exchange of favors', senior officers demand sexual favor as a condition for giving a job, or granting a promotion or increment. It may be either in the form of a physical or verbal threat or sexual offer. In another type called 'hostile work environment', it is the sexually-oriented work environment that threatens the employee's right to equal opportunity. Undesirable sexual proposals, advances, lewd remarks, mailing obscene photographs are some of the typical examples of this type of harassment.

A rights ethicist interprets this as a serious violation of human right to pursue one's job free from extraneous force, compulsion, punishment or threat or insult. A duty ethicist would call it as a blatant violation of duty to treat human being with dignity and individual freedom, and not to treat as inanimate object for immoral gratifications. The utilitarian would expose the effect on the happiness and the welfare of the victims, especially of women.

6. Right to Equal Opportunity—Affirmative Action or Preferential Treatment

It means giving a preference or advantage to a person of a group that was denied equal treatment in the past. Such treatments are given especially to women and minorities all over the world. It is also called 'reverse preferential treatment', because it reverses the historical preferences.

UNIT-IV

8.(a). Explain the different types of problems found in computer ethics.	5M
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The ethical problems initiated by computers in the workplace are:

1. Elimination of routine and manual jobs.

This leads to unemployment, but the creation of skilled and IT-enabled service jobs are more advantageous for the people. Initially this may require some upgradation of their skills and knowledge, but a formal training will set this problem right.

For example, in place of a typist, we have a programmer or an accountant.

2. Health and safety: *The ill-effects due to electromagnetic radiation, especially on women and pregnant employees, mental stress, wrist problem known as Carpel Tunnel Syndrome, and backpain due to poor ergonomic seating designs, and eye strain due to poor lighting and flickers in the display and long exposure, have been reported worldwide. Over a period of long exposure, these are expected to affect the health and safety of the people. The computer designers should take care of these aspects and management should monitor the health and safety of the computer personnel.*

3. Computer failure: *Failure in computers may be due to errors in the hardware or software. Hardware errors are rare and they can be solved easily and quickly. But software errors are very serious as they can stop the entire network. Testing and quality systems for software have gained relevance and importance in the recent past, to avoid or minimize these errors.*

Property Issues

The property issues concerned with the computers are:

1. Computers have been used to extort(బలవంతం) money through anonymous telephone calls.

2. Computers are used to cheat and steal by current as well as previous employees.
3. Cheating of and stealing from the customers and clients.
4. Violation of contracts on computer sales and services.
5. Conspiracy(കൂట) as a group, especially with the internet, to defraud the gullible, stealing the identity and to forge documents.
6. Violation of property rights: Is the software a property? The software could be either a Program (an algorithm, indicating the steps in solving a problem) or a Source code (the algorithm in a general computer language such as FORTAN, C and COBOL or an Object code (to translate the source code into the machine language). How do we apply the concept of property here? This demands a framework for ethical judgments.

Property is what the laws permits and defines as can be owned, exchanged, and used. The computer hardware (product) is protected by patents. The software (idea, expression) is protected by copyrights and trade secrets. But algorithms can not be copyrighted, because the mathematical formulas can be discovered but not owned. The object codes which are not intelligible to human beings can not be copyrighted.

Thus, we see that reproducing multiple copies from one copy of (licensed) software and distribution or sales are crimes. The open source concepts have, to a great extent, liberalized and promoted the use of computer programs for the betterment of society.

Computer Crime

The ethical features involved in computer crime are:

1. Physical Security

The computers are to be protected against theft, fire, and physical damage. This can be achieved by proper insurance on the assets.

2. Logical security

The aspects related are

- (a) *the privacy of the individuals or organizations,*
- (b) *confidentiality,*
- (c) integrity, to ensure that the modification of data or program are done only by the authorized persons,
- (d) *uninterrupted service. This is achieved by installing appropriate uninterrupted power supply or back-up provisions, and*
- (e) *protection against hacking that causes dislocation or distortion. Licensed anti-virus packages and firewalls are used by all computer users to ensure this protection. Passwords and data encryption have been incorporated in the computer software as security measures. But these have also been attacked and by-passed. But this problem is not been solved completely.*

Major weaknesses in this direction are:

- (a) *the difficulty in tracing the evidence involved and*
- (b) absence of stringent punishment against the crime. The origin of a threat to the Central Government posted from an obscure browsing center, remained unsolved for quite a long time. Many times, such crimes have been traced, but there are no clear *cyber laws to punish and deter the criminals.*

Privacy and Anonymity

The data transmission and accessibility have improved tremendously by using the computers, but the right to privacy has been threatened to a great extent. Some issues concerned with the privacy are listed hereunder:

1. Records of Evidence

Service records or criminal records and the details of people can be stored and accessed to prove the innocence or guilty. Records on psychiatric treatment by medical practitioners or hospital, or records of membership of organizations may sometime embarrass the persons in later years.

2. Hacking

There are computer enthusiasts who willfully or for fun, plant virus or “Trojan horses” that may fill the disc space, falsify information, erase files, and even harm the hardware. They breakdown the functioning of computers and can be treated as violation of property rights. Some hackers opine (that the information should be freely available for everybody. It is prudent that the right to individual privacy in limiting the access to the information on oneself, should not be violated.

8.(b). What are various issues and requirements for engineers who act as advisors for planning and policy making?	5M
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The engineers are required to give their view on the future such as in planning, policy-making, which involves the technology. For example, should India expand nuclear power options or support traditional energy sources such as fossil fuels or alternative forms like solar and wind energy? In the recent past, this topic has created lot of fireworks, in the national media.

Various issues and requirements for engineers who act as advisors are:

1. Objectivity

The engineers should study the cost and benefits of all possible alternative means in objective manner, within the specified conditions and assumptions.

