

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

AGEN 353: IRRIGATION AND DRAINAGE

STREAMS:

TIME: 2 HOURS

DAY/DATE: THURSDAY 13/12/2018

11.30 A.M – 1.30 P.M

INSSTRUCTIONS:

- Answer all questions in section 1 and two in section II
- Do not write on the question paper

SECTION A (30 MARKS) ANSWER ALL QUESTIONS

1. (a) Explain the term irrigation. [2 marks]
- (b) Discuss four factors that influence the choice of an irrigation method. [8 marks]
- (c) Calculate moisture content of a soil sample collected from a vegetable garden whose wet soil plus the sampling tube weighted 265.9g. When the wet sample was put in an oven at 105 ° C for 24 hours the dry soil plus the sampling tube weighted 246g. Sampling tube weight is 86g. [2 marks]
- (d) Discuss drip/trickle method of irrigation. [5 marks]
- (e) Explain FOUR causes of water logging [8 marks]
- (f) Explain the term Weir. [5 marks]

SECTION II (40 MARKS) ANSWER TWO QUESTIONS

2. (a) Explain the importance of a buffer zone in a ring cylinder infiltrometer. [2 marks]
- (b) Discuss four benefits of irrigation. [4 marks]
- (c) Explain the term duty of water [2 marks]
- (d) Discuss FOUR methods of controlling water logging. [8 marks]

- (e) Explain FOUR causes of salt accumulation in irrigation water. [4 marks]
3. (a) Briefly explain three factors that affect water requirements for crops. [6 marks]
- (b) Find the efficient cross section area of a canal having a discharge of 10^3 /s. Assume bed slope of 1 in 5000 value of $N = 0.0025$ CVR, $(m) = 1$ full supply depth not to exceed 1.60m, side slope 1:1. [6 marks]
- (c) Explain the measurement of consumptive use of crops by use of a lysimeter. [4 marks]
- (d) Explain four objectives of diversion headworks. [4 marks]
4. (a) Using a diagram, explain how infiltration rate can be determined in a paddy field. [6 marks]
- (b) Explain basic infiltration rate using a graph. [2 marks]
- (c) Explain two methods used in determining permanent wilting point of a crop. [2 marks]
- (d) Explain field capacity and briefly describe how it can be measured in an irrigated field. [6 marks]
- (e) Describe the following terms used in designing of irrigation canals.
- (i) Mean velocity [2 marks]
- (ii) Coefficient of rugosity [2 marks]
5. (a) Discuss three factors that will influence irrigation efficiency. [6 marks]
- (b) Discuss the following three types of irrigation efficiencies.
- (i) Transpiration efficiency [4 marks]
- (ii) Water storage efficiency [4 marks]
- (iii) Water distribution efficiencies. [4 marks]
- (c) A stream of 135 litres per second was directed from a canal and 100l//sec were delivered to the field. Determine water conveyance efficiency. [2 marks]
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