



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIFTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECV 505: ENVIRONMENTAL ENGINEERING

DATE: 26/8/2022

TIME: 11.00-1.00 PM

INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Define Global Environmental Change giving two examples (4 marks)
- b) What causes environmental changes? (2 marks)
- c) What are the problems associated with global environmental change? (6 marks)
- d) Ozone (O₃) is a necessary evil. Discuss. (10 marks)
- e) What is greenhouse effect? (2 marks)
- f) Name greenhouse gases and why are these gases referred to as such? (6 marks)

QUESTION TWO (20 MARKS)

- a) What is climate change? (4 marks)
- b) What causes climate change? (5 marks)
- c) What is the evidence which shows that there is climate change? (9 marks)
- d) Name one United Nations Organization that does research on climate change (2 marks)

QUESTION THREE (20 MARKS)

- a) What is global warming? (1.5 marks)
- b) What causes global warming? (1.5 marks)
- c) What are the effects of global warming? (14 marks)
- d) How can global warming be reduced? (3 marks)

QUESTION FOUR (20 MARKS)

- a) What is Environmental Impact Assessment (EIA) (2 marks)
- b) What is sustainable development? (2 marks)
- c) There is a link between poverty and environmental degradation. Discuss. (8 marks)
- d) How can EIA contribute to sustainable development? (8 marks)

QUESTION FIVE (20 MARKS)

- a) What is air pollution? (2 marks)
- b) What are the air pollutants of major public concern? (6 marks)
- c) Why are the policies to reduce air pollution beneficial to global climate and health? (4 marks)
- d) Sulphur dioxide (SO_2) is emitted at a rate of 100g/s from a top of a chimney that is 31 m high. The plume initially rises vertically a further 10 m above the chimney exit before convected horizontally by a wind speed of 2.5 m/s under conditions of neutral stability. Determine the centre-line ground level concentration of SO_2 at an estate 3 km away if σ_y and σ_z are 80m and 30m respectively. (8 marks)