12425

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

Instructions :   (1)   All Questions are *compulsory.*

(2)   Illustrate your answers with neat sketches wherever necessary.

(3)   Figures to the right indicate full marks.

(4)   Assume suitable data, if necessary.

Marks

1.   **Attempt any FIVE of the following :**   **10**

(a)   Define the term Compression Ratio. Write the expression for the same.

(b)   State two advantages and disadvantages of horizontal engines.

(c)   Write the name of material used for inlet and exhaust valve.

(d)   Enlist four types of nozzles used in diesel fuel supply system.

(e)   State two requirements of ignition system.

(f)   State the function of Water Expansion Tank.

(g)   Define the terms : Brake Power and Indicated Power.

2.   **Attempt any THREE of the following :**   **12**

(a)   Classify I.C. engine on the basis of :

(i)   Cycle of operation

(ii)   Ignition system

    (b)   Describe with sketch constructional features of compression ring.

    (c)   Compare dry type and oil wetted type air cleaners (any 4 points).

    (d)   Draw a neat layout of water/liquid cooling system.

3.   **Attempt any THREE of the following :**   **12**

    (a)   Describe with sketch the working principle of four stroke diesel engine.

    (b)   Draw a neat valve timing diagram of four stroke petrol engine.

    (c)   Describe construction and working of Baffle type muffler.

    (d)   State the firing order used for 4 and 6 cylinder engine with justification.

4.   **Attempt any THREE of the following :**   **12**

    (a)   Select I.C. engine for transport application with justification.

    (b)   With a neat sketch, describe relation between speed of cam shaft and crank shaft.

    (c)   Describe with sketch working of battery ignition system.

    (d)   Explain construction and working of pressure cap in cooling system.

    (e)   A single cylinder engine operating at 2000 rpm develops a torque of 8 N/m. The indicated power of the engine is 2.0 kW. Find loss due to friction as the percentage of brake power.

5.   **Attempt any TWO of the following :**   **12**

    (a)   Describe valve operating mechanism for rear wheel drive car with neat sketch.

    (b)   Explain with neat sketch circuits in two wheeler carburettor.

    (c)   Draw neat layout of Fuel Injection System of

        (i)   Unit injector system

        (ii)   Distributor system

        (iii)   Common Rail system

6. **Attempt any TWO of the following :** **12**

(a) Describe with neat graph William's Line method for finding Frictional power.

(b) Explain with neat sketch construction and working of Dry Sump type lubrication system.

(c) In a trial on a four cylinder engine 100 mm bore, 150 mm stroke and working on a four stroke cycle. The following observations were made :

Speed = 2500 rpm

Net dynamometer load of 50 mm radius = 200 N

Mechanical efficiency = 80%

Fuel consumption = 752 gm/min.

Cooling water circulated = 200 gm/min.

Temp. difference of cooling water = 50 °C

Calorific value = 46,000 kJ/kg

(i) Calculate I.P. and Indicated mean effective pressure

(ii) Draw heat balance sheet for the test in kJ/kg

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