

**M. TECH.-I (CIVIL-HYDRAULIC ENGINEERING) (CBCS – 2015  
COURSE) : WINTER - 2017  
SUBJECT : HYDROLOGY**

Day : Monday  
Date : 22/01/2018

Time 11.00 AM TO 02.00 PM  
Max. Marks : 60

**W-2017-2775**

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Assume suitable data if necessary.

**SECTION – I**

- Q.1** a) State and explain various forms of precipitation. (04)
- b) What are the applications of depth-area-duration relations? Explain the procedure of developing these relations. (06)
- OR**
- a) What is meant by PMP? Describe the method of estimating PMP. (05)
- b) Explain the working of float type of rain gauge with a sketch. (05)
- Q.2** a) Define and explain infiltration indices. (05)
- b) A 400 sq. km. watershed received a 8 hr storm which produced hourly intensities of 6,9,18,15,7,12,8,5 mm/hr. If initial abstractions are estimated to be 15 mm and  $\phi$  index is 6 mm/hr, what would be the run off volume produced by the storm? (05)
- OR**
- a) Explain the term evapotranspiration and explain any one method of measurement of evapotranspiration. (05)
- b) Explain Horton's infiltration equation. Explain how the constants  $f_c, f_0$  and  $k$  in the Horton's equation can be obtained from the experimental data. (05)
- Q.3** a) Define basin yield . Explain one method of estimation. (05)
- b) Explain factors affecting run off from a water shed.. (05)
- OR**
- a) Explain use and significance of regression analysis in hydrology. (05)
- b) Explain limitations of run off estimation by empirical relations. (05)

**SECTION - II**

- Q.4** a) Define Unit Hydrograph and state the assumptions in theory of unit hydrograph. (04)
- b) The hourly ordinates of 1 hr unit hydrograph are give in table below. Derive the ordinates of storm hydrograph if rain of 3 hr duration with depth of 2.5, 5.5 and 3.5 cm in each hour is experienced with  $\phi$  index of 1.5 cm/hr. Assume appropriate base flow. (06)

Time (Hr)	1	2	3	4	5	6	7
Discharge (cu.m/s)	0	15	45	30	20	10	0

P.T.O.

**OR**

Differentiate with neat sketches between (10) **(10)**

- i)** Hydrograph and hietogram
- ii)** S hydrograph and instantaneous unit hydrograph.
- iii)** Normal distribution and Gumbel distribution method for flood estimation.

- Q.5** **a) i)** What is flood routing? Explain role of flood routing in planning a monument near river. **(05)**
- ii)** Explain with neat sketch, one method of flood routing in reservoir. **(05)**

**OR**

- a)** Differentiate between **(10)**
- i)** Hydraulic and hydrologic routing with an example in each case.
  - ii)** Prism storage and wedge storage.
  - iii)** Inflow hydrograph and outflow hydrograph.

- Q.6** **i)** What are different types of aquifers? **(04)**
- ii)** Explain the method images and state the situations under which it is used. **(06)**

**OR**

- i)** What are different pumping tests? Why do we carry out these tests? **(05)**
- ii)** Explain the effect of interference of wells and its role in locating the well. **(05)**

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