

Seat No.: _____
No. _____

Enrolment

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER IV (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 741201

Date: 04/05/2016

Subject Name: Hydrological Modelling

Time: 10:30 am to 01:00 pm

Total Marks: 70

Instructions:

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

- Q.1** (a) (i) Explain giving examples physical, empirical and conceptual models **07**
(ii) Explain coefficient of partial correlation.
(b) Explain sensitivity analysis, calibration and validation of a model **07**
- Q.2** (a) State and explain the role of remote sensing and GIS in hydrological modeling **07**
(b) Daily run off data is available for a period of 10 years, explain how you will convert this data to average :weekly, 10 days and monthly run off data. **07**
- OR**
- (b) The observed field evaporation data and that estimated by hydrological modeling for 10 consecutive days for a station are given in Table 1. Calculate the standard error of estimate. **07**
- Q.3** (a) Explain the capabilities of MOD FLOW software. How can it be utilized for ground water modeling? **07**
(b) Actual run off and that estimated by use of hydrological model are given in Table 2. Calculate the coefficient of linear correlation. **07**
- OR**
- Q.3** (a) State and explain the capabilities of HEC- HMS software used for surface water modeling. **07**
(b) Explain the major applications of ground water modeling. **07**
- Q.4** (a) Discuss the properties of the following distributions and explain to which hydrological processes they are applicable (i) Gumbel's Distribution (ii) Normal Distribution. **07**
(b) Enlist the various parameters which are used for testing goodness of fit for a hydrological model. Explain the importance of Chi Square Test. **07**
- OR**
- Q.4** (a) Explain the role of threshold value in automatic digitization of drainage network. **07**
(b) Draw sketches to explain the following distribution (i) Bimodal (ii) Multimodal (iii) Bell Shaped and (iv) J Shaped. Explain the term Kurtosis Coefficient stating what it measures. **07**
- Q.5** (a) (i) Define probabilistic, stochastic and deterministic hydrological models and give example of each. (ii) Explain 'Model Efficiency' as suggested by Nash to evaluate the performance of a model. **07**
(b) Explain the hydrological models used for flood routing discussing the equations involved. Discuss the relative merits and demerits of hydrological model over hydraulic modeling for flood routing. **07**

OR

- Q.5** (a) Define simulation of a hydrological process. Discuss the advantage and disadvantages of simulation. **07**
- (b) Explain the following processes which are a part of rainfall, runoff system model (i) Infiltration (ii) Deep Percolation (iii) Prompt Interflow (iv) Delayed Interflow. **07**

Table-1 for Q2(b)	
Actual Evaporation(mm)	Evaporation Estimated by model(mm)
0	0
1	1.2
0	0
0.2	0.25
0	0
0.2	0.22
0.8	0.8
0.6	0.61
1.2	1.25
5	5.1

Table-2 for Q3(b)	
Actual Run Off (mm)	Estimated Run Off (mm)
25	23
13	12.5
4.75	4.25
25.2	27
2	3.2
5.68	6
