S–2017

Seat No.	

Total No. of Pages : 4

T.E. (Civil) (Semester - V) Examination, December - 2015

WATER RESOURCES ENGINEERING - I

Sub. Code : 45538

Day and Date : Thursday, 17 - 12 - 2015 **Total Marks : 100**

Time : 02.30 p.m. to 05.30 p.m.

Instructions : 1) **Attempt any three questions from each section.**

2) **Assume any other suitable data, if necessary.**

3) **Figures to the Right indicate full marks.**

SECTION - I

Q1) **[4 × 4 = 16]**

a) Define Hydrology. Explain briefly man's interference in various parts of hydrologic cycle.

b) Describe the salient characteristics of precipitation in India.

c) Describe with a sketch, the construction and functioning of any one type of recording rain gauge.

d) Briefly explain the factors that affect the runoff from a basin.

Q2) a) Observations taken on a 1.0 m diameter circular land pan on 7 July 2012 from 8.00 a.m. to 6.00 p.m. were as follows : **[6]**

i) Quantity of water taken out of the pan : 5 Lit.

ii) Precipitation during this time period : 20 mm.

If there was no change in the water level in the pan, find out the rate of evaporation.

P.T.O.

b) Explain the different methods of determining the average annual rainfall over a catchment due to a storm. Discuss the relative merits and demerits of the various methods. **[6]**

c) Explain the procedure for supplementing the missing rainfall data. **[4]**

Q3) a) The average precipitation during a storm over a catchment area of 10 km^2 is as follows > **[6]**

i) 40 mm/hr for 1st hour

ii) 60 mm/hr for 2nd hour and

iii) 30 mm/hr for 3rd hour

The resulting hydrograph was plotted on a graph paper with the following scale :

i) 1 cm = 1 hour on X axis

ii) 1 cm = 10 m^3/s on Y axis

If the area of hydrograph was measured as 30cm^2, find the phi index of infiltration.

b) Mention the factors controlling the evaporation process. Also describe the measures to reduce evaporation losses. **[6]**

c) Describe briefly the procedure of using current meter for measuring velocity in a stream. **[4]**

Q4) a) Following ordinates of flood hydrograph were recorded in a stream resulting from a storm in a catchment having an area of 15400 Ha. Base flow is 5 cumecs. **[8]**

Time (h)	0	12	24	36	48	60	72	84	96
Discharge (m^3/s)	5	10	20	35	30	20	15	10	5

Find

i) The runoff in cm.

ii) Ordinates of 12 hour unit hydrograph

b) Describe the S-curve method of developing a 6-hr UH by using 12-hr UH of the catchment? **[6]**

c) Describe the various structural methods adopted for control of floods? **[4]**

SECTION - II

Q5) a) What is meant by 'Duty' and 'Delta' of canal water? Derive a relationship between Duty and Delta for a given base period. **[6]**

b) Distinguish with sketches if necessary, between an unconfined and a confined aquifer. Also explain the terms - i) specific yield, ii) specific retention. To which type of aquifer these terms are related, **[6]**

c) Write a detailed note on Bandhara Irrigation. **[6]**

Q6) a) Explain the various factors on which the duty of irrigation water depends. Also explain different measures that can be adopted to improve the duty. **[8]**

b) The culturable commanded area of a water course is 1200 ha. Intensity of irrigation for the crops of sugarcane and wheat is 20% and 40% respectively. The duties for the two crops at the head of the water courses are 730 ha/cumec and 1800 ha/cumec. respectively. Find – **[8]**

i) The discharge required at the head of the water-course.

ii) Determine the design discharge at the outlet, assuming a time factor equal to 0.80

Q7) a) Explain the following - **[8]**

i) Specific retention of soil

ii) Specific yield of an aquifer

iii) Storage coefficient of an aquifer

iv) Specific capacity of a well

b) A 30 cm diameter well penetrates 25 m below the static water table. After 24 hours of pumping @ 5400 lit/min, the water level in a test well at 90 m. is lowered by 0.53 m. and in a well 30 m away the drawdown is 1.11 m. Find – **[8]**

i) What is the transmissibility of aquifer.

ii) Also determine the drawdown in the main well.

Q8) Write short notes on any four of following - **[16]**

i) Furrow Irrigation

ii) Drip irrigation

iii) Rainwater harvesting

iv) Land drainage

v) Warabandi system

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