18EE506

Hall Ticket Number:

II/IV B.Tech (Regular\Supplementary) DEGREE EXAMINATION

February, 2021 — **Electrical and Electronics Engineering**

Fifth Semester — **Professional Ethics and Human values.**

Time: Three Hours — **Maximum: 50** Marks

Answer ALL Questions from PART-A. (1X10 = 10 Marks)

*Answer **ANY FOUR** questions from PART-B.* (4X10=40 Marks)

PART-A

1.	a)	What is engineering ethics?	CO1	
	b)	Define integrity.	CO1	
	c)	Define empathy.	CO1	
	d)	Explain the term moral dilemma.	CO2	
	e)	List the uses of ethical theories.	CO2	
	f)	Define safety.	CO3	
	g)	Name two senses of loyalty.	CO3	
	h)	What is meant by occupational crime?	CO3	
	i)	List some of global issues.	CO4	
	j)	Give some ethical problems by computers in workplace.	CO4	
		PART-B		
2.	a)	List the human values and explain any two in detail.	CO1	10 M
3.	a)	What is self confidence? What are the factors that influence self-confidence?	CO1	5M
	b)	What do you mean by spirituality? Explain how it motivates for better performance.	CO1	5M
4.	a)	Discuss how moral development occurs according to Kohlberg theory.	CO2	5M
	b)	Discuss ethics of care adopted according to Gilligan's theory.	CO2	5M
5.	a)	Discuss on three types of inquiries, giving an example each..	CO2	10 M
6.	a)	Write short notes on Engineers as responsible experimenters.	CO3	5M
	b)	How are conflicts of interest solved? Explain with examples.	CO3	5M
7.	a)	Discuss in detail about risk benefit analysis and reduce risk.	CO3	5M
	b)	What is the importance of loyalty and collegiality in team work?	CO3	5M
8.	a)	Does globalization solve the global issues? Why or Why not?	CO4	5M
	b)	Explain the role of engineers as managers.	CO4	5M
9.	a)	Discuss the disasters that take place as moral issues concerning the environment.	CO4	5M
	b)	Give brief notes on Multinational Corporations.	CO4	5M

Answers

PART-A

Answer all questions

a)	What is engineering ethics? Engineering Ethics is the activity and discipline aimed at understanding the moral values that ought to guide engineering profession or practice,
b)	Define integrity. Integrity is defined as the unity of thought, word and deed (honesty) and open mindedness.
c)	Define empathy. Empathy is social radar. Sensing what others feel about, without their open talk, is the essence of Empathy.
d)	Explain the term 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 the uses of ethical theories. They provide clarity, consistency, systematic and comprehensive understanding. It provides helpful practical guidance in moral issues towards the solution.
f)	Define safety. Safety was defined as *the risk that is known and judged as acceptable*.
g)	Name two senses of loyalty. 1.Agency loyalty 2.Attitude loyalty.
h)	What is meant by occupational crime? An occupational crime may be committed by wrong actions of a person through one's lawful employment
i)	List some of global issues. For the engineers, the issues such as multinational organizations, computer, internet functions, military development and environmental ethics have assumed greater importance for their very sustenance and progress
j)	Give some ethical problems by computers in workplace. Elimination of routine and manual jobs , Health and safety

PART-B

2. **List the human values and explain any two in detail.**

Types of Values
The five core human values are: (1) Right conduct, (2) Peace, (3) Truth, (4) Love, and (5) Nonviolence.
1. Values related to RIGHT CONDUCT are:
(*a*) SELF-HELP SKILLS: Care of possessions, diet, hygiene, modesty, posture, self reliance, and tidy appearance
(*b*) SOCIAL SKILLS: Good behaviour, good manners, good relationships, helpfulness, No wastage, and good environment, and
(*c*) ETHICAL SKILLS: Code of conduct, courage, dependability, duty, efficiency, ingenuity, initiative, perseverance, punctuality, resourcefulness, respect for all, and responsibility
2. Values related to PEACE are: Attention, calmness, concentration, contentment, dignity, discipline, equality, equanimity, faithfulness, focus, gratitude, happiness, harmony, humility, inner silence, optimism, patience, reflection, satisfaction, self-acceptance, self-confidence, self-control, self-discipline, self-esteem, self-respect, sense control, tolerance, and understanding
3. Values related to TRUTH are: Accuracy, curiosity, discernment, fairness, fearlessness, honesty, integrity (unity of thought, word, and deed), intuition, justice, optimism, purity, and quest for knowledge, reason, self-analysis, and sincerity, sprit of enquiry, synthesis, trust, truthfulness, and determination.
4. Values related to LOVE are: Acceptance, affection, care, compassion, consideration, dedication, devotion, empathy, forbearance, forgiveness, friendship, generosity, gentleness, humanness, interdependence, kindness, patience, patriotism, reverence, sacrifice, selflessness, service, sharing, sympathy, thoughtfulness, tolerance and trust
5. Values related to NON-VIOLENCE are:
(*a*) PSYCHOLOGICAL: Benevolence, compassion, concern for others, consideration, forbearance, forgiveness, manners, happiness, loyalty, morality, and universal love
(*b*) SOCIAL: Appreciation of other cultures and religions, brotherhood, care of environment, citizenship, equality, harmlessness, national awareness, perseverance, respect for property, and social justice.
Student can present any two values with detail explanation.

