B.E. / B.Tech. (Full Time) DEGREE ARREAR EXAMINATIONS, NOV / DEC 2013

AGRICULTURAL AND IRRIGATION ENGINEERING

IV Semester

AI 9252 Hydrology and Water Resources Engineering

(Regulation 2008)

Time: 3 Hours   Answer ALL Questions   Max. Marks 100

PART- A (10 x 2 = 20 Marks)

1. State the hydrologic equation.

2. Name the agency that usually maintains the rain gauges and state the timings at which the rainfall is recorded.

3. Plot an f-curve and state the Horton's equation.

4. What are isochrones?

5. Give the importance of inflection point on the recession side of a hydrograph.

6. Compare a levee and a flood bye pass.

7. In an alluvial basin of 100 km^2, 80 Mm^3 of groundwater was pumped in a year and the groundwater table was dropped by about 4 m during that year. Assuming no replenishment, estimate the specific yield of the aquifer.

8. Define transmissibility and storage coefficient.

9. While allocating space for dead storage in a reservoir, how much percentage of trap efficiency is accounted for?

10. Differentiate between a ridge canal and a contour canal.

Part – B (5 x 16 = 80 marks)

11. i) Explain how one would compute the design flood for a spillway in a reservoir. Assume that rainfall data are available for the basin for about 60 years.   (8)
    ii) Write brief notes on the IMD method and NDVI method of drought assessment.   (8)

12. a) i) State Dalton's law of evaporation and elaborate on the various factors affecting evaporation.   (8)
    ii) Explain any one method of estimating the evaporation by taking actual measurements.   (8)

(OR)

b) Discuss on the various methods available for calculating the average depth of penetration of precipitation occurring over an area. (16)

13. a) i) A small watershed consists of 2.5 km² of cultivated area (c=0.2), 1.5 km² under forest (c=0.1) and 1.5 km² (c=0.35) under grass cover. There is a fall of 20 m in a water course of length 2 km. The I-D-F relation for the area is given by $I = \dfrac{80\,T^{0.2}}{(t+12)^{0.5}}$, I in cm/hr, T in years and t in minutes. Estimate the peak rate of runoff for a 25 year frequency. (10)

ii) Elaborate on the method of developing rainfall-runoff relationship using the SCS method. (6)

(OR)

b) Find the flood hydrograph from a catchment for excess rainfall of 2 cm/hr for one hour followed by 4 cm/hr for one hour followed by 3 cm/hr for one hour and plot the combined hydrograph. Given one hour-one cm unit hydrograph ordinates. (16)

Time (hr)	0	1	2	3	4	5	6	7	8	9	10
Discharge (m³/s)	0	6	13	22	16	11	7	4	2	1	0

14. a) (i) Elaborate on the different types of aquifers with neat sketches. (8)

(ii) Two lakes A and B (surface elevation 24.2m and 20.2m respectively), 1500m away are separated by a land mass (permeability 34.6m/day) lying on an impervious horizontal layer (elevation 16.2m). Determine the flow between the lakes, assuming no infiltration loss. (8)

(OR)

b) (i) Give the schematic sketches of the types of rainwater harvesting structures that are used to harvest water from the roof tops and open areas. (16)

15. a) Elucidate on the different types of structural and non-structural methods of flood control measures. (16)

(OR)

b) (i) Definition of drought varies with the discipline – Substantiate. (8)

(ii) Describe the IMD method of assessment of drought. (8)