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BME-053

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

December, 2015

BME-053 : APPLIED THERMAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Answer any* ***seven*** *questions. Assume any missing data suitably. Use of scientific calculator is allowed.*

1. (a) Derive an expression for Thermal Efficiency of Diesel Engine. 5

(b) In a Petrol Engine, the swept volume is 0·13 m^3. The temperature T_1 = 2000 K, T_2 = 977 K, T_3 = 333 K and T_4 = 681 K. The engine produces power stroke once in 2 revolutions. The engine runs at 1000 rpm. Calculate :

(i) Heat supplied

(ii) Heat rejected

(iii) Work done (per cycle per minute)

Use C_v= 713 J/kg, m = 0·1615 kg. 5

2. (a) Explain the working of a 2-stroke Petrol Engine (SI) with a neat sketch. 5

(b) Compare the Petrol Engine (SI) with Diesel Engine (CI). 5

3. (a) What are Liquid Fuels ? List out their merits and demerits. 5

(b) Explain the Capacitance Discharge Ignition System with a neat sketch. 5

4. (a) What are Gaseous Fuels ? List their characteristics. 5

(b) Explain the working of a spark plug with a neat sketch. 5

5. (a) List out the components of water cooling system and explain about thermostat value. 5

(b) Distinguish between Air cooling system and Water cooling system of IC engine. 5

6. (a) Describe the working of Dry sump lubrication system with a neat sketch. 5

(b) Describe the working of Oil pump with a neat sketch. 5

7. (a) What are the basic measurements for evaluating performance of IC engine ? How is fuel consumption measurement carried out ? 5

(b) Explain the basic principle and working of Proxy Brake Dynamometer. 5

8. (a) Explain the operation of single stage reciprocating compressor with a neat sketch. 5

(b) A single cylinder reciprocating air compressor running at 150 rpm delivers to a receiver $5\ m^3$ of free air per minute compressed to a pressure of 6 bar. The section is at 1 bar and 300° K. Compression curve follows the law $pV^{1.3} = C$ and clearance is 5% of active stroke. Calculate the volumetric efficiency and power compressor. 5

9. (a) Explain the working of open cycle gas turbine plant with a neat sketch. 5

(b) What are fuels that can be used in gas turbine power plant ? 5

10. Write short notes on the following : $4 \times 2\frac{1}{2} = 10$

(a) Carnot Cycle

(b) Coal Gas

(c) Pinking

(d) Radiator