# 24292

# B. Tech. 5th Sem. (Civil Engg.)
# Examination – December, 2014

## HYDROLOGY

### Paper : CE-311-F

*Time : Three Hours ]*          *[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :* Q. No. **1** is *compulsory*. Each question carries equal mark (20 marks). Students have to attempt *five* questions in total at least *one* question from each Section. Assume suitable data if missing.

1. Write short notes on the following :      $5 \times 4 = 20$

    (a) Mean precipitation,

    (b) Evapo- Transpiration,

    (c) Wire gauge,

**5.** In a 140 min. storm the following rates of rainfall were observed in successive 20 min intervals : 8.0, 8.0, 18.0, 15.0, 2.0, 3.0 and 12.0 mm/h. Assuming φ index value as 3.0 mm/h and an initial loss of 0.9 mm, determine the total rainfall, net runoff and W index for the storm.

20

## SECTION – C

**6.** List the factors affecting the seasonal and annual runoff (yield) of a catchment. Describe briefly the intersection of factors listed by you. **20**

**7.** (a) What is an IUH ? What are its characteristics ? **10**

(b) Given below are observed flows from a storm of 6 h duration on a stream with a catchment area of $500 \text{ km}^2$. Assuming the base flow to be zero derive the ordinates of the 6-h unit hydrograph : **10**

| Time observed (h) | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 |
|---|---|---|---|---|---|---|---|---|---|
| Flow (m³/s) | 0 | 200 | 350 | 100 | 140 | 160 | 90 | 50 | 45 |

(d) Unconfined aquifers,

(e) Hypsometric curve.

## SECTION – A

**2.** (a) What is the application of hydrology to engineering problems ? Explain drainage basin and its characteristics.                    10

(b) What is meant by Probable Maximum Precipitation (PMP) over a basin ? Explain how PMP is estimated ?                    10

**3.** The normal annual precipitation of five raingauge station P, Q, R, S and T are respectively 135, 105, 96, 113 and 177 cm. During a particular storm the precipitation recorded by stations P, Q, R, S are 15.2, 9.2, 7.8 and 15.2 respectively. The instrument at station T was inoperative during that storm. Estimate the rainfall at station T during that storm.                    20

## SECTION – B

**4.** Distinguish between :                    10 + 10 = 20

(a) Infiltration capacity and infiltration rate.

(b) Field capacity and permanent wilting point.

## SECTION – D

**8.** Describe the recovery test to estimate the transmissivity of a confined aquifer. 20

**9.** Explain the following : $4 \times 5 = 20$

(a) Specific capacity

(b) Well loss

(c) Specific yield

(d) Bulk pore velocity

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