



THE OPEN UNIVERSITY OF SRI LANKA
 BACHELOR OF TECHNOLOGY/ SOFTWARE ENGINEERING
 MPJ5233/5263 (TECHNOLOGY, SOCIETY AND ENVIRONMENT)
 FINAL EXAMINATION – 2014/2015
 (OPEN BOOK EXAMINATION)

Date: 06th August 2015

Time: 09.30hrs – 13.30hrs

Mark your Index Number and the question number you are answering on all answer booklets provided to you.

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

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

Questions belong to Sections A, B, C and D should be answered in separate booklets.

Section A

1. i) State advantages and disadvantages of technology? (40 marks)
 ii) Can modern technologies be used at small scale? Discuss. (60 marks)
2. i) Assuming that you are the Minister of Research and Development (R&D), identify four key areas you would like to invest in strengthening R&D in Sri Lanka (e.g. energy technology). State reasons for your selection. (50 marks)
 ii) What steps would you like to take to strengthen the local R&D culture in general? (50 marks)

Section B

3. "Over 350 large/medium dams, headwork and trans-basin canals of Sri Lanka are dilapidated and suffering from various structural deficiencies and shortcomings in the operation and monitoring facilities. Thirty-two dams have been identified as high risk with respect to their appurtenant structures and operational efficiency. Those dams are required to have immediate interventions so as to decrease the vulnerability of downstream populations and socio-economic infrastructure, if breached. This situation threatens the safety and operational efficiency of the dams and their appurtenant structures and as a result increases the vulnerability of breaching. The intervention need to carry out the rehabilitation works one by one to further ensure dam safety and sustain the life of inhabitant dwelling in the surrounding areas." - EIA report, UNIC, 2015

- i. Assume that, you are one of the engineers who contribute to carry out an environmental assessment based on the identified interventions for rehabilitation of five dams in Sri Lanka. Identify and evaluate the potential environmental impacts that would arise as a result of the proposed interventions. (60 marks)
 - ii. Recommend appropriate mitigation measures to avoid the predicted negative impacts. (40 marks)
4. i. Critically discuss the negative consequences that commercial signs can have on the visual quality of urban areas and on people's quality of life. (50 Marks)
 - ii. Propose a set of recommendations to enhance the visual quality of city centers, useful for urban planners, civil engineers, architects, and policymakers. (50 marks)
5. "Essential infrastructure which guarantees our energy and water supplies and enables safe and reliable use of road, rail and air transport is vulnerable to the effects of climate change. We already have some insight into what a changing climate might mean for our infrastructure; high temperatures affecting rail lines leading to delays, floods affecting water infrastructure, closing motorways and damaging century old bridges, more extreme winter weather bringing costs and disruption to services. And as our climate continues to change the difficulty in meeting the challenge of maintaining a robust and reliable infrastructure system increases. This is especially true as our infrastructure sectors have developed into highly technical and interconnected systems. If one sector is at risk, so are the rest. If floods damage our energy supply, all other services can be affected, causing a cascade of failure. To meet the challenge, we need an infrastructure system that is more resilient to climate change. This will require Government, the public and private sectors and professional sectors such as engineers to come together and proactively meet the challenge of creating a climate resilient infrastructure system for the country. This will reduce the risk of economic disruption to the country and enable the opportunities from well-adapted infrastructure to be maximized. The engineering profession has a crucial role to play. Engineers will be designing, building and maintaining our infrastructure to enable it to adapt".

– *Engineering the Future*, 2011

Read the above paragraph and discuss four such measures available for climate change mitigation and adaptation in relation to infrastructure. (100 marks)

6. i. Write reasons why there is an emerged concern that cell phones may cause cancer or other adverse health outcomes. (30marks)
 - ii. Briefly discuss what a cell phone user could do to avoid exposure to the radiofrequency energy. (70 marks)
7. i. What is the difference between "sex" and "gender"? (20 marks)
 - ii. Under the Equal Pay Act in United State, employers are prohibited from paying unequal wages to men and women who perform jobs that require equal skills, effort and responsibility and perform under similar working conditions. Do you recommend the introduction of such an Act to Sri Lanka? Justify your answer. (80 marks)

8. Read the paragraph given below.

The Industrial Revolution and Its Impact on Our Environment

The Industrial Revolution began in Britain in the 1700's, and spread to the rest of the world, beginning with the United States. The use of machinery and factories led to mass production, which in turn led to the development of numerous environmental hazards. The effects on the environment would only be seen clearly years later.

The use of factories and mass production has led to a depletion of certain natural resources, leaving the environment permanently damaged. One example of this depletion is deforestation, which is the clearing of forest trees for use in production. When the trees are cleared, the wildlife in the forest also becomes uprooted.

The lack of trees is only compounded by the problem of carbon emissions. Whereas forests would help emit oxygen and refresh the levels of healthy gases in the air, factories are emitting poisonous emissions and eliminating the source of oxygen. The pollution that has resulted from factories involves not only airborne emissions but land and water pollution as well. The primary issue resulting from pollution and carbon emissions is that of global warming. As the temperature rises, the glaciers are melting and oceans are rising. More animal species are becoming endangered or extinct as a result of global warming.

The upside of the Industrial Revolution has certainly been the mass production of food for the world population. The population has grown by leaps and bounds due to the availability of food, yet at the same time the mass production of man-made and chemically altered food has also contributed to worldwide obesity and health problems. Obesity may also be linked to the sedentary lifestyle made possible by the use of factory-made home appliances which have made life easier for homemakers (i.e. washing machines, dishwashers) and recreational appliances (namely televisions).

While the Industrial Revolution was the cause of positive change for the industrial world, there is no question that it has wreaked havoc on the environment. The depletion of natural resources, the carbon emissions, pollution and human health problems that have resulted directly from the Industrial Revolution's accomplishments have only been disastrous for the world environment.

- *Eco-Issue.com*, 27th August 2012 -

Answer the questions below;

- i. Write down how industrial revolution has contributed to environmental degradation.
– (40 marks)
- ii. How do mass production and industrial revolution bring adverse impacts on human life and also to wild life as well? (25 marks)
- iii. What are the challenges face by engineers today to find workable solutions to avoid depletion of natural resources? (35 marks)

Section C

9. i) Discuss the environmental consequences of energy resource use. (marks 40)
- ii) Using a coal power plant as an example, discuss why Energy Accounting is important in energy studies. (marks 60)
10. i) Briefly explain the first and the second law of Thermodynamics and the concept "entropy". (marks 50)
- ii) Why do you think that the study of the second law of thermodynamics is socially relevant? (marks 50)

Section D

11. It is widely believed that social media played a crucial role at the last election held on the 8th January 2015 which brought President Sirisena to power. Are you in agreement? Argue your case. (marks 100)