



**EMBU UNIVERSITY COLLEGE**  
**(A CONSTITUENT COLLEGE OF THE UNIVERSITY OF NAIROBI)**

**SECOND SEMESTER EXAMINATION 2013/2014**

**SECOND SEMESTER EXAMINATION FOR THE MASTERS DEGREE IN**  
**AGRICULTURAL RESOURCE MANAGEMENT**

**ACA 601: AGROMETEOROLOGY AND CLIMATE CHANGE ON CROP**  
**PRODUCTION**

**DATE: APRIL 9, 2014**

**TIME: 2.00 – 5.00PM**

---

---

**INSTRUCTIONS:**

**Answer Any FOUR Questions**

---

---

**QUESTION ONE**

- a) Describe how a Class A Open Evaporimeter is used to measure evaporation at a weather station. (10 Marks)
  
- b) Describe five plant factors that affect the rate of evapotranspiration in crops. (5 Marks)
  
- c) Using the water-balance method, compute the weekly evapotranspiration from a reservoir from the following data: Average inflow into the reservoir,  $32.5 \text{ m}^3\text{s}^{-1}$ ; Average outflow from the reservoir,  $40.2 \text{ m}^3\text{s}^{-1}$ ; Rainfall during the week, 73.6 mm; Average water-spread area,  $15.8 \text{ km}^2$ ; Estimated seepage, 0.25 million  $\text{m}^3$ ; Storage at the beginning of the week, 9180 ha-m; Storage at the end of the week. 8630 ha-m. (10 Marks)

## QUESTION TWO

- a) Explain the changes that befall hexose sugar after photosynthesis. (10 Marks)
- b) Compare the processes of photosynthesis and respiration in crop production. (5 Marks)
- c) Describe how the Crassulaceous Acid Metabolism (CAM) pathway is accomplished in field crops. (10 Marks)

## QUESTION THREE

- a) Give a brief account on how crop modeling has evolved as suggested by Penning de Vries (1982). (10 marks)
- b) Explain the role of agrometeorological modeling in the understanding crop production research in Embu County, Kenya. (10 Marks)
- c) Describe the main challenges facing the development and application of agrometeorological models in Kenya. (5 Marks)

## QUESTION FOUR

- a) Explain how the processes of glycolysis, Krebs cycle and oxidative respiration take place in respiration of crop plants. (10 Marks)
- b) Explain the strategies that crop plants use to adapt to drought conditions. (10 Marks)
- c) Describe five means of implementation proposed in Agenda 21 of United Nations Framework Convention on climate Change (UNFCCC). (5 Marks)

## QUESTION FIVE

- a) Explain the objectives of tillage practices as a means of ameliorating the effects of soil microclimates in crop production. (10 Marks)
- b) Explain how the micro-plot technique is used to schedule irrigation in marginal areas. (5 Marks)
- c) Explain the recommended management practices that will make salt-affected soils economically viable? (10 Marks)

---END---