

--	--	--	--	--	--	--	--	--	--



GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester – Regular) Examinations, December – 2022

BPCAG5017- Drainage Engineering

(AGE)

Time: 3 hrs

Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)

(1 x 10 = 10 Marks)

- Q.1. Answer ALL questions** [CO#] [PO#]
- | | | | |
|---|---|-----|-----|
| a. Waterlogging is caused by | | CO1 | PO1 |
| (i) Excess Rainfall | (ii) Poor internal Drainage | | |
| (iii) Poor internal Drainage | (iv) All of the above | | |
| b. Factors affecting Water Logging | | CO1 | PO1 |
| (i) Weather | (ii) Soil type | | |
| (iii) Geology | (iv) None | | |
| c. ----- also facilitates the growth of toxins and other injurious substances | | CO2 | PO1 |
| (i) Poor aeration | (ii) Temperature | | |
| (iii) humidity | (iv) None of the above | | |
| d. Area is called water logged when Water table is within _____ from the land surface | | CO1 | PO1 |
| (i) 2m | (ii) 5m | | |
| (iii) 6m | (iv) 10m | | |
| e. The physical effects of water logging are: | | CO1 | PO1 |
| (i) Lack of aeration in the root zone, | (ii) Difficulty in soil workability | | |
| (iii) Deterioration of soil structure. | (iv) All of the above | | |
| f. The main causes of soil salinity and alkalinity are: | | CO4 | PO1 |
| (i) Irrigation mismanagement; | (ii) Poor land leveling; | | |
| (iii) soil compaction | (iv) All of the above | | |
| g. Crop production is exclusively dependent upon rainfall in _____ | | CO1 | PO1 |
| (i) Arid region | (ii) Semi-Arid region | | |
| (iii) Rainfed Region | (iv) None of the Above | | |
| h. Type of Surface Drainage Systems is | | CO2 | PO1 |
| (i) Mole drainage | (ii) Tile drainage | | |
| (iii) Vertical drainage | (iv) Random drains | | |
| i. Which is a type of surface drainage system: | | CO2 | PO1 |
| (i) Random drain system | (ii) Bedding system | | |
| (iii) Parallel field drain system | (iv) All of the above | | |
| j. Requirements of a good drain outlet is: | | CO3 | PO1 |
| (i) to provide a free outlet with minimum maintenance | (ii) to discharge outflow without serious erosion or damage to the pipe | | |
| (iii) to keep out rodents and other small animals | (iv) All of the above | | |

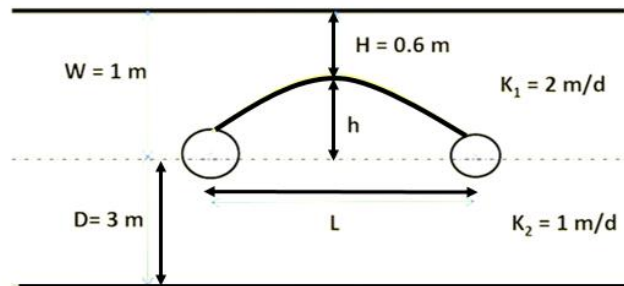
PART – B: (Short Answer Questions)**(2 x 10 = 20 Marks)**Q.2. Answer ALL questions

	[CO#]	[PO#]
a. Define Water Logging in Agricultural field.	CO1	PO1
b. Write the Objectives of Drainage.	CO2	PO1
c. Define Manhole and Blind Junction.	CO3	PO1
d. Enlist the softwares used in drainage design.	CO2	PO2
e. Write the equation of leaching requirement.	CO4	PO1
f. Classify the salt affected soil. Also define Acid soil.	CO4	PO1
g. Differentiate between Arid, Semi-Arid and Rainfed area.	CO1	PO1
h. What are the different types of drainage system	CO2	PO1
i. Write the full form of “ICID” and “MOWR”, “GIR” and “NIR”	CO2	PO1
j. Enlist the types of outlets for pipe drainage system.	CO3	PO1

PART – C: (Long Answer Questions)**(10 x 4 = 40 Marks)**Answer ALL questions

	Marks	[CO#]	[PO#]
3. a. Write about the components in designing the surface drainage system.	5	CO2	PO1
b. Define Land Grading and Land Smoothing. Also Enlist various types of surface drainage system.	5	CO2	PO1
(OR)			
c. What are the different types of surface drainage system? Explain any two types of surface drainage system.	5	CO2	PO1
d. What are the different component of pipe drainage system? Write the functions of each component in details.	5	CO3	PO1
4. a. An agricultural soil contains 40% pore space, and the moisture content after gravity drainage is 40% (by volume). Find the void ratio, drainable porosity, and drainable water volume from a 20m × 15m plot having 1.0m root zone depth.	5	CO2	PO2
b. A watershed of 1200 hectares is discharging through a drain at an average ratio of 2.5 m ³ /s. Calculate the drainage coefficient. If the drainage coefficient is 4 cm, what would be the discharge through the drain?	5	CO2	PO3
(OR)			
c. What are different methods to determine the hydraulic conductivity of soil in the laboratory? Explain any one method in details.	6	CO2	PO1
d. Define the followings: (i) Mole Drainage (ii) Bio-Drainage	4	CO3	PO1
5. a. (i) In a subsurface drainage network, 10 lateral drains laid at a spacing of 30 m and each 200m long, join a collector drain. The average discharge at the outlet of the collector drain was 10L/s when the water table dropped from ground surface to 40 cm below the ground surface in 3days. Find (i) the average drainable porosity of the soil and (ii) Define Field Capacity, and Wilting Point.	5+3	CO3	PO2
b. The depth from soil surface to subsurface tile drains, impermeable soil layer and the highest water tables are measured as 4 m, 6.0m and 1.2 m respectively. What is the effective hydraulic head for drainage in meter?	2	CO3	PO3
(OR)			
c. Write the assumptions of Ernst Equation and Hooghoudt’s Equation.	4	CO3	PO2

- d. Tile drains have to be installed in the agricultural land having soil permeability 2.3×10^3 mm/sec. An impervious strata exist at 3.2 m below land surface and it is desirable to keep water level 1m below land surface. Average discharge is 2mm/day. If tile drains are planned to be placed 1.5 m below land surface. Determine the Drain spacing assuming equivalent depth to be same as tile depth. 6 CO3 PO3
6. a. Describe the followings: 7 CO3 PO1
- (i) Interceptor Drains (ii) Drainage of Sloping Land
- b. What do you understand by the Artesian Relief Wells? 3 CO3 PO1
- (OR)
- c. Determine the required drain spacing for the basic design criteria $q = 7$ mm/day, $H = 0.6$ m, pipe with OD = 0.2m and $u = 0.3$ m. 6 CO3 PO3



- d. Write the short notes on leaching requirement. 4 CO4 PO1

--- End of Paper ---