Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IST Semester–Remedial Examination – July- 2011

Subject code: 712106

Subject Name: Modeling Simulation & Computer Application

Date:13/07/2011 **Time: 10:30 am – 01:00 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 a system? Explain all types of system with an example of each.	**06**
	(b)	Explain linear and nonlinear system with an example of each.	**06**
Q.2	**(a)**	Discuss types of model with an example of each.	**06**
	(b)	What is simulation? Why should we simulate a system? State steps to be followed in simulating a system.	**06**
		OR	
	(b)	Differentiate between continuous event model and discrete event model. Also define: Entity, Activity, State and Event of a system.	**06**
Q.3	**(a)**	Model any first order system and write a Matlab program for it. State inputs and outputs of the system clearly.	**06**
	(b)	Discuss modeling of automobile suspension system and write its system equations.	**06**
		OR	
Q.3	**(a)**	Discuss unforced response of second order mechanical system and write Matlab program for it.	**06**
	(b)	Write a short note on various simulation softwares which can be used in Mechanical Engineerig.	**06**
Q.4	**(a)**	Discuss inverted pendulum model and write its Matlab program.	**06**
	(b)	Discuss advantage of Matlab and discuss various simulation toolboxes available in it.	**06**
		OR	
Q.4	**(a)**	Discuss modeling of R-L-C series circuit and write a Matlab program for it.	**06**
	(b)	Write a short note on simulink.	**06**
Q.5	**(a)**	Explain Monte Carlo method and state the points which make it different than other simulation.	**06**
	(b)	500 articles from a factory are examined and found to be 2% defective. 800 similar articles from a second factory are found to have only 1.5% defective. Can it reasonably be concluded that the product of the first factory are inferior to those of second?	**06**
		OR	
Q.5	**(a)**	100 electric bulbs are found to be defective in a lot of 5000 bulbs. Find the probability that at the most 3 bulbs are defective in a box of 100 bulbs. [exp(-2) = 0.1353]	**06**
	(b)	A random sample of 200 villages from Coimbatore district gives the mean population per village at 485 with a S.D. of 50. Another random sample of the same size from the same district gives the mean population per village at 510 with a S.D. of 40. Is the difference between the mean values given by the samples statistically significant? Justify your answer.	**06**

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