Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V EXAMINATION – WINTER 2015

Subject Code:X51904 **Date:08/12/2015**

Subject Name: Internal Combustion Engines

Time: 10:30pm to 1:00pm **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)**	With a neat sketch explain the working of two stoke diesel engine.	**07**
	(b)	Write about Ethanol, Methanol, Bio diesel and Hydrogen as I C Engine fuels.	**07**
Q.2	**(a)**	Distinguish between: (1) Octane number and Performance number (2) RON and MON (3) Carburetor icing and vapor lock (4) Cloud point and pour point	**07**
	(b)	What do you mean by air standard cycle? Compare air standard cycle and fuel air cycle. Explain the effect of compression ratio and A/F ratio on fuel air cycle	**07**
		OR	
	(b)	Derive an expression for A:F ratio in carburetor neglecting compressibility of air.	**07**
Q.3	**(a)**	Draw and explain working of constant vacuum type carburetor.	**07**
	(b)	Compare air injection and airless diesel injection system. Draw and explain any one type of airless injection system.	**07**
		OR	
Q.3	**(a)**	What is the importance of nozzle in an injector? Describe pintle and pintaux nozzle with neat sketch and discuss their relative merits and demerits.	**07**
	(b)	What are the functions of ignition system of an S I Engine? Focus the light on ignition timing with help of P – θ diagram. Explain the methods for achieving it.	**07**
Q.4	**(a)**	What is scavenging? Compare different methods for achieving scavenging in 2-stroke I C Engine? Enumerate different types of scavenging pump.	**07**
	(b)	What is the effect of supercharging on S I Engine and C I Engine? Compare natural aspired, supercharge and turbocharge I C Engine with help of P-V diagram.	**07**
		OR	
Q.4	**(a)**	Write different parameters/variable considered to control the knock in S I Engine.	**07**
	(b)	With help of P-θ diagram explain different stages of combustion in S I Engine.	**07**
Q.5	**(a)**	Explain Willans line method and Motoring test for finding friction power of an I C Engine.	**07**
	(b)	The following data is given for a single cylinder 4-stroke oil engine: Speed of engine = 290 RPM, Brake Torque = 375 Nm, Fuel consumption = 3.80 liters/hr, Specific gravity of fuel = 0.8, CV of fuel used =44500 kJ/kg, A:F ratio=25:1, Ambient air temperature =16°C, Exhaust gas temperature = 410°C, Cooling water circulated = 4.2 kg/min , Rise in temperature of cooling water = 28.5^{o}C.	**07**

Take Cp(gases)=1.2kJ/kgC, Cp(water)=4.2 kJ/kgC
Draw a heat balance sheet on percentage basis.

OR

Q.5	**(a)**	Explain different methods and devices for reducing S I Engine emission.	**07**
	(b)	What is the importance of VCR engine? What are the different methods to achieve variable compression ratio in an engine? Explain any one of them.	**07**

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