

B.E. / B.Tech. (Civil Engineering) Model Curriculum Semester-IV
PCC-CE406 - Hydrology and Water Resources Engineering

P. Pages : 2

Time : Three Hours



GUG/W/24/13720

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Diagrams and Chemical equation should be given wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain with neat sketch the different type of precipitations. 6
- b) A catchment has six rain gauge stations. In a year, the annual rainfall recorded by the gauges are follows: 10

Station	A	B	C	D	E	F
Rainfall (cm)	82.6	102.9	180.3	110.3	98.8	136.7

- a) determine the standard error in the estimation of mean rainfall in the existing set of rain-gauges.
- b) For a 10% error in the estimation of the mean rainfall, calculate the optimum number of rain gauge station in the catchment.

OR

2. a) Enlist recording and non-recording rain gauges. Describe in detail any one recording gauge. 8
- b) Explain hydrologic cycle with neat sketch. 8
3. a) A class-A pan was setup adjacent to a lake. The depth of water in the pan at the beginning of a certain week was 195 mm. In that week there was a rainfall of 45 mm and 15 mm of water was removed from the pan to keep the water level within the specified range. If the depth of water in the pan at the end of week was 190 mm. Calculate the pan evaporation using a suitable pan coefficient estimate lake evaporation in that week. 8
- b) Write a short note on interception losses. 8

OR

4. a) Describe water budget method for estimation reservoir evaporation. 6
- b) Describe Infiltration? What are the various factors affecting infiltration capacity. 6
- c) Explain Energy Budget method for estimation reservoir evaporation. 4

5. a) State and explain factor affecting runoff. 8
- b) Define Influent, effluent stream, Intermittent and perennial stream. 8

OR

6. a) The ordinate of a one hour unit hydrograph at sixty minutes interval are 0, 3, 12, 8, 6, 3 & 0 m³/s. A two hour storm of 4 cm excess rainfall occurred in a basin from 10 am. 10
- Considering constant base flow of 20 m³/s the flow of the River (in m³/s) at 1 pm is-

- b) Explain Runoff and their categories. 6

7. a) Define: 8

- | | |
|---------------|---------------|
| i) Aquifer | ii) Aquiclude |
| iii) Aquitard | iv) Aquifuge |

- b) A catchment area has a time of concentration of 20 mm and an area of 20 hectares. 8
- Estimate peak discharge corresponding to return period of 25 years. Assume a runoff coefficient of 0.25 the intensity duration frequency for the storm. In the area can be expressed by

$$i = \frac{KT^x}{(D + a)^n}$$

Where, K = 6.93, x = 0.189, a = 0.50, n = 0.878

i = Intensity in cm/hr.

D = duration of storm in hours

T = return period in years

OR

8. a) Define flood and state various causes and effects of flood. 8

- b) How do you analyse the cost benefit ratio of a project. 8

9. a) Describe the ground water occurrence in detail. 8

- b) Write a note on: 8

- i) Infiltration well
- ii) Spring's

OR

10. a) What is meant by artificial recharge of ground water? Enumerate the different method which are used for this purpose and describe one of them in brief. 8

- b) Explain with neat sketch the leaky confined aquifer and non-leaky confined aquifer. 8