Five core human values—1M

Explanationof two human values each carry –2x2=4M

3.a) What is self confidence? What are the factors that influence self-confidence?

Certainty in one's own capabilities, values, and goals, is self-confidence. These people are usually positive thinking, flexible and willing to change. They respect others so much as they respect themselves. Self-confidence is positive attitude, wherein the individual has some positive and realistic view of himself, with respect to the situations in which one gets involved. The people with self-confidence exhibit courage to get into action and unshakable faith in their abilities, whatever may be their positions.

They are not influenced by threats or challenges and are prepared to face them and the natural or unexpected consequences.
The self-confidence in a person develops a sense of partnership, respect, and accountability, and this helps the organization to obtain maximum ideas, efforts, and guidelines from its employees. The factors that shape self-confidence in a person are:
1. Heredity (attitudes of parents) and family environment (elders),
2. Friendship (influence of friends/colleagues),
3. Influence of superiors/role models, and
4. Training in the organization (e.g., training by Technical Evangelists at Infosys Technologies).

The following methodologies are effective in developing self-confidence in a person:
1. Encouraging SWOT analysis. By evaluating their strength and weakness, they can anticipate and be prepared to face the results.
2. Training to evaluate risks and face them (self-acceptance).
3. Self-talk . It is conditioning the mind for preparing the self to act, without any doubt on his capabilities. This make one accepts himself while still striving for improvement.

Def and explanation:2M, factors: 2M

b**) What do you mean by spirituality? Explain how it motivates for better performance**.

Spirituality is a way of living that emphasizes the constant awareness and recognition of the spiritual dimension (mind and its development) of nature and people, with a dynamic balance between the material development and the spiritual development. This is said to be the great virtue of Indian philosophy and for Indians. Sometimes, spirituality includes the faith or belief in supernatural power/ God, regarding the worldly events. It functions as a fertilizer for the soil 'character' to blossom into values and morals.
Spirituality includes creativity, communication, recognition of the individual as human being (as opposed to a life-less machine), respect to others, acceptance (stop finding faults with colleagues and accept them the way they are), vision (looking beyond the obvious and not believing anyone blindly), and partnership (not being too authoritative, and always sharing responsibility with others, for better returns).
Spirituality is motivation as it encourages the colleagues to perform better. Remember, lack of motivation leads to isolation. Spirituality is also energy: Be energetic and flexible to adapt to challenging and changing situations. Spirituality is flexibility as well. One should not be too dominating. Make space for everyone and learn to recognize and accept people the way they are. Variety is the order of the day. But one can influence their mind to think and act together. Spirituality is also fun. Working is okay, but you also need to have fun in office to keep yourself charged up. Tolerance and empathy are the reflections of spirituality. Blue and saffron colors are said to be associated with spirituality.
Creativity in spirituality means conscious efforts to see things differently, to break out of habits and outdated beliefs to find new ways of thinking, doing and being. Suppression of creativity leads to violence. People are naturally creative. When they are forced to crush their creativity, its energy turns to destructive release and actions. Creativity includes the use of color, humor and freedom to enhance productivity. Creativity is fun. When people enjoy what they do, it is involvement. They work much harder.

Spirituality: 2M, Motivations: 3M

4.a)Discuss how moral development occurs according to Kohlberg theory.

