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	
		(ii) Explain coefficient of partial correlation.	
	(b)	Explain sensitivity analysis, calibration and validation of a model	07

- **(b)** Explain sensitivity analysis, calibration and validation of a model
- State and explain the role of remote sensing and GIS in hydrological modeling 07 **O.2 (a)**
 - Daily run off data is available for a period of 10 years, explain how you will 07 **(b)** convert this data to average :weekly,10 days and monthly run off data.

OR

- The observed field evaporation data and that estimated by hydrological 07 **(b)** modeling for 10 consecutive days for a station are given in Table 1. Calculate the standard error of estimate.
- Explain the capabilities of MOD FLOW software. How can it be utilized for **Q.3** (a) 07 ground water modeling?
 - Actual run off and that estimated by use of hydrological model are given in 07 **(b)** Table 2. Calculate the coefficient of linear correlation.

OR

- State and explain the capabilities of HEC- HMS software used for surface Q.3 **(a)** 07 water modeling.
 - Explain the major applications of ground water modeling. 07 **(b)**
- Discuss the properties of the following distributions and explain to which 07 0.4 (a) hydrological processes they are applicable (i) Gumbel's Distribution (ii) Normal Distribution.
 - Enlist the various parameters which are used for testing goodness of fit for a **(b)** 07 hydrological model. Explain the importance of Chi Square Test.

OR

- Explain the role of threshold value in automatic digitization of drainage **Q.4 (a)** 07 network.
 - Draw sketches to explain the following distribution (i) Bimodal (ii) Multimodal 07 **(b)** (iii) Bell Shaped and (iv) J Shaped. Explain the term Kurtosis Coefficient stating what it measures.
- (i) Define probabilistic, stochastic and deterministic hydrological models and 07 **Q.5 (a)** give example of each. (ii) Explain 'Model Efficiency' as suggested by Nash to evaluate the performance of a model.
 - Explain the hydrological models used for flood routing discussing the equations 07 **(b)** involved. Discuss the relative merits and demerits of hydrological model over hydraulic modeling for flood routing.

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

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			
