Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 712104N **Date: 05-12-2014**

Subject Name: Combustion Engineering

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 combustion? State the general conditions necessary for combustion.	**07**
	(b)	With the help of P-Θ diagram explain stages of combustion in S. I. engines.	**07**
Q.2	**(a)**	Explain briefly the phenomenon of diesel knock in C. I. Engine combustion chamber.	**07**
	(b)	Derive the Clausius-Clapeyron equation for phase equilibrium.	**07**
		OR	
	(b)	Describe the Pre-combustion chamber for C.I. Engine and Discuss its relative merits and demerits.	**07**
Q.3	**(a)**	What is adiabatic flame temperature? Explain the factors affecting adiabatic flame temperature.	**07**
	(b)	What is knocking? Explain the various theories of knocking.	**07**
		OR	
Q.3	**(a)**	Explain briefly diesel injected fuel spray characteristics with neat sketch.	**07**
	(b)	Describe the M-combustion chamber system for C. I. Engine.	**07**
Q.4	**(a)**	Explain the working of cyclone burner with neat sketch.	**07**
	(b)	What is premixed and diffusion flame? Explain the structure of premixed flame of a simple gas burner.	**07**
		OR	
Q.4	**(a)**	Explain Fluidized bed combustion system.	**07**
	(b)	Discuss the performance of pulverized coal during combustion.	**07**
Q.5	**(a)**	Bituminous coal is burned to completion with 50% excess air. Find the fuel-air ratio and the volumetric analysis of the products. The as-received ultimate analysis of the coal is 70% (wt) carbon, 5% hydrogen, 15% oxygen, 5% moisture, and 5% ash.	**07**
	(b)	Enlist measuring tools which can measure the exhaust gas of I.C. Engine. Explain any Two.	**07**
		OR	
Q.5	**(a)**	For a stoichiometric hydrogen-air reaction at 1 atm pressure, Find (a) the fuel to air mass ratio, (b) the mass of fuel per mass of reactants, and (c) the partial pressure of water vapor in the products.	**07**
	(b)	Discuss pollution due to combustion of coal in power plants.	**07**

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