Kohlberg Theory
Moral development in human being occurs overage and experience. Kohlberg suggested there are three levels of moral development, namely pre-conventional, conventional, and post-conventional, based on the type of reasoning and motivation of the individuals in response to moral questions. In the pre-conventional level, right conduct for an individual is regarded as whatever directly benefits oneself. At this level, 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. All young children exhibit this tendency. 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 in this level want to please or satisfy, and get approval by others and to meet the expectations of the society, rather than their self interest (e.g., good boy, good girl). Loyalty is regarded as most important. Many adults do not go beyond this level. At the post-conventional level, people are called *autonomous*. They think originally and want to live by universally good principles and welfare of others. They have no self-interest. They live by principled conscience. They follow the golden rule, 'Do unto others as you would have them do unto you'. They maintain moral integrity, self-respect and respect for others.
Kohlberg believed that individuals could only progress through these stages, one stage at a time.
He believed that most of the moral development occurs through social interactions.

b) Discuss ethics of care adopted according to Gilligan's theory.

Gilligan's Theory
Carol Gilligan found that Kohlberg's theory had a strong male bias. 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 maintaining personal relationships was called the *ethics of care*, in contrast with the *ethics of rules and rights* adopted by men. Gilligan revised the three levels of moral development of Kohlberg, as stages of growth towards ethics of caring. The pre-conventional level, which is same as that of Kohlberg's first one, right conduct, is viewed in a selfish manner solely as what is good for oneself. The second level called *conventional level*, the importance is on not hurting others, and willing to sacrifice one's own interest and help others. This is the characteristic feature of women. At the post-conventional level, a reasoned balance is found between caring about others and pursuing the self-interest. The balance one's own need and the needs of others, is aimed while maintaining relationship based on mutual caring. This is achieved by context-oriented reasoning, rather than by hierarchy of rules.

Pre conventional, Conventional, Post conventional—5M

5.a) Discuss on three types of inquiries, giving an example each.
1. Normative inquiry
Seeks to identify values that should guide individuals/groups. Normative questions:
1. How far does the obligation of engineers to protect public safety extend in given situations?
2. When should engineers be expected to blow whistle on dangerous practices of their employers?
3. Whose values ought to be primary in making judgments on acceptable risks in designing a public transport/a nuclear plant? Is it of management, senior engineers, government, or voters?
2. Conceptual inquiry Seeks to clarify important concepts or ideas.
(*a*) What does safety mean and how is it related to risk?
(*b*) What is a bribe?
(*c*) What is a profession?
3. Factual or Descriptive inquiry
Seeks to provide facts needed for understanding and resolving value issues. One may use mathematical or statistical techniques. They provide reasons as well as alternative ways of solution for moral problems.

Enquiries: 3M, Examples: 2M

6.a)Write short notes on Engineers as responsible experimenters
The engineer, as an experimenter, owe several responsibilities to the society, namely,
1. A conscientious commitment to live by moral values.
2. A comprehensive perspective on relevant information. It includes constant awareness of the progress of the experiment and readiness to monitor the side effects, if any.
3. Unrestricted free-personal involvement in all steps of the project/product development (autonomy).
4. Be accountable for the results of the project (accountability). Conscientiousness
Conscientious moral commitment means: (*a*) Being sensitive to full range of moral values and responsibilities relevant to the prevailing situation and (*b*) the willingness to develop the skill and put efforts needed to reach the best balance possible among those considerations. In short, engineers must possess open eyes, open ears, and an open mind (i.e., moral vision, moral listening, and moral reasoning).
Comprehensive Perspective
The engineer should grasp the context of his work and ensure that the work involved results in only moral ends. One should not ignore his conscience, if the product or project that he is involved will result in damaging the nervous system of the people (or even the enemy, in case of weapon development)
Moral Autonomy

Viewing engineering as social experimentation, and anticipating unknown consequences should promote an attitude of questioning about the adequacy of the existing economic and safety standards. This proves a greater sense of personal involvement in one's work.

Three responsibilities-3x1.5M and correlation 0 .5M-- 5M

6.b) How are conflicts of interest solved? Explain with examples

A conflict of interest occurs when the employee has more than one interest. A professional conflict of interest is the situation where the professional has an interest that, if pursued, might prevent him from meeting his obligations to his employers or clients, e.g., an Electrical Engineer working in the State Electricity Board may have a financial interest in a company which supplies electrical instruments. If the engineer is decide on the bid for the supply of electrical instruments, a clear case of conflict of interest exists.

1. Actual Conflict of Interest

This refers to the situation where the objectivity is lost in decision making, and the inability to discharge the duty to the employer. It is the result of weaker judgment and service. A Civil Engineer working in the Public Works Department has a financial interest in a contracting company, which has submitted a bid for the construction of a bridge. There may be a variety of outside interests. But the conflict arises when the outside interest influences or threatens the professional judgment in serving the employer or clients.

