Intake 35

QUESTION 1:

(a) Explain how a person is introduced to Values during the formative years (09 marks)

- **Person's family** – the family is responsible for teaching children what is right and wrong long before there are other influences.
- **School** - school helps to further shape the values of children, and introduces them to the concept of correction
- **Religion** - that the family introduces to a child, both at home and through formal instructions, plays a role in teaching the right and wrong behaviors, especially with respect to child's religion

(b) **Why is Ethics of importance to an organization, highlighting the benefits to the organization, and the role played by the employer, employees and organizations culture (4x4 = 16)**

- **Benefits**
- A positive and healthy corporate culture improves the morale among workers in the organization, which may increase productivity and employee retention
- Correspondingly this has financial benefits for the organization.
- A good reputation for ethics and integrity, will improve business

- **Employer:**
- The ethical standards that the Head of an organization uses in managing employees will impact on the morale and loyalty of the workers.
- When the Leaders have high ethical standards, such as integrity, honesty, and treat employees with respect, it encourages workers in the organization to strive to meet that same level.
- Ethical leadership also enhances the company's reputation

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- **Employees:**
- Ethical behavior among workers in an organization ensures that employees do their work with honesty and integrity.
- They adhere to employee policies and rules while striving to meet the goals of the organization.
- Ethical employees also meet standards for quality in their work.

- **Organizational Culture:**
- Leaders and employees adhering to a code of ethics create an ethical organizational culture.

- The leaders of a business may create an ethical culture by behaving in an ethical manner and inspiring their employees to behave in a similar fashion.
- The organization can encourage ethical behavior by rewarding employees who exhibit the values and integrity that coincides with the company code of ethics and disciplining those who do not act accordingly.

QUESTION 2:

(a) Engineering Codes of Ethics states that "Engineers shall perform professional services only in the areas of their competence"
Describe what is meant by this clause and how the Code of Ethics can be violated by not complying with its requirements (13 marks)

i. Engineers are expected to ONLY undertake work in areas in which they are specialized. They shall undertake assignments only when qualified by education and experience in the specific technical fields involved i.e. an engineer who has specialised as a Structural Engineer should not take on work in Water Supply or Geotechnical or Electrical Engineering , even though he/she may have an elementary knowledge gained during under-graduate studies
ii. If an Engineer does not have the expertise for a particular section of the assignment that requires qualifications and experience outside their fields of competence they should not try to do this work, but engage compe ent professionals with necessary qualifications and experience for this part of the project.
iii. The employers and clients must be informed of such arrangements.
iv. Engineers must not sign or seal any plans or documents dealing with subject matter in which they lack competence, or to any plan or document not prepared under their direction or control.

(b) Engineering Code of Ethics requires that Engineers should continue their professional development throughout their careers, and assist and encourage engineers under them to advance their knowledge and experience,
Explain the importance that this Clause has in the development and growth of the engineering profession in Sri Lanka (12 marks).

i. Engineering is a dynamic science and the knowledge and technology in all disciplines of engineering are rapidly expanding. In this context Engineers must not think that the knowledge they gained at graduation is adequate for their work, Hence then need is that engineers shall strive to widen their knowledge and improve their skill in order to achieve a continuing improvement of themselves and the profession.
ii. Also Engineers have to specialize in a branch of their field and do post-graduate studies in these fields
iii. Further as their careers advance, Engineers will get more involved in management and need to develop soft-skills and knowledge in management related subjects.
iv. Engineers must encourage their subordinates to further their education,
These activities help to boost the advancement of engineering in Sri Lanka

QUESTION 3:

Explain the following concepts with examples of possible ethical issues:

i. **Loyalty** **(6 marks)**
ii. **Confidentiality** **(6 marks)**
iii. **Conflict of Interest** **(6 marks)**
iv. **Standard of Care** **(7 marks)**

1. **Loyalty** to an employer can mean that one must work in the best interest of the employer as long as there is no threat to the health, safety and welfare of the community.
   In general loyalty to the employer will mean acting to fulfill one's contractual duties, which are specified in the contract of employment, as well as the more general activities of cooperating with colleagues and following legitimate authority within the company.

   - Ethical issues that could arise here are:

     a. The need to be impartial when acting as administrators of a contract
     b. Should not ask or accept free engineering designs, from material or equipment suppliers for specifying their products
     c. Should not complete, sign, or seal plans and/or specifications that are not of a design, safe to the public health and welfare..

   Loyalty towards the employers can also go beyond doing the duties expected, by working in the best interest of the company and by assisting the employer to maintain an ethical position with regards to the welfare of the community.

   - Ethical issues that could arise here are:

     a. Shall not accept a commission, fee, reward or other benefit from a third party, while working for a particular employer
     b. Advise their employer when as a result of their studies they believe that a project will not be viable or be harmful to the community

2. **Confidentiality** is not disclosing any information that the employer or client would like to have kept secret to compete effectively against business rivals. This is understood to be any data concerning the company's business or technical processes that are not already public knowledge.

   Code of Ethics of Engineering Institutions charge that members shall neither disclose nor use confidential information gained in the course of their employment without express permission, except where public interest and safety are involved.

