COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra)

Affiliated to University of Pune

End Semester Examination

(ML 102) Professional Ethics and Human Values

Semester - II

Programme: **F.Y. B. Tech**
Academic Year: **2012-13**
Duration: **3 hours**

Divisions: **I, II, III, IV, V**
Date:
Marks: **50**

Instructions:

1. Figures to the right indicate full marks.
2. Begin each answer on a fresh page. Neatness will be rewarded.
3. Mobile phones are not permitted in the examination hall.

Answer any FIVE questions

Q1. Carefully, read the case given below and answer the questions that follow:

Case Study on Environmental Ethics

You are an environmental engineer in one of the factories in an industrial estate. Your plant discharges effluents into a lake in a flourishing tourist area. Although all the plants in this area are reasonably profitable, they compete for the same customers, most of whom are tourists. Your responsibility is to monitor the water and air discharges at your plant and report the results periodically to the Pollution Control Board. You have just prepared your report that indicates that the pollutants in the water discharged into the lake slightly exceed the legally permitted limits.

However, your supervisor says that the "excess" is a mere technicality, and wants you to "adjust" the data to appear to comply with the legal limits, before you send out the report. His explanation is that solving the problem would be expensive, and that the company cannot afford the investment. It would also slow down production, giving an undue advantage to the competitors. He feels that many of the competitors are also doing the same. Besides, declaring the actual test results might be bad publicity for the company and could also scare off the tourists, making it worse for the business itself.

Questions

(a) If you were the environmental engineer at this plant, explain the *moral dilemma* this situation would create in your mind? (5 marks)

(b) *As a socially responsible engineer, how would you deal with this situation? Justify* your answer with ethically valid and clear reasoning. (5 marks)

Q2. (a) Right from our school days we have been told that *energy can neither be created nor destroyed*. If this is true, how do you explain the ethical need to explore alternative sources of energy? As a social experimenter, what is an engineer's role in energy conservation? Explain with examples. (5 marks)

Q2. (b) Why is it important to replace fossil fuels with alternative sources of energy? Name any four such sources and explain, with reasons which one, according to you, could be useful to provide the energy of the future. (5 marks)

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Q3. Read the news item given below and answer the questions that follow it:

Hydroelectricity at the cost of drinking water?

Even as Maharashtra faces one of the severest droughts in recent history, the irrigation department continues to divert water from the water-deficient Krishna valley to the water-surplus Konkan region. Around 50,000 million cubic feet (TMC) of water is annually diverted for three private hydro electricity plants in the Bhima sub-basin. This water ultimately flows into Konkan. Engineers of the water resources department claim that this diversion is necessary for production of hydro electricity.

Located in the upper Krishna Basin, the Koyna Dam has the largest live water reservoir (2,836 TMC) in Maharashtra. The dam also houses five powerhouses with a total capacity of 1,956 MW. Of this, 1,920 MW installed capacity takes out water from the Krishna basin that flows into the water-surplus region and only the smallest 36 MW powerhouse allows the water to flow back into the Krishna basin. Krishna basin also houses some of the worst drought-hit areas of the state, such as the taluka of Maan and districts of Sangli and Solapur. Diversions are also taking place from other dams such as of Shirawantha, Walwhan, Lonavala, Kundli, Thokewadi and Bhira for the three private plants, with a total generation capacity of around 300 MW. However, the water used to generate this hydro-electricity, ultimately flows into the westward flowing rivers, which drain in Konkan.

The Koyna reservoir has a live storage of 68.78 TMC of water, while the dams catering to the private hydro-electric stations have around 18.75 TMC. This can cater to the drinking water and domestic requirements of 7 crore people for an entire year. But alas, after being used in the privately owned dams, the water flows into the rivers that drain into the Arabian Sea via Konkan. Some of these rivers passing through chemical hubs get polluted and become unsuitable for human consumption.

The water, if not diverted to Konkan, would be sufficient to meet the drinking water needs of Sangli and Satara immediately. In neighbouring Karnataka, the government has stopped five hydro power generation stations to preserve water for drinking purposes in Bangalore city. Engineers associated with the project, however, point out that such a proposal cannot be executed in Maharashtra for technical reasons. They say that the canal distribution system to carry water downstream is not ready, and due to the gradient difference, lifting water would be difficult. According to the chief engineer of the Koyna project, the power generated from these projects is required for the state's development and that there is sufficient water available in the Koyna dam for this purpose.