2. Apparent Conflict of Interest

This is explained in the following example. An engineer is paid based on a per cent of the cost of the design and there is no incentive for him to cut the costs. In this situation, it appears that the engineer makes the design more expensive in order to get larger commission for him. This situation leads to doubting the engineer's interest and ability for professional judgment.

3. Potential Conflict of Interest

There are situations where the interest of an employee extends beyond the current employer and into the interest on one's spouse, relative or friend. The interest changes into intimacy and subsequent non-moral judgments against the interest of the employer and in favor of the outsider or even a potential competitor.

Three solutions -3M, examples-2M

7. a) Discuss in detail about risk benefit analysis and reduce risk

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

Several techniques adopted to reduce the risks (or improve safety) in a product or process are listed as follows:

1. Application of inherent safety concepts in design, e.g., LPG cylinder is provided with frame to protect the valve while handling and facilitate cryogenic storage. A magnetic door catch provides an easy escape for children caught inside the 'fridge' accidentally.
2. Use of redundancy principle in the instrument protection/design. For example, use of stand-bye device, and back-up for computer storage.
3. Periodical monitoring (inspection) and testing of safety system to ensure reliability, e.g., fire extinguishers, 'earth' system in electric circuits are checked periodically.
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.
5. Development of well-designed emergency evacuation plan and regular rehearsal/drills to ensure preparedness, in case of emergency

Risk benefit analysis-2.5M, Reducing risk-2.5M

7.b) What is the importance of loyalty and collegiality in team work?

Collegiality is the tendency to support and cooperate with the colleagues. It is a virtue essential for the team work to be effective. This consists of various aspects such as:

1. *Respect to the ideas and work of others*: This results in support and co-operation with one's colleagues. One gets back the support and cooperation in return, and this is mutually beneficial.
2. *Commitment to moral principles*: Commitment is towards moral decisions, actions, goals of the organisation and values of the profession.
3. *Connectedness*: It means the shared commitment and mutual understanding. It ensures the absence of egoism and paves way for progress for both.

Loyalty is exhibited in two senses, namely,

1. Agency Loyalty

It is an obligation to fulfill his/her contractual duties to the employer. The duties are specific actions one is assigned, and in general cooperating with others in the organization. It consists of several obligations to employers. But, for the engineers, the paramount obligation is still "the safety, health, and welfare of the public"

2. Attitude Loyalty (or Identification loyalty)

It is concerned with the attitudes, emotions, and a sense of personal identity. It includes willingness to meet moral duties, with attachment, conviction, and trust with employer. The attitude loyalty is more a virtue than an obligation. This type of loyalty is all right when the organizations work for productivity or development of community. Working together in falsification of records or serious harm to the public, does not merit loyalty.

Collegiality-2.5M, Loyalty-2.5M

8.a)Does globalization solve the global issues? Why or Why not?

Globalization means integration of countries through commerce, transfer of technology, and exchange of information and culture. In a way, it includes acting together and interacting economies through trade, investment, loan, development schemes and capital across countries. In a different sense, these flows include knowledge, science, technology, skills, culture, information, and entertainment, besides direct human resource, tele-work, and outsourcing. This interdependence has increased the complex tensions and ruptures among the nations. For the engineers, the issues such as multinational organizations, computer, internet functions, military development and environmental ethics have assumed greater importance for their very sustenance and progress.

Multi national corporations

Organisations who have established business in more than one country, are called multinational corporation. The headquarters are in the home country and the business is extended in many host countries. The Western organizations doing business in the less-economically developed (developing, and overpopulated) countries gain the advantage of inexpensive labor, availability of natural resources, conducive-tax atmosphere, and virgin market for the products. At the same time, the developing countries are also benefited by fresh job opportunities, jobs with higher remuneration and challenges, transfer of technology, and several social benefits by the wealth developed. But this happens invariably with some social and cultural disturbance. Loss of jobs for the home country, and loss or exploitation of natural resources, political instability for the *host* countries are some of the threats of globalization.

International Human Rights

To know what are the moral responsibilities and obligations of the multinational corporations operating in the host countries, let us discuss with the framework of rights ethics. Common minimal rights are to be followed to smoothen the transactions when the engineers and employers of MNCs have to interact at official, social, economic and sometimes political levels. At international level, the organizations are expected to adopt the minimum levels of (*a*) values, such as mutual support, loyalty, and reciprocity,

(*b*) the negative duty of refraining from harmful actions such as violence and fraud, and (*c*) basicfairness and practical justice in case of conflicts.

