Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Examination January 2010

Subject code: 711204 **Subject Name: Water Resources Engineering**

Date: 29 / 01 /2010 **Time: 12.00 – 2.30 pm**

Total Marks: 60

Instructions:

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

Q.1 **(a)** What is Hydrological cycle? Describe it . **06**

(b) Determine the optimum numbers of rain gauge in a catchments area from the following data **06**

(i) Numbers of rain gauge =9

(ii) Mean annual rainfall at gauge =950, 860, 740, 610, 760, 850, 710, 735, 805

(iii) Permissible error =5%

Q.2 **(a)** The ordinates of observed flood hydrograph of 4 Hr for a catchments area of 490 sq.km. is recorded below calculate ordinates unit hydrograph 4 Hr unit hydrograph **06**

Time in Hours	0	4	8	12	16	20	24	28	32	36
Observed discharge m^3/s	10	20	45	85	140	120	90	65	25	10

(b) Explain factors affecting runoff **06**

OR

(b) What is unit hydrograph? Describe assumptions made in the unit hydrograph. **06**

Q.3 **(a)** The Infiltration data at the time of measuring infiltration are given below derive Horton's equation for the same **06**

Time in Hours	0	2	4	6	8	10	12	14	16	18
Infiltration in Cm/hr	2.5	2.4	2.2	1.8	1.5	1.4	1.3	1.1	0.9	0.9

(b) Explain S- Curve Hydrograph how it is useful ? **06**

OR

Q.3 **(a)** Explain Float type recording Rain gauge **06**

(b) The ordinates of unit hydrograph for 3 Hours duration are given below . calculate ordinates of the 6- hour hydrograph **06**

Time in Hours	0	3	6	9	12	15	18	21	24	27	30	33
Discharge m^3/s	0	10	35	75	110	180	170	120	80	30	15	0

Q.4 **(a)** Explain different methods of flood estimation and control **06**

(b) For a certain stream the 50 year and 100 year flood have been estimated to be 600 m^3/s and 800m^3/s using Gumbels method estimate 150 Year flood for the stream . **06**

OR

Q.4 **(a)** Explain following terms in respect to Ground Water (i) Permeability (ii) Transmissibility (iii) Specific Yield (iv) Confined Aquifer **06**

(b) In an Unconfined Aquifer a pumping test was made . Impermeable strata found at 20 m depth. And observation wells are located at 5m and 12m from pumped well .. the draw down observed at 5m was 1.54m and at 12m was 0.3m ,. Compute the Coefficient of Permeability of soil if the discharge in the pumped well 4.2 $x10^{-3}$ m^3/s **06**

Q.5 **(a)** What is meant by Flood routing ? Explain any one method of flood routing **06**

(b) Explain flood forecasting and Warning **06**

OR

Q.5 **(a)** Derive Theims Formula for Confined Aquifer **06**

(b) Explain Factors affecting Evaporation and Transpiration **06**

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