Questions

(a) **Do agree with the Chief Engineer that "development" is a priority over drinking water even when the state is facing an acute drought situation? Explain with ethical reasoning why you think so.** **(5 marks)**

(b) ***Can we solve the drought problem by following Karnataka's example and*** **stopping the diversion of water to Konkan? Suggest an ethical solution to optimize development in Maharashtra without adverse effect on the drought affected districts.** **(5 marks)**

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Q4. In the following statements, fill in the blanks with suitable words from those given in brackets: (20 x 0.5 = 10 marks)

1. _____ ***(simple/ intermediate/ high)*** technology is suitable for _____ ***(large/ small/ micro)*** scale production of goods, employing _____ ***(antiquated/ sophisticated/ obsolete)*** machines and equipment.

2. The use of plastic bags is environmentally _____ ***(sustainable/ preferable/ unsound)*** because they are _____ ***(convenient/ bio-degradable /non-biodegradable)***

3. _____ ***(high/ appropriate/ nuclear)*** technology uses only locally available resources for manufacture of goods.

4. Over the centuries, the toxicity of e-waste _____ ***(is lost/ remains present/ gets neutralized)*** compared with toxicity of nuclear waste.

5. Mass production makes is highly _____ ***(labour/ material/ capital)*** intensive and uses _____ ***(high medium/ intermediate)*** technology.

6. Appropriate technology is relatively _____ ***(complicated/ hazardous/ easy)*** to operate and can be maintained by _____ ***(less/ highly/ specially)*** **skilled persons.**

7. Moral dilemmas arise because of one's _____ ***(difficulty/ ease/ reluctance)*** in deciding the action to take when there is a _____ ***(clash/ agreement/ excitement)*** of different moral values.

8. Appropriate technology is an _____ ***(eco-friendly/ ecologically damaging/ environmentally unsustainable)*** technology

9. MNCs do business in their _____ ***(home/ host/ hostage)*** countries because labour is expensive in their _____ ***(home/ host/ hostage)*** countries.

10. _____ ***(mass/ batch/ manual)*** production is large scale _____ ***(manufacture/ distribution/ consumption)*** of goods, by _____ ***(sophisticated/ simple/ inexpensive)*** machines and equipment using high technology.

11. The technology of mass production requires _____ ***(high/ low/ medium)*** investment to install.

Q5. Write notes on any TWO: (2 x 5 = 10 marks)

(a) Engineer as a social experimenter

(b) Intellectual property rights

(c) Appropriate technology

(d) Environmental ethics

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Q6. (a). *Technology can have no legitimacy unless it inflicts no harm.* Explain this statement in the context of the need for *ethics* in practising the engineering profession. (5 marks)

Q6. (b) *Environmental safety should be built into the design of an engineered product.* How can industrial corporations develop and apply environmentally sustainable technologies in their production processes? (5 marks)

Q7. Read the paragraphs given below and answer the questions that follow it:

Residents of Wakad, near Pune, recently complained of a stink emanating from a large number of dead fish found along the banks of the River Mula. While officials of the Maharashtra Pollution Control Board (MPCB) declined to comment on its cause, residents suspect that it happened due to the poisoning of the river water by fishermen. On the other hand, Pimpri Chinchwad Municipal Corporation (PCMC) officials rejected the possibility of the dissolved oxygen in the river water being below acceptable levels. The MPCB has sent samples of the dead fish to the central forensic laboratory to ascertain the cause of death. They have also sent samples of the river water for analysis.

Effluents from a number of factories are released into this river. It is not clear how many of these factories treat their effluents effectively. Also, the thick layer of water hyacinths covering the river's surface could act as a barrier to the supply of oxygen to the water. Last year, a similar incident of dead fish was reported from Katraj Lake. The tests conducted by MPCB at that time had confirmed that the dissolved oxygen in the lake was far below the requisite level, which resulted in their deaths. Results of the tests of this incident are still awaited and, hopefully, will point out the source of the problem.

Questions

(a) What do you think could be the real cause of the fish dying? Why do you think so? (5 marks)

(b) If you were the Municipal Commissioner, what actions would you take to ensure that such incidents never happen? (5 marks)

Q8. (a) What is *Computer Ethics*? Explain with examples. Why is it unethical to use or copy software for which one has not paid? (5 marks)

Q8. (b) Has the introduction of computers affected the employment situation in India? How? Justify your answer with convincing reasons. (5 marks)