



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Ag. Engg.) 2016 Admission
V Semester Final Examination-January 2019

Iden 3108

Drainage Engineering (1+1)

Marks: 50
Time: 2 hours

I Fill up the following (10x1=10)

- 1 Most crops will grow and respire normally if the oxygen diffusion rates exceeds _____g/cm²/min.
- 2 _____are earthen embankments used along the streams to prevent flooding of adjoining areas.
- 3 Relief drains are oriented _____to the direction of groundwater flow.
- 4 Recommended side slopes for drainage ditch in sandy loam soils is _____
- 5 Minimum diameter of observation well is _____cm.

State whether following statements are true or false

- 6 Stream lines are always Parallel to isobaths.
- 7 Intrinsic permeability depends on properties of both media and fluid.
- 8 Unlined drainage ditches can also be used for subsurface drainage.
- 9 Filters are recommended for SSD in case of non-cohesive soils with clay content less than 40 %.
- 10 In gridiron system of SSD, laterals meet the main from both the sides.

II Write Short notes on any FIVE of the following (5x2=10)

- 1 Anthropogenic causes of water logging.
- 2 Benefits of subsurface drainage.
- 3 Define "Leaching requirement". State the equation to compute Leaching Requirement.
- 4 Explain Rational Method for the computation of peak discharge through the drains.
- 5 Classify the salt affected soils based upon pH, ECe and ESP.
- 6 Explain French Inlet with neat sketch.
- 7 State and explain the salt balance equation for irrigated lands with neat sketch.

III Answer any FIVE of the following. (5x4=20)

- 1 Derive Hooghoudt's equation for the spacing the drains.
- 2 Special types of drainage systems.
- 3 Drainage Investigations.
- 4 Laboratory methods for the measurement of soil permeability.
- 5 Filters for tile drains.
- 6 Explain how to drain (a) Saline Soil and (2) Alkaline Soil
- 7 Explain drainage coefficient in detail.
Drainage coefficient of an area is 6.6 cm. The catchment area is 6 sq. km. Design a main open drain with bed slope of 0.1 %, assuming the value of Manning's n to be 0.03. Type of soil permits the side slope of 1.5:1. Depth of the drain at outlet cannot exceed 1.5 m based upon the area topography and elevation of outlet.

IV Answer any ONE of the following (1x10=10)

- 1 Different Surface Drainage Systems with neat sketches.
- 2 Explain all the steps for designing the open ditch system with neat sketch
