THE OPEN UNIVERSITY OF SRI LANKA
Faculty of Engineering Technology
Department of Mathematics and Philosophy of Engineering

Bachelor of Technology Honours in Engineering
Bachelor of Software Engineering Honours
Bachelor of Industrial Studies Honours

Final Examination (2020/2021)
MHJ5342: TECHNOLOGY, SOCIETY AND ENVIRONMENT

(Open-book Examination)

Date: 23rd February 2022 (Wednesday) **Time: 14:00 pm – 18:00 pm**

Please answer a total of five questions only.

Start each answer on a separate answer book. Clearly mark your index number on each answer book. Please make sure that you submit five answer books.

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

Q1.

Institution of engineers Sri Lanka requires engineers to follow a Code of Ethics when involved with the professional practice.

Out of the 8 clauses, clause 1 and clause 3 address, in particular, the broader responsibilities that engineers have towards the society.

Clause 1
Engineers shall hold paramount the health, safety and welfare of the public and proper utilization of the funds and other resources in the performance of their professional duties. It shall take precedence over their responsibility to the profession, sectoral or private interests, employers or to other engineers.

Clause 3
Engineers shall be committed to the need for sustainable management of the planet's resources and seek to minimize adverse environmental impacts of their engineering works or applications of technology so as to protect both present and future generations.

Go through the content of MHJ5342 we discussed during the academic year and discuss how topics we have discussed help us to follow clause 1 and 3 of the Code of Ethics.
(100 marks)

Q2.

Depletion of dollar reserves and unmanageable debt have pushed Sri Lanka to a crisis situation and there are predictions that the Sri Lankan society would go through severe hardships during the coming months and years. By considering a crisis also as an opportunity, argue in detail how the research and development of the country can be developed within the current context to face this crisis situation. (100 marks)

Q3.

Write an essay analyzing why the "Gender and Development" approach is far better than the "Women in Development" approach when addressing issues faced by women. You can use examples to support your argument. (100 marks)

Q4.

a) Discuss characteristics of low entropy and high entropy states using terms "quality of energy", "order/chaos", "information content" and "stability". (30 marks)

b) Assume the case of a bus traveling from Colombo to Vavuniya with all seats occupied by passengers. Explain why passengers seated in the bus tend to get down, walk randomly and mixed with each other at a breakdown using your knowledge on entropy obtained by interpreting the second law of thermodynamics. (40 marks)

c) Draw a graph of entropy change of a human being from birth to death. (30 marks)

Q5.

There is no agreement at global level on the adverse health impacts of electromagnetic waves. While some believe that there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health, some others believe that the exposure is harmful. Write an essay discussing the reasons for this disagreement.
(100 marks)

Q6.

Discuss advantages and disadvantages of zoom sessions against standard practice of day schools where students are present in-person. (100 marks)

Q7.

'Visual pollution' can be described as the degradation of the quality of the composition of the visual environment. Here, the 'visual quality' is assessed considering the 'visual environment' as an aesthetic composition. However, there is a fundamental difference between the composition of the visual environment and other aesthetic compositions. Unlike other aesthetic compositions, visual environment cannot be created anew. It is already there, and can only be transformed or changed to another. If the quality of the visual environment that existed is degraded when changed, then, the term 'visual pollution' is used.

a) How do you define 'composition' in aesthetics? (10 marks)

b) Briefly describe following fundamental characteristics of a composition.
   (i). Unity
   (ii). Balance
   (iii). Harmony & contrast
   (iv). Rhythm (40 marks)

c) Select a context where you noticed 'visual pollution'. It can be an urban city, heritage city, countryside, picturesque beach, mountains or any other context. Write a short essay on visual pollution of that context (Please see the guidelines given below) (50 marks)

Guide to formulate your essay:

You may start your essay by naming the selected location and describing the aesthetics of the existed context, highlighting characteristics of the composition of the visual environment. Next you may describe how the quality of the visual environment has been degraded due to new additions to that context such as billboards, structures, and other ways. (Give details).

Q8.

a) Define the Environmental Impact Assessment (EIA) and mentionmajor steps of the current EIA procedures? (20 marks)

b) Briefly explain each step of scoping process under EIA procedures. (50 marks)

c) What is the importance of Strategic Environmental Assessment (SEA)? (10 marks)

d) Briefly explain key steps of conducting SEA. (20 marks)

Q9.

Sustainable development is defined as "Meeting the needs of the present without compromising the ability of future generations to meet their needs". However, there are issues related to current development.

a) What are the main issues of current development? (20 marks)

b) Name two sustainable development goals (SDG)? (20 marks)

c) A farmer carrying her produce to the local market, a ship being loaded with medical supplies, a child seated on a school bus – the movement of people and goods whether going from a village to a town or across a continent or ocean, shapes sustainable development. What aspects do you need to consider in developing a sustainable transport system to a country like Sri Lanka? (20 marks)

d) "Walking and cycling" are both underutilized transport modes in Sri Lanka. What are the advantages of "walking and cycling" as a mode of sustainable transport in urban cities? (40 marks)

Q10.

As one of the goals to combat the climate change it is suggested, and countries are being asked to come forward with ambitious 2030 emission reduction targets. There it is discussed and announced at the Conference of Parties (COP) to secure global net zero by mi-century and keep 1.5 degrees within reach.

a) What actions/activities can the countries take in order to reduce the CO_2 emissions? (40 marks)

b) Deforestation is accelerated all over the world due to various reasons. Name what are the reasons for deforestation and how it affects the climate change. (20 marks)

c) What is the main cause of global warming? (10 marks)

d) As engineers you are given two materials to be selected for a building construction- wood, and Aluminum. Compare and critically evaluate which material is suitable for the foresaid construction considering the climate change impacts and global warming? (30 marks)

- The End -