Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2161902 **Date: 24/10/2016**

Subject Name: Internal Combustion Engines

Time: 10:30 AM to 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 I.C Engine? Explain with neat sketch valve timing diagram for 4-stroke diesel engine.	**07**
	(b)	What are the different methods of cooling I.C. engine? Compare different methods.	**07**
Q.2	**(a)**	Explain pumping loss and rubbing friction loss as applied to I.C.Engines.	**07**
	(b)	What is fuel air cycle? Explain the phenomenon of dissociation.	**07**
		OR	
	(b)	Explain construction and working of Junker's gas calorimeter with neat sketch.	**07**
Q.3	**(a)**	Define the following terms: - (i) Octane number (ii) Cetane number (iii) HUCR (iv) Diesel index (v) Performance number (vi) Flash and Fire point (vii) Vapour lock.	**07**
	(b)	A 4 cylinder 4-stroke engines have 10 cm bore and 14 cm strokes runs at 4000 rpm. A: F ratio supplied to engine is 16:1 with volumetric efficiency of 75%. Manometer shows reading of 12 cm of mercury causing the air flow through the venture. Find diameter of venture and nozzle orifice. Neglect the compressibility of air. Take: - C_{da} = 0.85, C_{df} = 0.75, ρ_a = 1.25 kg/m^3, ρ_f = 750 kg/m^3, ρ_m = 13600 kg/m^3.	**07**
		OR	
Q.3	**(a)**	Explain with neat sketch of simple carburetor and its limitations.	**07**
	(b)	What do you mean by solid injection system? Explain with neat sketch of common rail fuel injection system.	**07**
Q.4	**(a)**	What is the function of S.I engine ignition system? Explain with neat sketch of magneto ignition system.	**07**
	(b)	What type of governing used in S.I engine and C.I engine? Explain any one of them.	**07**
		OR	
Q.4	**(a)**	Define Supercharging and give its advantages. Also explain the methods of supercharging and explain with sketch any one of them.	**07**
	(b)	Explain with neat sketch the pulse turbo charging (Buchi type).	**07**
Q.5	**(a)**	Classify different types of combustion chambers in S.I and C.I engine. Also explain any one of them.	**07**

(b) A two stroke diesel engine was motored when energy meter reading was 1.5 KW. Then the test on the engine was carried out for 1 hour and following observations were recorded:- Brake torque = 120 Nm, RPM = 600, Fuel used = 2.5 kg, C.V of fuel = 40.3 MJ/kg, Cooling water used = 818 kg, Rise in cooling water temperature = 10^0 C, C_{pw} = 4.2 KJ/kg K, Exhaust gas temperature = 345^0 C, Room temperature = 25^0 C, A:F used = 32:1, C_{pg} = 1.05 KJ/kg K. Draw heat balance sheet indicating units in KJ/min basis and also on percentage basis. **07**

OR

Q.5 **(a)** Describe the "Morse test". Write the assumptions made and limitation of this test. **07**

(b) A diesel engine working on diesel cycle uses compression ratio of 18. The cut off is 6% of stroke at a particular load. The specific heat at constant volume increases by 1.2%. Find the percentage change in the air-standard efficiency of the cycle. Take C_v = 0.72 KJ/kg K and R = 287 J/kg K as an average values. **07**

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