Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Regular Examination January / February 2011

Subject code: 712106N

Subject Name: Modeling Simulation and Computer Application

Date: 04/02/2011 **Time: 02.30 pm – 05.00 pm**

Instructions: **Total Marks: 70**

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

Q.1	**(a)**	What is system modeling? Briefly discuss principles of it.	**07**
	(b)	Discuss types of model with an example of each.	**07**
Q.2	**(a)**	What is a System? Explain attributes, entities and activity of the system with an example.	**07**
	(b)	Model any first order system and write a Matlab program for it. State inputs and outputs of the system clearly.	**07**
		OR	
	(b)	Discuss modeling of simple mass, spring and damper system and derive its transfer function model considering displacement as output.	**07**
Q.3	**(a)**	Discuss unforced response of second order mechanical system and write Matlab program for it.	**07**
	(b)	Write a short note on various simulation softwares which can be used in Mechanical Engineerig.	**07**
		OR	
Q.3	**(a)**	Discuss modeling of automobile suspension system and write its system equations.	**07**
	(b)	Discuss inverted pendulum model and write its Matlab program.	**07**
Q.4	**(a)**	Discuss modeling of R-L-C series circuit and write a Matlab program for it.	**07**
	(b)	Write a short note on simulink.	**07**
		OR	
Q.4	**(a)**	Discuss advantage of Matlab and discuss various simulation toolboxes available in it.	**07**
	(b)	Explain stochastic system with at least two examples.	**07**
Q.5	**(a)**	A manufacturer claims that only 4% of his products supplied by him are defective. A random sample of 600 products contained 36 defectives. Test the claim of the manufacturer.	**07**
	(b)	Explain Monte Carlo method. Use it to find the area under the curve.	**07**
		OR	
Q.5	**(a)**	Before an increase in excise duty on tea, 800 people out of a sample of 1000 persons were found to be tea drinkers. After an increase in the duty, 800 persons were known to be tea drinkers in a sample of 1200 people. Do you think that there has been a significant decrease in the consumption of tea after increase in the excise duty?	**07**
	(b)	A sample of 100 dry battery cells tested to find the length of life produced the following results: mean is 12 hours and standard deviation is 3 hours. Assuming the data to be normally distributed, what percentage of battery cells are excepted to have life (i) more than 15 hours (ii) less than 6 hours (iii) between 10 and 14 hours?	**07**

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