2. Study All Aspects

They have to study the economic viability (effectiveness), technical feasibility (efficiency), operational feasibility (skills) and social acceptability, which include environmental and ethical aspects, before formulating the policy.

3. Values

Engineers have to possess the qualities, such as

- (a) *honesty*,
- (b) *(b) competence (skills and expertise)*,
- (c) *diligence (careful and alert)*
- (d) *loyalty in serving the interests of the clients and maintaining confidentiality*, and
- (e) *public trust, and respect for the common good, rather than serving only the interests of the clients or the political interests.*

4. Technical Complexity

The arbitrary, unrealistic, and controversial assumptions made during the future planning that are overlooked or not verified, will lead to moral complexity. The study on future is full of uncertainties than the investigations on the past events. On the study of energy options, for example, assumptions on population increase, life style, urbanization, availability of local fossil resources, projected costs of generating alternative forms of energy, world political scenario, world military tensions and pressures from world organizations such as World Trade Organisation (W.T.O.) and European Union (EU) may increase the complexity in judgment on future.

5. National Security

The proposed options should be aimed to strengthen the economy and security of the nation, besides safeguarding the natural resources and the environment from exploitation and degradation.

For the advisors on policy making or planning, a shared understanding on balancing the conflicting responsibilities, both to the clients and to the public, can be effected by the following roles or models:

1. Hired Gun

The prime obligation is shown to the clients. The data and facts favorable to the clients are highlighted, and unfavorable aspects are hidden or treated as insignificant. The minimal level of interest is shown for public welfare.

2. Value-neutral Analysts

This assumes an impartial engineer. They exhibit conscientious decisions, impartiality i.e., without bias, fear or favor, and absence of advocacy.

3. Value-guided Advocates

The consulting engineers remain honest (frank in stating all the relevant facts and truthful in interpretation of the facts) and autonomous (independent) in judgement and show paramount importance to the public (as different from the hired guns).

9.(a). Explain the code of ethics of IEEE in detail.	5M
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We the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making engineering decisions consistent with the safety, health and welfare of the public, and to disclose prompt factors that might endanger the public or the environment.

2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist.
3. to be honest and realistic in stating claims or estimates based on available data.
4. to reject bribery in all its forms.
5. to improve the understanding of technology, its appropriate application, and potential consequences.
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations.
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others.
8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin.
9. to avoid injuring others, their property, reputation, or employment by false or malicious action.
10. to assist colleagues and co-workers in their professional development and to support them in following code of ethics.

9.(b). What are the ethical responsibilities of a consulting engineer?	5M
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The consulting engineers work in private. There is no salary from the employers. But they charge fees from the sponsor and they have more freedom to decide on their projects. Still they have no absolute freedom, because they need to earn for their living. The consulting engineers have ethical responsibilities different from the salaried engineers, as follows:

1. Advertising

The consulting engineers are directly responsible for advertising their services, even if they employ other consultants to assist them. But in many organisations, this responsibility is with the advertising executives and the personnel department.

They are allowed to advertise but to avoid deceptive ones. Deceptive advertising such as the following are prohibited:

(a) *By white lies.*

(b) *Half-truth, e.g., a product has actually been tested as prototype, but it was claimed to have been already introduced in the market. An architect shows the photograph of the completed building with flowering trees around but actually the foundation of the building has been completed and there is no real garden.*

(c) *Exaggerated claims. The consultant might have played a small role in a well-known project.*

But they could claim to have played a major role.

(d) *Making false suggestions. The reduction in cost might have been achieved along with the reduction in strength, but the strength details are hidden.*

(e) Through vague wordings or slogans.

2. Competitive Bidding

It means offering a price, and get something in return for the service offered. The organizations have a pool of engineers. The expertise can be shared and the bidding is made more realistic. But the individual consultants have to develop creative designs and build their reputation steadily and carefully, over a period of time. The clients will have to choose between the reputed organizations and proven qualifications of the company and the expertise of the consultants. Although competent, the younger consultants are thus slightly at a disadvantage.

3. Contingency Fee

This is the fee or commission paid to the consultant, when one is successful in saving the expenses for the client. A sense of honesty and fairness is required in fixing this fee. The NSPE Code III 6 (a) says that the engineers shall not propose or accept a commission on a contingent basis where their judgment may be compromised. The fee may be either as an agreed amount or a fixed percentage of the savings realized. But in the contingency fee-agreements, the judgment of the consultant may be biased. The consultant may be tempted to specify inferior materials or design methods to cut the construction cost. This fee may motivate the consultants to effect saving in the costs to the clients, through reasonably moral and technological means

4. Safety and Client's Needs

The greater freedom for the consulting engineers in decision making on safety aspects, and difficulties concerning truthfulness are the matters to be given attention. For example, in design-only projects, the consulting engineers may design something and have no role in the construction. Sometimes, difficulties

may crop-up during construction due to non-availability of suitable materials, some shortcuts in construction, and lack of necessary and adequate supervision and inspection. Properly-trained supervision is needed, but may not happen, unless it is provided. Further, the contractor may not understand and/or be willing to modify the original design to serve the clients best.

A few on-site inspections by the consulting engineers will expose the deficiency in execution and save the workers, the public, and the environment that may be exposed to risk upon completion of the project.

The NSPE codes on the advertisement by consultants provide some specific regulations

The following are the activities prohibited in advertisement by consultant:

1. The use of statement containing misrepresentation or omission of a necessary fact.
2. Statement intended or likely to create an unjustified expectation.
3. Statement containing prediction of future (probable) success.
4. Statement intended or likely to attract clients, by the use of slogans or sensational language format.