

# University of Ruhuna - Faculty of Technology

Bachelor of Engineering Technology Degree

Level 111 (Semester 1) Examination

July 2020

Course Unit: TCS3121, Ethics for Technologists

Time Allowed: 2 hours

Answer all four (04) questions

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This question paper contains **06 pages** including this instruction page.

Instructions to Candidates:

- This paper carries 60% marks of the course unit.
- Maximum marks allocated for each section of questions are shown.
- Start your answers to each question on a new page in the answer script.
- If you are having any doubt about wordings of the questions, make your own assumptions and clearly mention them in the answer script.

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Q1 Why should Professional Engineering Technologists adhere to the following clauses of Engineering Ethics? Explain with possible consequences. (about 100 words per each)

- a) Engineering Technologists shall not knowingly participate in any act, which will result in waste or misappropriation of public funds (Dishonesty). [5 marks]
- b) Engineering Technologists shall give proper credit for professional work to those to whom credit is due (Acknowledge). [5 marks]
- c) Engineering Technologists shall give evidence, express opinions or make statements in an objective and truthful manner (Truthful). [5 marks]

Q2 Discuss about the behavior of below mentioned engineering technologists stating whether they are ethical or unethical engineering technologists according to IESL Code of Ethics. (about 100 words for each)

- a) Mr. Nuwan is a mechanical engineering technologist working in a multi-national manufacturing company in Sri Lanka. His immediate supervisor is the mechanical engineer in that company and has visited a foreign country for an official work. Because of that, Mr. Nuwan is the acting in charge of the maintenance team of the company. Factory Manager has informed Mr. Nuwan to complete some urgent maintenance works of the steam pipe line on the roof with the support of the maintenance team. Manufacturing process of the factory cannot be started until the maintenance works completed. However, Mr. Nuwan refused to send technicians to the roof without any safety precautions. Because of that, Factory Manager blamed Mr. Nuwan for his disobedience. [5 marks]
- b) Mr. Kelum is an engineering technologist working in a government owned factory in Sri Lanka. During the working time, he has a practice of doing some sub contract engineering works for private sector by his own to earn extra income. Because of that, he is available in the factory for few hours per day. When his boss asked about this matter from him, Mr. Kelum leisurely said that he is doing a great service to Sri Lankan industrial sector by his expertise and knowledge. [5 marks]
- c) Ms. Nimali is an engineering technologist working in an electrical engineering firm. She is responsible for the tendering works of the company. Her brother also owns a small scale company which undertakes electrical engineering sub contract works of large scale

engineering firms. She reveals the confidential information of the different tendering activities of the company to her brother. Because of that, Ms. Nimali's brother has got lot of sub contracts from the tendering process although his works are not in good quality. Ms. Nimali thinks that it is her duty to help her brother. [5 marks]

Q3 Study the following case and answer the given questions.

#### A7-D Brake Case

In the 1960s, Air Brake Corporation was a major defence contractor. One of their main defence-related industries was the production of brakes and wheels for military aircraft. Air Brake had developed a new and innovative design: a four-rotor brake that would be considerably lighter than the more traditional five-rotor designs. Any reduction in weight is very attractive in aircraft design, since it allows for an increase in payload weight with no decrease in performance.

In June of 1967, Air Brake was awarded the contract to supply the brakes for the A7-D by LTV, the prime contractor for the airplane. The qualifying of this new design was on a very tight schedule imposed by the Air Force. The new brake had to be ready for flight testing by June of 1968, leaving only one year to test and qualify the design. To qualify the design for the flight test, Air Brake had to demonstrate that it performed well in a series of tests specified by the Air Force.

After the design had been completed, John Warren, the design engineer, handed the project over to **David Lawson**, who was a just passed out **engineering technologist** to perform the testing of the brakes. Warren moved on to other projects within the corporation. Lawson's first task was to test various potential brake-lining materials to see which ones would work best in this new design. This test would be followed by the testing of the chosen linings on full-scale prototypes of the brakes. Unfortunately, after six months of testing, Lawson was unable to find any materials that worked adequately. He became convinced that the design itself was wronged and would never perform according to the Air Force's specifications.

Lawson spoke with Warren about these problems. Warren still felt that the brake design was adequate and made several suggestions to Lawson regarding new lining materials that might improve performance. However, none of these suggestions worked and the brakes still failed to pass the initial tests. Lawson then spoke about these problems with Robert Sink, the A7-D project manager at Air Brake. Sink asked Lawson to keep trying some more linings and expressed confidence that the design would work correctly.

In March of 1968, Air Brake began testing the full brake prototypes. After 13 tests, it was realized that brake had not passed the Air Force's specification for temperature. Then, by setting up cooling fans directed at the rotors, Lawson performed the test to get passing results for the brakes. Actually, it was a violation of standard procedure of testing brake pads for Air Force's specification for temperature. In that case, Lawson did not work in conformity with recognized engineering standards so as not to jeopardize the health, safety and welfare of the public. Although the results were like that, project manager Robert Sink assured LTV that the brake development was going well successfully.

**Paul Peterson** was another **engineering technologist** working for Air Brake who was responsible for writing test reports and was assigned to write the report for the new A7-D brakes. This report would be an integral part of the Air Force's decision-making process. In the course of writing the report on the A7-D brake tests, Peterson became aware that some of the test results had not been fitted with the Air Force's specifications. Peterson raised his concerns about the report he was writing, feeling that he couldn't write a report based on falsified data. His attempts to write an accurate report were not allowed by management. Air Brake's management forced Peterson to prepare that report falsifying test results to get approval for the brake pads from the Air Force. But, Peterson refused that order thoroughly. Finally, Air Brake assigned another person to prepare that report and got the approval for the brake pads neglecting the safety issues, from Air Force.

*(Original Source: Text Book of "Engineering Ethics" written by Charles B. Fledderman)*

- a) Name 3 unethical acts mentioned in this case. [3 marks]
- b) Comment on the behaviors of two engineering technologists (Lawson & Peterson) involved in this case separately. (about 50 words for each) [4 marks]
- c) If you are the engineering technologist "Peterson" mentioned in the case, what will you do against the unethical act of his company to ensure the safety of airplanes? [2 marks]
- d) Explain, why engineering technologists should work in conformity with recognized engineering standards so as not to jeopardize the health, safety and welfare of the public? (about 100 words) [6 marks]

Q4. a) Name 4 types of work place misconducts which cause for the termination of employment on disciplinary grounds according to the labour and employment law. [4 marks]

b) According to legal regulations and IESL code of Ethics, engineering technologists cannot neglect their responsibility to protect the environment from harmful effects originated from their engineering activities. Explain this statement using at least one relevant incident happened in the past, locally or internationally. (about 150 words) [4 marks]

c) As the inaugural batch of the Engineering Technology degree program in University of Ruhuna, you are having a huge responsibility to establish the engineering technologists' profession in Sri Lanka. For that, you should have a good technical knowledge in engineering technology. And also, you should know how to work ethically according to applicable legal regulations and in corporation with other professionals in the industry.

Discuss about above scenario. (about 200 words)

[7 marks]

[3 marks]

a) Name 3 unethical acts mentioned in this case.

b) Comment on the behaviors of two engineering technologists (Lawson & Peterson) involved in this case separately. (about 50 words for each)

[4 marks]

c) If you are the engineering technologist "Peterson" mentioned in the case, what will you do against the unethical act of his company to ensure the safety of airplanes?

[2 marks]

d) Explain why engineering technologists should work in conformity with recognized engineering standards so as not to jeopardize the health, safety and welfare of the public?

(about 100 words)

[6 marks]

End of the question paper.