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T.E. (Civil) (Part - III) (Semester - V) Examination, May - 2016

WATER RESOURCES ENGINEERING - I (Old)

Sub. Code : 45538

Day and Date : Monday, 02 - 05 - 2016 **Total Marks : 100**

Time : 10.30 a.m. to 01.30 p.m.

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

2) **Figures to the right indicate full marks.**

3) **Assume any other suitable data, if required.**

SECTION - I

Q1) a) Differentiate between the intensity of rainfall and annual rainfall average. Explain the Thissen polygon method for computing the average annual rainfall over a catchment.

b) List out the essential requisites for the formation of clouds and precipitation, Enlist the different forms of precipitation.

c) Enumerate the different methods of measuring stream discharge.

[3 × 6 = 18]

Q2) a) Allowing 10 % error in establishing the mean rainfall data, calculate the minimum number of additional stations required over existing 7 number of rain gauges to represent the basin adequately. The annual rainfall data for stations are 62, 94, 62,47,32,88 and 70 cm respectively.

b) What is meant by design flood and what is its importance? Enumerate the various methods which can be used for estimating design flood discharge from a certain catchment and discuss any one of these methods in detail.

[2 × 8 = 16]

P.T.O.

Q3) a) What is rainfall hyetograph? How it is derived from a given rainfall mass curve? Also define the term 'phi index' and how it is determined from rainfall hyetograph.

b) Briefly describe any method by which you can measure the evaporation loss from a free water surface. Also explain any two methods of reducing the evaporation loss from a free water surface.

[2 × 8 = 16]

Q4) a) Describe methods of separating the baseflow from a total runoff hydrograph. **[6]**

b) The ordinates of a 3 hr UH of a catchment are given below.

Time (hr)	0	3	6	9	12	15	18	21
3 hr UHO (m^3/s)	0	10	20	16	12	8	4	0

Derive flood hydrograph at the catchment outlet due to a storm given below. Assume phi index 3 mm/hr and a constant baseflow 10 m^3/s

Time from start of storm (hr)	0	3	6	9
Accumulated rainfall (cm)	0	3.9	4.7	7.6

[10]

SECTION - II

Q5) a) Explain the following terms - **[6]**

i) Storage coefficient

ii) Coefficient of transmissibility

iii) Perched Aquifer

b) A 30 cm diameter well penetrates 25 m. below the static water table. After 24 hours of pumping @5400/litres per minute, 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 1.11m. **[10]**

i) What is the transmissibility of the aquifer?

ii) Also determine the drawdown in the main well.

Q6) a) Explain Drip method of irrigation and its components in detail. Explain under what conditions it is preferred and state its advantages and disadvantages. **[8]**

b) Distinguish clearly between the following with neat sketches- **[8]**

i) Direct Irrigation scheme

ii) Storage irrigation scheme

Q7) a) Explain following- **[4]**

i) G.C.A. and C.C.A.

ii) Rabi and Kharif crops

b) After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if **[6]**

i) Field capacity of soil = 28%

ii) Permanent wilting point = 13%

iii) Dry density of soil = 1.3 gm/cc

iv) Effective depth of root zone = 70 cm

v) Daily consumptive use of water for the given crop = 12 mm

vi) Readily available moisture = 80% of available moisture

c) The culturable commanded area for a reservoir is 60,000 hectares. Find out the reservoir capacity if canal losses are 7.5%, reservoir losses 10.5% and other data are given as follows: **[8]**

Crop	Base Period in days	Duty in hectares/cumec	Intensity of irrigation as percentage
Rice	130	1000	10
Wheat	120	2400	15
Cotton	180	1800	12
Sugarcane	360	3000	18

Q8) a) Draw a neat sketch of a typical lift irrigation scheme. Name the various components in the scheme. Give design formulae for designing the different components of the lift irrigation scheme. **[8]**

b) Explain the importance of soil conservation measures. Write short notes on contour bunds and graded bunds adopted for soil conservation. **[8]**