



THE OPEN UNIVERSITY OF SRI LANKA
 BACHELOR OF TECHNOLOGY HONOURS IN ENGINEERING/ SOFTWARE
 ENGINEERING HONOURS
 MPJ5233/5263 - TECHNOLOGY, SOCIETY AND ENVIRONMENT
 FINAL EXAMINATION – 2015/2016. OPEN BOOK EXAMINATION
 DURATION: FOUR HOURS (ESSAY TYPE PAPER)

Date: 19 Nov 2016

Time: 0930-1330 hrs

Please answer a total of six questions only. Do not use more than 300 words to answer any question.

The questions are grouped in the following manner: Part A: Q1-Q4; Part B: Q5-Q6; Part C: Q7-Q11. Please ensure that answers for questions in different parts are given in separate answer books. Clearly mark your index number and the part you are answering on each book.

Please **DO NOT** copy directly from a text. If you have to quote, please do so within inverted commas.

Part A

- 1) a) What are the lessons to be learnt from the story of Icarus? (20 marks)
 b) Synthetic fertilizer has been identified as increasing crop yield. Therefore it has been used with the intention of increasing food production in Sri Lanka. Has that use of synthetic fertilizer produced favourable results? Do you think the optimism of Icarus is justified? Discuss. (80 marks)
- 2) a) State different representations of thermodynamics for entropy. (20 marks)
 b) Briefly describe the relationship between the quality of energy and entropy. (20 marks)
 c) Renewable energy sources have been identified as a solution for fossil fuel depletion and the negative effects (Green House Gas emission) of fossil fuel combustion. Global renewable energy potential is considered to be more than sufficient to fulfil the present world energy requirement or considered to be limitless. Can we harness that total potential and what are the limitations in extracting it? How does entropy change when these renewable energy sources are utilized for energy generation? Discuss. (60 marks)
- 3) a) What is internal brain drain and external brain drain? (10 marks)
 b) How does the external brain drain affect the development of the country (30 marks)
 c) Propose steps to be taken to reduce external brain drain. (60 marks)

- 4) a) What are the advantages and disadvantages of the use of coal, biomass and solar power? (30 marks)
b) Has human civilization reached the end of the fossil fuel era? Justify your answer. (70 marks)

Part B

- 5) Discuss the difference between sex and gender.
6) Explain what is meant by gender socialisation. Discuss how gender inequalities are manifested in society using relevant examples.

Part C

- 7) a) Define the term "Environmental Impact Assessment". (10 marks)
b) Read the paragraph below.

"The World Bank provided a loan of \$213 million to Sri Lanka in the form of the Metro Colombo Urban Development Project to support the government's long-term urban development program. The government aims to transform Colombo into a modern, world-class capital by reducing the physical and socioeconomic impacts of flooding, and improving overall capacity for operating and maintaining metropolitan and local infrastructure. The project seeks to reduce flooding in the catchment of the Colombo Water Basin and to rehabilitate, improve and maintain priority local infrastructure and services through selected key demonstration projects."

Assume that you are assigned as an engineer to conduct an Environmental Impact Assessment of that development project. Identify and predict its possible impacts on the environment. (Hint: Your answer should include the impacts of the different phases of construction, commissioning, operation, change, and closure of the project). (50 marks)

- c) Propose and briefly discuss mitigation measures to eliminate the negative impacts of the project. (20 marks)
d) List the alternative methods that you can propose to control the flooding that occurred in the Colombo metropolitan areas. (20 marks)
- 8) a) Define the term "Sustainable Development". (10 marks)
b) Briefly discuss how you can identify that key ecosystems are being threatened due to anthropogenic activities. (30 marks)
c) Select any industrial production process assuming that you work as an engineer responsible for health, safety and environmental management. Discuss in brief how you could apply sustainable development principles in that industrial production process to increase the profit of the industry and protect the environment surrounding the area. (Hint:

Your answer should include the phases of extraction of raw materials, ancillary materials, machines, production, use of products and disposal.) (60 marks)

- 9) Considering your roles and responsibilities as an engineer in the future, write a report to an Institute of Engineers of Sri Lanka (IESL) newsletter to create awareness on controlling visual pollution in cities through visual environment conservation. Choose a suitable title for your article. (100 marks)
- 10) "Prolonged exposure to radio frequency fields due to the popularity of mobile phones among young people carries the risk of cancer and other health problems." Do you agree with that statement? Justify your answer. (100 marks)
- 11) When considering a design solution, an engineer must give serious thought to society and the environment. Tapping into the knowledge bases of the social sciences, humanities and the multidisciplinary field of environmental science, will give the engineer key insights into the effects of the technology he or she is designing. Develop an argument for or against this stance. (100 marks)