Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2014

Subject code: 731101 **Date: 03-06-2014**

Subject Name: I. C. Engine Modeling and Simulation

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)**	What do you mean by simulation of internal combustion engine? Explain step-by-step approach for simulating Internal Combustion engine.	**07**
	(b)	Show basic steps of ə-Ůmodel and application of it.	**07**
Q.2	**(a)**	Generate zero dimensional, single zone models for progressive combustion with burning rate concept	**07**
	(b)	Show the evaluation of spray elements? Explain each term.	**07**
		OR	
	(b)	Classify and Explain different types of diesel combustion system.	**07**
Q.3	**(a)**	Considering internal combustion engine as open system, explain combustion efficiency and inefficiency	**07**
	(b)	Explain various flow processes taken place in S.I. engine during running condition with suitable sketch.	**07**
		OR	
Q.3	**(a)**	What is turbulence modeling state its type.	**07**
	(b)	Develop wiebe heat release model.	**07**
Q.4	**(a)**	Explain diesel fuel spray structure with its major parameter.	**07**
	(b)	Explain wall impingement phenomenon and its effect?	**07**
		OR	
Q.4	**(a)**	Discuss importance of modeling in context to I C engine.	**07**
	(b)	Explain different impingement regimes and droplet transition condition with suitable diagram	**07**
Q.5	**(a)**	How does combustion air swirl affect spray penetration?	**07**
	(b)	What basic procedure you follow to generate, fluid mechanics based multidimensional model for engine processes. Which governing equations are required for this?	**07**
		OR	
Q.5	**(a)**	Carried out fuel-air cycle analysis for petrol engine considering gasoline as fuel	**07**
	(b)	Define: 1. Zero dimensional modeling. 2. Single zone modeling. 3. Diffusive burning	**07**

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