AU – 2644

Fifth Semester B. E. (Civil Engineering) (CGS) Examination

Elective - I

WATERSHED MANAGEMENT

Paper – 5 ECE 05

(USC – 10197)

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) All questions carry marks as indicated.
(2) Answer **Three** questions from Section A and **Three** questions from Section B.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answer wherever necessary with the help of neat sketches.
(5) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) Explain briefly :

(i) Hydrologic equation.

(ii) Concept of storages. 3+4

(b) What is energy quality.? Explain briefly energy quality evaluation methods. 6

OR

2. (a) Define hydrology and explain its importance and various scopes. 7

(b) Explain the role of water in energy sphere. 6

3. (a) What are different forms of precipitation ? Distinguish between the precipitation and the rainfall. 7

(b) Explain briefly how would you estimate evapotranspiration. 7

OR

4. (a) What is evaporation ? Explain briefly the empirical methods for the estimation of evaporation. 7

   (b) A 500 km^2 watershed received a 8 h storm which produced hourly intensities of 6, 9, 20, 16, 4, 14, 12 and 2 mm/h. If the initial abstractions are estimated to be 15 mm and ϕ index is 5 mm/h, What would be runoff volume produced by the storm ? 7

5. (a) Distinguish between :

   (i) Channel routing and reservoir routing.

   (ii) Maximum probable flood and design flood. 6

   (b) What are the methods of estimating design flood ? What are their limitations? 7

OR

6. (a) What are the various components of runoff ? Explain why rainfall runoff relationships are needed. 7

   (b) Explain briefly various flood control techniques. 6

SECTION B

7. (a) Explain the terms :

   (i) Cone of depression.

   (ii) Radius of influence.

   (iii) Drawdown.

   (iv) Secondary porosity 6

   (b) Explain the 'Theis' method for the determination of the aquifer constants S and T. 7

OR

8. (a) What is steady radial flow ? List out the assumptions made in the analysis of steady radial flow into well. 6

   (b) A well of 0.5 m diameter penetrales fully into a confined aquifer of thickness 20 m and hydraulic conductivity 8.2×10^{-4} m/s. What is the maximum yield expected from this well if the drawdown in the well is not to exceed 3 m ? The radius of influence may be taken as 260 m. 7

9. (a) What is watershed ? What are some key steps in watershed management ? 7

   (b) What are the assumptions underlying the unit hydrograph theory ? What are the uses of unit hydrograph ? 7

OR

10. (a) What is watershed management ? Why is watershed management important? 7

    (b) Find out the ordinates of storm hydrograph resulting from a g -hr storm with rainfall of 2.0, 5.75 and 2.75 cm during subsequent 3-hr intervals. The ordinates of 3-hr unit hydrograph at 3-hr intervals are as follows :

    0, 100, 355, 510, 380, 300, 200, 225, 165, 120, 85, 55, 30, 22, 10, 0 (cumecs)

    Assume an initial loss of 0.5 cm, an infiltration index of 0.25 cm/hr and a base flow of 10 cumecs. 7

11. (a) What is rainwater harvesting ? What are the advantages of rainwater harvesting system ? 7

    (b) Explain the role of individuals and NGOs in rainwater harvesting. 6

OR

12. (a) What is roof top rainwater harvesting ? Explain various methods of roof top rainwater harvesting. 7

    (b) Explain the quality assurance of stored water in Rain water harvesting. 6