



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2015/2016

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL STUDIES

FIRST SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE

ENVIRONMENTAL SCIENCE (ENVIRONMENTAL CONSERVATION)

ECD 209: CLIMATE CHANGE AND COMMUNITY LIVELIHOODS

Date: 26/04/2016

Time: 2.00-4.00 PM

INSTRUCTIONS

This paper consists of FIVE questions

Answer question one and other two questions in this paper

1. a) Define each of the following concepts
 - i) Climate change (2 marks)
 - ii) Climate forcing (2 marks)
 - iii) Climate system (2 marks)
 - iv) Community livelihoods (2 marks)
 - v) Anthropogenic activities (2 marks)
- b) Outline the **FOUR** main differences between climate and weather. (4 marks)
- c) Express the net radiation in terms of short and long wave radiations. (3 marks)
- d) State **FIVE** sources of biogeochemical climate records useful in climate change studies (5 marks)

- e) Explain the technologies developed in order to reduce greenhouse gas emissions from any **FOUR** development sectors in Kenya. (8 marks)
2. a) Discuss **FIVE** livelihood resources communities obtain from arid and Semi arid lands of Kenya. (10 marks)
- b) Discuss **FIVE** internal sources of climate forcings. (10 marks)
3. a) Discuss the **FOUR** main external sources of climate forcings (10 marks)
- b) Discuss **TWO** positive and **THREE** negative feedbacks important for understanding the response of the climate system to elevated concentration of atmospheric carbon dioxide. (10 marks)
4. a) The solar luminosity for the planet Earth, $S_s = 1370 \text{ Wm}^{-2}$ and albedo, $\alpha = 30\%$. Given the Stefan-Boltzmann constant, $\sigma = 5.67 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}$, and a temperature change due to greenhouse effect, $\Delta T = 33\text{K}$, calculate the surface temperature, T_s of the earth (6 marks)
- b) With the help of factual figures, discuss why the Earth's effective temperatures are higher than those of the planet Venus, though being closer to the Sun than the Earth (8 marks)
- c) Explain the **THREE** flexible mechanisms in the Kyoto Protocol aimed at climate change mitigation and adaptation (6 marks)
5. a) Explain **FIVE** possible impacts of climate change on community livelihoods, health and safety (10 marks)
- b) Discuss the concept of the UN-REDD+ and its implications on climate change adaptation and mitigation in developing world (10 marks)