



UNIVERSITY OF EMBU

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**2021/2022 ACADEMIC YEAR**

**FIRST SEMESTER EXAMINATIONS**

**FOURTH YEAR EXAMINATION FOR THE BACHELOR OF SCIENCE DEGREE IN  
WATER RESOURCES MANAGEMENT**

**AWM 405 – CLIMATE CHANGE AND WATER RESOURCES**

**DATE: DECEMBER 8, 2021**

**TIME: 11:00AM-1:00PM**

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**INSTRUCTIONS:**

**Answer Question One and Any Other Two Questions**

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**QUESTION ONE (30 MARKS)**

(a) Distinguish between:

- i. Climate change and global warming. (2 marks)
- ii. Climate change adaptation and climate change mitigation (2 marks)
- iii. Global climate models (GCMs) and regional climate models (RCMs) (4 marks)

(b) Explain the two main bottlenecks to managing climate change (4 marks)

(c) Describe two aspects of downscaling climate models (4 marks)

(d) Discuss five mitigation measures that can be put in place to avoid/reduce pollutants emission (5 marks)



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- (e) Outline the roles of Intergovernmental Panel on Climate change (IPCC) (4 marks)
- (f) Explain how global warming occurs (5 marks)

**QUESTION TWO (20 MARKS)**

- a) Compare and contrast the dynamical and statistical approaches to downscaling general circulation climate models (GCMs)
- (20 Marks)

**QUESTION THREE (20 MARKS)**

- (a) Discuss the steps to follow when assessing climate change using Rainfall-Runoff modeling.
- (12 Marks)
- (b) Climate change has been a pronounced problem globally attracting interest of governments as well as researchers. Discuss the impacts of climate change on water resources in Embu County that would require attention in the next ten years
- (8 Marks)

**QUESTION FOUR (20 MARKS)**

- (a) Discuss the components of the hydrological cycle impacted by increasing global temperatures
- (10 marks)
- b) Global warming and climate change is a controversial discussion in the world with proponents and opponents of its existence. In line with this discussion, describe the three positions on the matter "Global Warming".
- (10 Marks)

**QUESTION FIVE (20 MARKS)**

- (a) Discuss the Spatial Structures in Rainfall-Runoff models (10 Marks)
- (b) Describe the greenhouse gases credited with causing global warming in order of their global warming potential (GWP) (10 Marks)

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