- Ethical issues that could arise here are:

    a. Engineers at senior levels are entrusted with specific information, which is of special interest to the company, be it in research and development or financial strategy and details with regards to competitive bidding. Competitors may attempt to bribe an employee to get this information.
    b. If the engineer changes employment, the technology and information gained during employment in one company, should not be passed to the new company that employs him. In most developed countries this is the Law, and an engineers can be prosecuted for this breach of ethics
        - Volkswagen vs General Motors
        - B.F.Goodrich vs Donald Wohlgemuth

3. **Conflict of Interest** is a situation where professional has an interest that, if pursued, might keep him/her from meeting his/her obligations to the employers or clients. The Codes of Ethics of Engineering Institutions are very clear that engineers
    a. Should not participate in assignments that would create conflict of interest between their clients / employers and the public and shall advise the client of their concerns.
    b. Should at all times avoid all known or potential conflicts of interest that involve the engineer himself. They should keep their employers or clients fully informed on such matters

    - Ethical issues that could arise here are:

        a. Advise their employer when as a result of their studies they believe that a project is unsafe/harmful to the community, creating a public outcry
        b. In a project that involves a design and build component, the contractor may request an engineer in the client's organization to do the design for the payment of a fee.
        c. When it is known that a major project is to be started, a contractor can offer to give the client's engineer, the design and specifications for inclusion in the bid documents.

4. **Standard of Care** - The work of engineers must conform to applicable engineering standard to specify technical requirements for specific types of engineering design and also meet standards of quality and safety.
   However there may arise unforeseen problems that the standard procedures and regulations are not well equipped to handle, and in such situations the engineer has to satisfy a more demanding norm, the **"Standard of Care".**
   Since particular situation cannot be anticipated from all angles, application of standards requires professional judgement to cater over and above set standards.

Example – the New York City building code's requirement was buildings should withstand winds striking the structure at 90°. The Citicorp Center was designed on this basis and approved. Subsequent review of the design with the wind striking the structure at a 45° angle, however showed that the structural integrity of the building became suspect. The Chief Structural Design Engineer (CSDE), informed the client and took immediate action to strengthen the building to meet this new threat, although the building had complied with the NY Codes.
Satisfying the standard of care cannot guarantee that failure will not occur, but failure to satisfy the standard of care itself is **not** acceptable.

- Ethical issues that could arise here are:

  a. The CSDE could have ignored problems with 45° wind load and continued with the NY City approved building design, thereby risking the lives of people if building collapsed at a later date

  b. The CSDE "whistle blew" on himself: he did not try to hide his error, but came out in the open and took the full responsibility for flawed design

  c. The Code of Ethics for Engineers expects them to "Hold paramount the safety, health and welfare of the public", and in exercising the **"standard of care"** and taking necessary corrective action, the loss of life and injury to the public was avoided.

QUESTION 4:

The primary cause for major engineering disasters in the past, has been the violation of professional ethics, and the main violations can be considered as:

i. Failure to safeguard life and property (8 marks)
ii. Corporate goals over-riding Engineering advise and concerns (8 marks)
iii. Not making public serious engineering flaws - failure to "whistle blow" (7 marks)

Considering the disasters of the Titanic, the Turkish Airlines DC-10 aircraft and the Volkswagen Emissions violation, give examples of how ethical violations contributed to major engineering disasters.

ANSWER Q-4:

	Failure to safeguard life and property	Corporate goals over-riding Engineering advise and concerns	Not making public serious engineering flaws
Titanic	Ship owner's insistence in; • Reduction of lifeboats from designed 32 to 20 • Change the 16 watertight compartments so partitions not at full height and water-tight to accommodate 1st Class cabins	Ship owner's insistence in; • Ordering the captain to complete crossing in 6 days, by going at maximum speed, even at night with poor visibility, for sales promotion • To reduce lifeboats to improve the ship's appearance	Failure of the Marine Architect/ Designer, "WHISTLE BLOW" : • To make public the ship owner's non-compliance with BOT's specified number of lifeboats. • Non-disclosure of owner's change of the watertight compartments, which could pose a major risk
Turkish Airlines DC-10	McDonall Douglas (McDD) • Failure to rectify rear cargo door locking system which failed on two occasions • FMEA done for rear cargo door system, which identified nine life-threatening modes not shown certifying authority FAA	McDonall Douglas (McDD) • Ignoring the two warning had and going ahead with production to meet orders • Agreement between McDD and FAA to certify DC-10 before the rear cargo door was rectified, to meet possible orders Convair's refusal to take up cargo door fault with McDD for fear of losing future contracts	Failure of Convair's (McDD contractor) Chief Engineer to "Whistle Blow"; • When his report on the rear cargo door failure was down-graded by McDD and no corrective action was taken
Volkswagen's Emission violation	Volkswagen Company's • Cheating on emission tests so that noxious gases were way above allowed limits • Failure to comply with national legislative, regulatory and policy aspects of environmental protection	Volkswagen Company's • Diliberate violation of standards to boost sales and maximize profits • Deliberate mis-use of technology, to meet commercial goals, disregarding concerns for human health and welfare	Volkswagen Company's • Failure by VW Engineers party to this deception to **"whistle blow"** and alert the Authorities of this irregular activity which was not safe for human health and welfare