UNIVERSITY OF EMBU

2019/ 2020 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE MASTER OF SCIENCE DEGREE IN LAND AND WATER MANAGEMENT

ALM 605: IRRIGATION AND DRAINAGE

DATE: OCTOBER 26, 2020 **TIME: 2.000 – 5.00PM**

INSTRUCTIONS:
Answer Any FOUR Questions

QUESTION ONE (25 MARKS)

a) Deficit irrigation gives high water use efficiency but application of the practice is yet to gain popularity. Discuss this statement. (15 marks)

b) Describe the indices used to detect need for irrigation scheduling. (10 marks)

QUESTION TWO (25 MARKS)

a) Explain the working of a sub-surface drain system. (15 marks)

b) Water of electrical conductivity 1 dS/m is used for irrigation in a command area at the rate of 500 mm per year. If 50 percent of the salts accumulated in a year is washed out and leached down during the long rains, find how many tons of salt would get added to 1 hectare of land after 10 years of irrigation. (10 marks)

QUESTION THREE (25 MARKS)

a) The Embu County Government approaches you on the need to integrate an irrigation system design in their Development Plan. Discuss five considerations you will include in your presentation for designing of the irrigation system in Mbeere Sub-County, Kenya. (10 Marks)

b) Describe the procedure you will use to design a sprinkler irrigation system in Garissa County. (15 marks)

QUESTION FOUR (25 MARKS)

a) Evaluate the impacts of acid sulphate soils in relation to irrigated agriculture. (10 marks)

b) Explain **five** causes of salinity and sodicity in irrigated agriculture in Kenya. (10 marks)

c) A Persian wheel with an average discharge of 230 litres per minute irrigates 1 hectare wheat crop in 50 hours. Determine the average depth of irrigation. (5 marks)

QUESTION FIVE (25 MARKS)

a) Great economy in water use by rice crop could be achieved if suitable measures are adopted to reduce the deep percolation losses. Evaluate this statement. (10 marks)

b) Compute the reservoir storage efficiency for a 24-h period when 3100 litres/min of water are being diverted from the reservoir based on the following data: The rate of inflow into the reservoir of 4420 litres per minute; ΔS = 410 cubic meters (the quantity of water to be removed to restore the initial water level in the reservoir). (15 marks)

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