

**SUBJECT CODE NO: E-92**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**T.E.(CIVIL) Examination Nov/Dec 2017**  
**Water Resource Engineering - I**  
**(REVISED)**

[Time: Three Hours]

[Max.Marks:80]

- N.B
- Please check whether you have got the right question paper.
- i. Question no.1 and question no.6 are compulsory.
  - ii. Attempt any two questions from remaining questions from each section.
  - iii. Figures to right indicate the maximum marks.
  - iv. Assume suitable data, if necessary.

**SECTION-A**

- Q.1 Attempt any FIVE: 10**
- a) Enlist various practical applications of hydrology.
  - b) Define total runoff.
  - c) Draw a typical mass curve of rainfall obtained from recording type of rain-gauge.
  - d) Define Depth Area Duration (DAD) curve, what is its use?
  - e) Enlist the factors affecting evaporation.
  - f) Define potential evapo-transpiration (PET)
  - g) Enlist the factors affecting runoff.
  - h) What is current meter? What are the uses of current meter?

- Q.2 a) Explain with neat sketch tipping bucket type rain-gauge. 07**
- b) A Catchment area has seven rain-gauge stations. In a year the annual rainfall recorded by the gauges are as follows. 08**

Station	A	B	C	D	E	F	G
Rainfall(cm)	142.3	148.6	120.2	145.1	165.5	133.8	155.9

For a 5% errors in the estimations of the mean rainfall calculate the minimum number of additional stations required to be established in the catchment.

- Q.3 a) The ordinates of a 4h U.H of a basin of area 350km<sup>2</sup> measured at 1h intervals are 8, 22, 46, 80, 110, 90, 85, 67, 52, 42, 38, 30, 28, 21, 15, 7, 5, 3 and 1.0m<sup>3</sup>/s respectively. Obtain the ordinates of a 3h U.H for the basin using S-curve technique. 08**
- b) Explain with neat sketch different methods of base flow separation. 07**
- Q.4 a) What do you understand by a crest gauge? Explain the principle and working of any one type of crest gauge. 08**
- b) Explain with neat sketch ISI standard evaporation pan. 07**

- Q.5 Write a short note on (any three):** **15**
- Double mass curve analysis
  - Infiltration measurement indices
  - Unit hydrograph derivation
  - Log Pearson type III distribution

**SECTION-B**

- Q.6 Attempt any FIVE.** **10**
- Define storage coefficient.
  - Define term specific yield
  - Define Aquifer and aquiclude.
  - Enlist advantages of crop rotation.
  - Enlist various methods of surface irrigation.
  - Define 'permanent wilting point'
  - Give the advantages of drip irrigation.
  - Explain with neat sketch earthen gully plugging.
- Q.7** **08**
- Derive an equation for steady flow in a well in a confined aquifer.
- Q.8** **07**
- A 0.4 m diameter well fully penetrates an aquifer of unconfined type whose bottom is 80 m below the watershed ground water table. When pumped at a steady rate of  $1.4\text{m}^3/\text{min}$ , the drawdown observed in two observation wells at radial distance of 5m and 15m are, respectively 4m and 2m. Determine the drawdown in the well.
- Q.9** **08**
- Explain the terms of delta, duty and base period and derive a relationship between them.
- Q.10** **07**
- The gross command area for an irrigation canal is 20,000 ha, out of which 65% for Rabi and 20% for rice. If kor period is 3 weeks for Rabi and 2.5 weeks for rice, determine the outlet discharge. The duty of water on the field for Rabi and rice may be assumed as 1550 hectares/cumec and 700 hect./cumec. Also calculate delta for each case.
- Q.11** **08**
- What is the necessity of watershed development? Explain conservation of soil and conservation of water.
- Q.12** **07**
- How the drainage of irrigated areas is done for water logged areas.
- Q.13** **15**
- Q.14 Write a short note on (any three):**
- Different methods of ground water recharge
  - Methods of improving duty
  - Various structures to minimize soil erosion
  - Constant level pumping test