S - 531

Total No. of Pages : 3

Seat No.	

T.E.(Civil) (Part -I) (Semester-V) Examination, Dec. - 2013

WATER RESOURCES ENGINEERING - I (New)

Sub. Code : 45538

Day and Date : Friday, 06 - 12 - 2013 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) **Attempt any three questions from each section.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific non programmable calculator is allowed.**
4) **Make suitable assumptions regarding data if necessary.**
5) **Draw neat sketches wherever required.**

SECTION - I

Q1) a) Describe with neat sketches different weather systems under which precipitation can occur. **[8]**

b) Explain with sketches: **[8]**

i) Weighing bucket type rain gauge.

ii) Tipping bucket type rain gauge.

Q2) a) For a drainage basin of 600 km^2 isohyetals drawn for a storm gave the following data:

Estimate the average depth of precipitation over the catchment. **[5]**

Isohyetal interval (cm)	15-12	12-9	9-6	6-3	3-1
Inter-Isohyetal area (km^2)	92	128	120	175	85

b) The Horton's infiltration equation for a basin is given by $f = 6 + 16\ e^{-2t}$ where f is in mm/h and t is in hours. What are the values of f_o, f_c, and k? If a storm occurs on this basin with an intensity of more than 22 mm/h determine the depth of infiltration for first 45 minutes and average infiltration rate for the first 75 minutes. **[6]**

c) Explain the rational method used for computing peak discharge in a catchment. **[5]**

P.T.O.

Q3) a) Given below are the ordinates of a 2-h unit hydrograph for a catchment. Calculate the ordinates of a 4-h unit hydrograph for the same catchment. **[6]**

Time (hours)	0	2	4	6	8	10	12	14	16	18	20	22	24	26
Ordinates(m3/s)	0	25	75	90	68	50	32	22	15	10	6	3	1	0

b) Explain the slope area method of measurement of discharge in a river. **[6]**

c) Explain what factors should be considered while selecting site for a stream gauging station. **[4]**

Q4) a) Explain the different approaches with which evaporation can be reduced. **[6]**

b) Explain any two empirical equations used to estimate evapo-transpiration in a catchment. **[6]**

c) Enlist the different types of evaporimeters used to measure the evaporation at a place. Explain any one type with a neat sketch. Explain the importance of pan coefficient in measurement of evaporation. **[6]**

Q5) Write short notes on any four of following: **[16]**

a) Rain gauge density - WMO guidelines.

b) Double ring infiltrometer.

c) Cloud seeding Technique.

d) Components of a flood hydrograph.

e) Design flood and most probable flood.

SECTION - II

Q6) a) Explain: **[8]**

i) Specific capacity of a well.

ii) Specific yield of an aquifer.

iii) Storage coefficient of an aquifer.

iv) Artificial Recharge.

b) Derive an expression for discharge from a well in unconfined aquifer. The well fully penetrates it. **[8]**

Q7) a) Draw a neat sketch showing different components of a lift irrigation scheme. Briefly explain the design procedure. **[8]**

b) Compare: **[8]**

i) Direct & Indirect irrigation.

ii) Drip & Sprinkler irrigation.

Q8) a) Describe with the help of diagram various forms of a soil - moisture. What do you understand by term-'available moisture'? **[8]**

b) A water course has a culturable commanded area of 1400 hectares. The intensity of irrigation for crop A is 45% & for B is 30% both the crops being Rabi crops. Crop A has a kor period 25 days. & crop B has kor period of 12 days. Calculate the discharge of the water course if the depth for crop A is 12cm & for B is 18 cm. **[10]**

Q9) a) Explain the terms 'duty' & 'delta'. Derive the relationship between the two. What are the factors affecting duty & how can duty be improved? **[8]**

b) What do you understand by water harvesting? Explain a typical rain-water harvesting scheme that harvests rain-water collected from roofs & terraces. **[8]**

Q10) Write notes on any four of the following: **[16]**

a) Evapotranspiration.

b) Bandhara irrigation.

c) Preparation of soil for irrigation.

d) K.T. Weir.

e) Soil conservation.

f) Water logging & land logging.

↓↑ ↓↑ ↓↑