Code No: RT32014   R13   SET - 1

III B. Tech II Semester Supplementary Examinations, November - 2017
WATER RESOURCES ENGINEERING–I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Write a note on scope of Hydrology.	[3M]
	b)	Write short notes on Infiltration indices.	[4M]
	c)	Discuss the effects of climatic factors on the run-off from a drainage basin.	[4M]
	d)	Define design flood, standard project flood and probable maximum flood.	[4M]
	e)	Distinguish between specific yield and specific capacity of a well.	[3M]
	f)	Define Instantaneous Unit hydrograph. How does it differ from Unit hydrograph of finite duration?	[4M]

PART -B

2 a) Describe various types and forms of precipitation. [8M]

b) Thiessen polygons constructed for a network of 10 rain gauges in a river basin yielded Thiessen weights of 0.10, 0.16, 0.12, 0.11, 0.09, 0.08, 0.07, 0.11, 0.06 and 0.10. The rainfalls recorded at these gauges during a cyclonic storm are 135, 115, 160, 140, 208, 150, 135, 160, 170, and 150 mm respectively. Determine the average depth of rainfall by Thiessen mean and Arithmetic mean methods. Also determine the volume of surface runoff at the basin outlet if 35% of the rainfall is lost as infiltration. Take the area of the basin as 5000 Km^2 and express your answer in million cubic metres. [8M]

3 a) What is infiltration? Explain the different methods of measuring infiltration. How would you use infiltration capacity curve to calculate runoff from a small catchment? [8M]

b) The surface runoff from a flood on a drainage basin amounted to 4.5 cm. The area of the basin is 20 km^2. The average depth of rainfall on the drainage basin was 15 cm, and the time distribution of the rainfall is given as follows. Calculate the ϕ - index for this storm. Assume data wherever necessary. [8M]

Hour	09-10	10-11	11-12	12-13	13-14	14-15	Total
Pptn. (mm)	13	19	47	20	31	20	150

4 a) Discuss the applications of flow mass curve and flow duration curve. [6M]

b) Table below gives ordinates of 6-hr Unit Hydrograph. Derive ordinates of 3-hr Un [10M] Hydrograph for the same catchment?

Time(Hrs)	0	3	6	9	12	15	18	21	24
Ordinates of 6-Hr UH (m^3/sec)	0	10	20	30	40	30	20	10	0

5 a) Discuss in detail the various causes and effects of Floods. [6M]

b) Observed values of inflow and outflow hydrograph at the end of a reach in a river are given below. Determine the best values of k and x for use in Muskingum method of flood routing. [10M]

Time (hr)	0	6	12	18	24	30	36	42	48	54	60	66
Inflow (m^3/sec)	20	80	210	240	215	170	130	90	60	40	28	16
Outflow (m^3/sec)	20	20	50	150	200	210	185	155	95	85	55	23

6 a) Discuss different types of aquifers. [4M]

b) During a recuperation test conducted on an open well in a region, the water level in the well was depressed by 3m and it was observed to rise by 1.75 m in 75 minutes. What is the specific yield of open well in that region and what could be the yield from a well of 5m diameter under a depression head of 2.5m? [8M]

c) Explain the various aquifer parameters. [4M]

7 a) How can the linear reservoir storage coefficient K in the Clark's IUH be determined from runoff data? [8M]

b) Describe Chow's Hydrological model. [4M]

c) What are the uses of rainfall – runoff modeling? [4M]

*****