Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 711204N **Date: 10-01-2013**

Subject Name: Water Resources Engineering

Time: 02.30 pm – 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Enlist different methods of flood estimation and explain rational method . **07**

(b) The following are the ordinates of the observed flood hydrograph of 4 hour storm . Catchment area of the basin Is 358 Sq. Km Workout the ordinates of the unit hydrograph **07**

Time	0	4	8	12	16	20	24	28	32	36	40
Discharge in cumec	5	16	22	35	42	63	51	39	26	18	5

Q.2 **(a)** Explain different uses of water . Also discuss importance of water **07**

(b) The following are the details of normal annual precipitation at station A,B,C and D 672, 714, 817 and 428.2 mm . If on certain day records of precipitation on A,B,C are 12, 24, 32 mm and rain gauge station on station D was not properly working so it was not taken. Workout the value of precipitation on D from the other data given . **07**

OR

(b) What are the factors affecting evaporation . Explain in detail **07**

Q.3 **(a)** Explain the following terms (i) Aqitard (ii) Storage coefficient (iii) Coefficient of transmissibility **07**

(b) For a river the estimated peak flow is given below . **07**

Return period in years	Peak flood cumec
100	1810
35	916

What flood discharge in this river will have a return period of 200 years . Use Gumbels method

OR

Q.3 **(a)** Explain flood routing by trial and error method . **07**

(b) Pumping was carried out in a well in unconfined aquifer with saturated depth 22m . The observation holes were located at a distance of 15m and 30m respectively. The rate of discharge from the well is 7.4 liters /s . a steady state was reached after 23 hours of pumping. The drawdown observed at 15m was 1.8m and at 30m was 0.4m . Calculate K **07**

Q.4 **(a)** The ordinates of 3 hour unit hydrograph are given in following table . calculate ordinates of 6 hour hydrograph . **07**

Time in Hours	0	3	6	9	12	15	18	21	24	27	30
Discharge in cumec	0	21	34	40	51	80	50	44	32	19	0

(b) Explain W_{index} and φ_{index} . Alos discuss Hyetograph **07**

OR

Q.4 **(a)** Explain (i) Fern leaf catchment (ii) Fanshaped catchment (iii) Form factor (iv) Orographic precipitation **07**

(b) From year 1941 to 1960 rainfall data at certain rain gauge station are given below **07**

16.2, 15.3, 5.3, 14.2, 11.4, 12.2, 21.4, 16.1, 16.8, 17.4, 17.6, 15.5 14.4, 14.6, 7.6, 6.2, 10.8 , 16.5, 16.4 and 11.6

Find out the precipitation having the recurrence interval of 10 years and 5 years

Q.5 **(a)** What is S-Curve hydrograph ? Explain its uses **07**

(b) Explain flood preparedness relief and recovery **07**

OR

Q.5 **(a)** Explain Horton's Equation of infiltration **07**

(b) Discuss the resistivity method of subsurface investigation of ground water **07**

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