

B.E. Civil Engineering (Model Curriculum) Semester - IV
PCCCE406 - Hydrology and Water Resources

P. Pages : 2

Time : Three Hours



GUG/S/23/13720

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) Write a short note on: 8
- | | |
|-------------------|------------------|
| a) Interception | b) Transpiration |
| c) Infiltration | d) Evaporation |
| e) Surface runoff | f) Precipitation |

- b) A lake had a water surface elevation of 103.20m above datum at the beginning of a certain month. In that month the lake received an average inflow $6.0 \text{ m}^3/\text{s}$ from Surface runoff Sources. In the same period, the outflow from the lake had an average value of $6.5 \text{ m}^3/\text{s}$. Further, in that month, the lake received a rainfall 145mm and the evaporation from the lake surface was estimated as 6.10cm. Write the water budget equation for the lake and calculate the water Surface elevation of the lake at the end the month. The average lake=surface area can be taken as 5000ha. Assume that there is no contribution to or ground water storage. 8

OR

2. a) Explain hydrologic cycle with diagram. 8
- b) Explain recording and non-recording rain gauges and describe in detail Tipping-Bucket type rain gauge. 8
3. a) Explain evaporation losses and different method to reduce evaporation losses. 8
- b) Explain Energy Budget method for estimation of reservoir evaporation. 8

OR

4. a) A class - A Pan was setup adjust to a lake. The depth of water in the pan at the beginning of a certain week was 195mm. In that week there was a rainfall of 45mm and 15mm 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 110mm. Calculate the pan evaporation using a suitable pan coefficient estimate the lake evaporation in that week. 10
- b) Write a short note on W-index and ϕ -index. 6
5. a) Write a short note on: 8
- | | |
|-----------------|---------------------|
| a) Influent | b) Perennial stream |
| c) Intermittent | d) Effluent stream |

- b) Explain runoff and their categories. 8

OR

6. a) Write a short note on: 8
a) Area velocity method b) Slope area method
- b) What is runoff? State and explain various component of Runoff with neat sketch. 8
7. a) How do you analyse the Cost benefit ratio of project. 6
- b) Define the followings: 10
a) Recurrence interval of a flood
b) Risk of the project
c) Reliability of the project

OR

8. a) A catchment area has a time concentration 20 minutes and an area of 20 hectares. Estimate peak discharge corresponding to return period of 25 yrs. Assume annual runoff coefficient 0.25. The intensity duration frequency for the storm in the area can be expressed by 8
- $$i = \frac{KT^n}{(D + a)^n}$$
- Where i=intensity in cm/her, T=return period in years, D=duration of storm in hrs.,
K = 6.93, x=0.189, a=0.50, n=0.878.
- b) Define flood and state various causes and effects of flood. 8
9. a) Describe ground water occurrence in detailed. 8
- b) Write a short note on: 8
i) Infiltration well
ii) Spring

OR

10. a) What is meant by artificial recharge of ground water? Enumerate the different method which used for this purpose and describe any one of them in brief. 8
- b) Explain with neat sketch the leaky Confined aquifer and non-leaky confined aquifer. 8
