Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –I Examination Feb. - 2012

Subject code: 714004N **Date: 21/02/2012**
Subject Name: Modeling and Simulation of Rubber Processing
Time: 10.30 am – 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.**

Q.1	**(a)**	What is simulation? How it is different from design? Give examples clearly differentiating design, simulation and optimization.	**07**
	(b)	'Every design decision is an optimization problem': justify the statement.	**04**
	(c)	'Simulation is a tool for optimization' justify the statement.	**03**
Q.2	**(a)**	Give concept of ANN.	**03**
	(b)	Discuss application of ANN for modeling Mooney viscosity of polybutadiene rubber.	**04**
	(c)	Explain back propagation algorithm for ANN.	**07**
		OR	
	(c)	List out different ways by which training/learning takes place in ANN and briefly explain each. Discuss importance of training/learning.	**07**
Q.3	**(a)**	Explain basics of FEA for rubber product/processing.	**05**
	(b)	Discuss role of engineer in analysis, modeling and result interpretation considerations for FEA.	**09**
		OR	
Q.3	**(a)**	Explain the theory/working of FEA with simple example.	**07**
	(b)	Discuss meshing for FEA highlighting its importance and important does and don'ts of meshing.	**07**
Q.4	**(a)**	Differentiate deterministic and stochastic processes.	**03**
	(b)	Differentiate distributed parameter and lumped parameter models.	**04**
	(c)	Give Step by step procedure with all stages in the development of a complete mathematic model of a process.	**07**
		OR	
Q.4	**(a)**	What is black box modeling? Explain with example	**05**
	(b)	Discuss time-independent nonlinear elasticity models used for FEA of elastomers.	**09**
Q.5	**(a)**	List out applications of simulation in rubber technology and tools used for simulation discussing benefits and limitations.	**07**
	(b)	Discuss benefits and limitations of using simulation for product development and manufacturing of o-ring by injection molding.	**07**
		OR	
Q.5	**(a)**	Differentiate static and dynamic simulation with examples and list out applications in each category.	**07**
	(b)	Explain the process simulation for Rubber Extruder discussing important aspects and key issues.	**07**

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