KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl.Engg.) 2013 Admission
VIIth Semester Final Examination-February-2017

Cat. No: Iden.4108.

<u>Title: Drainage Engineering (2+1)</u>   **Marks: 50.00**

                                                      Time: 2 hours

I Fill up the blanks/True or False
                                                  (10x1=10)

1. The relative proportions of sand, silt and clay determines the ---------- of the soil.
2. The minimum slope for tile drains should be ---------- %
3. The method of reclamation of water logged area with plantation of very high evapo-transpiration is termed as ----------
4. The ratio of volume of water to the volume of voids in soil is known as ----------
5. The line joining equal elevations of ground water table is termed as ----------
6. The most economical cross section of drainage channel is ----------
7. Mole drains are most suitable for---------- soil
8. Drainage coefficient is independent on soil property and type of crop (True/false)
9. The exchangeable Sodium percentage is more than 15% in saline soil (True/false)
10. Relief drains are constructed across the field slope. (True/false)

II Write short notes/answers on any FIVE of the following
                                                  (5x2=10)

1. Relief drains
2. Functions of envelops and different envelop materials
3. Vertical drainage system and its limitations
4. Darcy's law and its importance in drainage design
5. Drainable porosity and its significance in drainage investigations
6. Drainage problems of Kuttanad, Kerala
7. Significance of sedimentation basin and junction boxes in a tile drainage system

III Write short answers on any FIVE
                                                  (5x4=20)

1. Differentiate between parallel field drainage system and parallel open ditch system with their suitability and neat sketches.
2. Determine the drainage coefficient if a tile drainage system is laid along a length of 320m with laterals spaced at 30m apart and the measured outflow through one lateral is 6.0 cum/hr
3. Distinguish between steady state and unsteady state drainage equations. Under what conditions Glover Dumm equation is used?
4. Write notes on observation wells and their installation
5. In a tile drainage system for an irrigated area, tile drains of 0.2m dia are installed at a depth of 2m from the ground level. An impermeable layer was found to exist at a depth of 5m below the soil surface. The hydraulic conductivity of the soil which is uniform is 1m/day. The area is irrigated once in 15 days and it is estimated that the losses are 30mm in 15days so that the average discharge of the drainage system is 2mm/day. Calculate the required spacing of the drains if the water table is to be kept at 1.5m below ground level.

Values for the equivalent depth d

L (m) / d(m)	50	75	80	85	90	100	150
0.5	0.96	0.96	0.97	0.97	0.98	0.98	0.99
1	1.72	1.80	1.82	1.82	1.83	1.85	1.00
2	2.29	2.49	2.52	2.54	2.56	2.60	2.72
3	2.71	3.04	3.08	3.12	3.16	3.24	3.46
4	3.02	3.49	3.55	3.61	3.67	3.78	4.12
5	3.26	3.85	3.93	4.00	4.08	4.23	4.70

6. What is meant by equivalent depth? Explain its significance and methods for its Determinations.

7. What are the advantages of subsurface drainage system for agricultural lands?

IV Write essay on any ONE   **(1x10=10)**

1. Derive Hooghoudt's equation for tile drain spacing along with neat sketch. What are the assumptions made for the derivation? How this equation can be used for double layered soils?

2. Explain in detail about the drainage problems of Kerala with special reference to drainage needs in Kari lands.

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