Technology Transfer

It is a process of moving technology to a new setting and implementing it there. Technology includes hardware (machines and installations) and the techniques (technical, organizational, and managerial skills and procedures). It may mean moving the technology applications from laboratory to the field/factory or from one country to another. This transfer is affected by governments, organizations, universities, and MNCs

Global issues-3M, why and whynot-2M

8.b)Explain the role of engineers as managers

ENGINEERS AS MANAGERS
The characteristics of engineers as managers are:
1. Promote an ethical climate, through framing organization policies, responsibilities and by personal attitudes and obligations.
2. Resolving conflicts, by evolving priority, developing mutual understanding, generating various alternative solutions to problems.
3. Social responsibility to stakeholders, customers and employers. They act to develop wealth as well as the welfare of the society. Ethicists project the view that the manager's responsibility is only to increase the profit of the organization, and only the engineers have the responsibility to protect the safety, health, and welfare of the public. But managers have the ethical responsibility to produce safe and good products (or useful service), while showing respect
for the human beings who include the employees, customers and the public. Hence, the objective for the managers and engineers is to produce valuable products that are also profitable.
Five characteristics-5M

9.a) Discuss the disasters that take place as moral issues concerning the environment

Disasters
1. Plastic Waste Disposal
In our country, several crores of plastic bottles are used as containers for water and oil, and plastic bags are used to pack different materials ranging from vegetables to gold ornaments. Hardly any of these are recycled. They end up in gutters, roadsides, and agricultural fields. In all these destinations, they created havoc. The worse still is the burning of plastic materials in streets and camphor along with plastic cover in temples, since they release toxic fumes and threaten seriously the air quality. Cities and local administration have to act on this, collect and arrange for recycling through industries.
2. e-Waste Disposal
The parts of computers and electronic devices which have served its useful life present a major environmental issue for all the developing countries including India. This scrap contains highly toxic elements such as lead, cadmium, and mercury.
3. Industrial Waste Disposal
There has been a lot of complaints through the media, on (*a*) against the Sterlite Copper Smelting Plant in Thuthukkudi (1997) against its pollution, and (*b*) when Indian companies imported the discarded French Warship Clemenceau for disposal, the poisonous *asbestos* compounds were expected to pollute the atmosphere besides exposing the labor to a great risk, during the disposal. The government did not act immediately. Fortunately for Indians, the French Government intervened and withdrew the ship, and the serious threat was averted!
4. Depletion of Ozone Layer
The *ozone* layer protects the entire planet from the ill-effects of ultraviolet radiation and is vital for all living organisms in this world. But it is eaten away by the Chloro-fluro-carbons (CFC) such as *Freon* emanating from the refrigerators, air conditioners, and aerosol can spray. This has caused also skin cancer to sun-bathers in the Western countries. Further NO and NO2 gases were also found to react with the ozone. Apart from engineers, the organizations, laws of the country and local administration and market mechanisms are required to take up concerted efforts to protect the environment.
5. Global Warming
Over the past 30 years, the Earth has warmed by 0.6 °C. Over the last 100 years, it has warmed by 0.8 °C. It is likely to push up temperature by 3 oC by 2100, according to NASA's studies. About 190 nations met in Germany in the middle of May 2006 and tried to bridge vast policy gaps between the United States and its main allies over how to combat climate change amid growing evidence that the world is warming that could wreak havoc by stoking more droughts, heat waves, floods, more powerful storms and raise global sea levels by almost a meter by 2100.
Global Issues 97
6. Acid Rain
Large emissions of sulphur oxides and nitrous oxides are being released in to the air from the thermal power stations using the fossil fuels, and several processing industries. These gases form compounds with water in the air and precipitates as rain or snow on to the earth. The acid rain in some parts of the world has caused sufficient damage to the fertility of the land and to the human beings.
Five disasters-5M

9.b) Give brief notes on Multinational Corporations

MULTINATIONAL CORPORATIONS
Organisations, who have established business in more than one country, are called Multinational Corporation. The headquarters are in the home country and the business is extended in many host countries. The Western organizations doing business in the less-economically developed (developing, and overpopulated) countries gain the advantage of

inexpensive labour, availability of natural resources, conducive-tax atmosphere, and virgin market for the products. At