Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1721806 **Date: 05-12-2014**

Subject Name: Environmental Modeling

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 and explain the applications of Environmental Modeling	**07**
	(b)	Derive the equation to calculate the concentration of a biodegradable pollutant discharged into the lake.	**07**
Q.2	**(a)**	Enlist the water quality parameters and explain in brief.	**07**
	(b)	Enlist and explain the types of equations used to find the growth rate of biomass in lakes	**07**
		OR	
	(b)	Write the chemical equation showing algae production in lake and derive the relationship indicating relationship between Nitrogen ,Phosphorus and algal cells.	**07**
Q.3	**(a)**	Explain and derive the Streeter Phelps equation for finding the DO deficit in a stream	**07**
	(b)	With the help of a neat sketch, write a short note on DO sag curve.	**07**
		OR	
Q.3	**(a)**	Write short notes on : (i) Waste Load Allocation (ii) River Segmentation	**10**
	(b)	Differentiate between: Deoxygenation and reaeration	**04**
Q.4	**(a)**	Explain the phenomena of stratification and overturn of lakes	**07**
	(b)	Give the classification of lakes based on biological activity and based on productivity.	**07**
		OR	
Q.4	**(a)**	Estimate the total biomass production in terms of algal cell mass in one month, if an effluent containing 0.05 mg of phosphate is discharged daily in to the lake. Also estimate the quantity of nitrogen consumed.	**08**
	(b)	Explain clearly the difference between Calibration and Simulation.	**06**
Q.5	**(a)**	Give the classification of types of models and explain each type.	**07**
	(b)	Enlist and explain the degradation reactions in water	**07**
		OR	
Q.5	**(a)**	In a lake the sum of all inputs is 40 m3/s while the out flow is 42 m3/s and increasing 0.5 m3/s every day. If the initial volume of lake is 0.3×10^8 m3, calculate the volume of a lake over time . Estimate the time in days when there will be no water in the lake.	**10**
	(b)	Write a short note on model parameters.	**04**

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