USN | | | | | | | | | | |

10CV846

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Water Resources Engineering

Time: 3 hrs. Max. Marks:100

Note:1. ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. ***Graph sheets will be supplied on request.***

PART – A

1 a. Justify Water Resources Engineering as inter disciplinary. What are the purposes of water resources development and management? **(10 Marks)**

b. With a neat flow chart, explain the water resources community frame work at national level in India? What are the salient features of National Water Policy (2002)? **(10 Marks)**

2 a. Explain briefly interception and evapo transpiration process. **(08 Marks)**

b. Estimate the average depth of precipitation using DAD cure that may be expected over an area of 2400 sq.km due to a storm lasting for 24 hours, assuming the storm centre to be located at the centre of the area. The isohyetal map for the storm gave the following areas enclosed between different isohyets. **(12 Marks)**

Isohyets (mm)	21	20	19	18	17	16	15	14	13	12
Area Encl. (Sq.km)	543	1345	2030	2545	2955	3280	3535	3710	3880	3915

3 a. Define Unit hydrograph. What are the assumptions underlying the unit hydrograph theory? Give any three limitations. **(10 Marks)**

b. A 3 – hour storm occurs over a 63 sq.km area. From the following data estimate the rainfall excess for the entire area and its hourly distribution. **(10 Marks)**

Sub area	ϕ – Index	Hourly rain		
	Index cm/hr	1st	2nd	3rd
14.0	2.0	1.5	5.0	0.8
21.0	3.5	1.5	5.0	0.9
28.0	1.0	1.7	6.0	1.5

4 a. Write short notes on : i) Drip Irrigation ii) Border flooding. **(08 Marks)**

b. Explain briefly any two drought management options. **(04 Marks)**

c. The yield of water in Mm^3 from a catchment areas during each successive month from Jan to Dec is given below :
1.4, 2.1, 2.8, 8.4, 11.9, 11.9, 7.7, 2.8, 2.52, 2.24, 1.96, 1.68.
Determine the minimum capacity of a reservoir required to allow the above volume of water to be drawn off at a uniform rate assuming that there is no loss of water over the spillway. **(08 Marks)**

PART – B

5 a. Define flood plain. Explain any two flood management methods. **(06 Marks)**

b. What are the tangible and intangible benefits from a flood control project? **(06 Marks)**

c. Explain the structural and non – structural measures of flood control alternatives. **(08 Marks)**

6 a. Give any seven design criteria for storm sewers. **(07 Marks)**

b. With neat sketch, explain detention basin outlet works. **(08 Marks)**

c. An engineer is required to design a drainage system for an airport with an area of $2.5 km^2$ for a 50 year return period. The 50 year rainfall intensity in that region is given by

$$I = \frac{35}{(t+10)^{0.38}}$$

Where I is the intensity in cm/hr and t is the duration in minutes. If the concentration time for the area is estimated as 50 minutes, for what discharge must he design the system? **(05 Marks)**

7 a. Give any five design considerations for street pavements. **(10 Marks)**

b. With neat sketches, write a note on :

i) Pavement drainage inlet ii) Median inlets. **(10 Marks)**

8 a. With a neat sketch, explain i) Earth dam ii) Rockfill dam. **(12 Marks)**

b. List the 6 types of spillway crest gates. With neat sketch, explain radial gate. **(08 Marks)**

*****