



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ENERGY ENGINEERING

SET 538: ENERGY AND ENVIRONMENT

DATE: Tuesday, 10th April, 2012

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS: Do question ONE and any other TWO.

QUESTION 1 (Compulsory)

- i) List three main energy sources that are normally implicated as the causes for climate change? (3 marks)
- ii) Using a life cycle analysis table/matrix approach list 3 major environmental impacts of petroleum fossil fuels in the light of power generation (6 marks)
- iii) One of the environmental impacts of use of fossil fuels is the emission of various oxides of carbon. Depict thus the interchange or flow of carbon in the hydrosphere using an aquatic carbon cycle (6 marks)
- iv) Describe 3 main groups of emissions that companies in Kenya's Industrial area flue gas filtration system will tend to deal with (6 marks)
- v) Discuss the filtration and adsorption for dioxins, furans and heavy metal in wet flue gas filtration system (4 marks)
- vi) Differentiate between ISO 9000 and ISO 14000 standards (2 marks)
- vii) List 3 main scientific and political responses that have been witnessed in Kenya in response to Climate change (3 marks)

QUESTION 2

- i) Using a life cycle Analysis matrix discuss 4 main impacts of the Mumias sugar company Combined heat and Power plant (4 marks)
- ii) What 3 key areas does the ISO 14000 standards cover (3 marks)
- iii) Depict the Terrestrial carbon cycle indicating the 2 sections/areas and the kind of intervention that you as an energy engineer can implement (6 marks)
- iv) Juxtapose the environmental impacts caused by use of a freight truck and sea freight. Both of which use fossil based fuels (4 marks)
- v) Detail two environmental impacts on the use of fossil based fuels for generating power in conventional power plants (3 marks)

QUESTION 3

- i) Describe 4 major environmental impacts of high volume of personal and freight vehicles moving along Thika road upon the hydrosphere, lithosphere, biosphere and atmosphere (4 marks)
- ii) What three mitigation measure can be applied to deal with the aforementioned problems along Thika Road (3 marks)
- iii) Describe four main environmental impacts of sea freight (4 marks)
- iv) Using the life cycle analysis diagram detail how one can apply it to minimize or manage the environmental impacts during the innovation of technology upto its commercialization stage (8 marks)

QUESTION 4

- i) Explain two technology based approaches that can be applied in mitigation of the environmental impacts of the use of fossil fuels in road transport (2 marks)
- ii) Explain to the transport minister 3 main environmental impacts of fossil fuel based aviation (6 marks)
- iii) Differentiate between Grey, black and Bilge water in terms of their environmental impacts and as used in the fishing industries. In your differentiation explain the source and environmental impacts of these different water types (6 marks)
- iv) List the 3 major sources of ocean acidification as regards fossil fuel based transport and power generation sectors and explain their impacts (6 marks)