Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014

Subject code: 731101   **Date: 25-11-2014**
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)**	Explain the semi empirical model of two stroke engine for gas exchange process.	**07**
	(b)	Explain the one dimensional model for flow in engine manifolds for two stroke engine.	**07**
Q.2	**(a)**	Classify the subdivision of zero dimension model of engine combustion modeling and state the assumption for typical two zone model.	**07**
	(b)	Discuss the boundary condition for spray modeling and combustion modeling in single cylinder engine.	**07**
		OR	
	(b)	Explain the droplet turbulence interaction for spray equation based models	**07**
Q.3	**(a)**	Explain different impingement regimes and droplet transition condition with suitable diagram	**07**
	(b)	Generate model for no evaporating liquid sprays into gaseous environment	**07**
		OR	
Q.3	**(a)**	What basic procedure you follow to generate, fluid mechanics based multidimensional model for engine processes. Which governing equations are required for this?	**07**
	(b)	What is the vertex structures for laminar flow modeling	**07**
Q.4	**(a)**	Explain the multi zone model for the mass burning rate.	**07**
	(b)	How does combustion air swirl affect for spray penetration?	**07**
		OR	
Q.4	**(a)**	Develop wiebe heat release model.	**07**
	(b)	Describe the tactic for modeling Internal combustion engine use diesel as fuel?	**07**
Q.5	**(a)**	Discuss the two zone K- model with its purpose.	**07**
	(b)	Write the difference between premixed and diffusion combustion.	**07**
		OR	
Q.5	**(a)**	What is Probability density function?	**07**
	(b)	Considering internal combustion engine as open system, explain combustion efficiency and inefficiency	**07**

****

1