16117

3 Hours / 100 Marks   Seat No.

Instructions –   (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:**   12

   (i)   List any four applications of I.C. engines.

   (ii) Define brake power and indicated power.

   (iii) State function of cylinder head and cylinder block.

   (iv) State function of fuel feed pump.

   (v)   Define I.C. engine.

   (vi) State any two disadvantages of water cooling system.

   (vii) State any three specifications of light motor vehicle engine.

   (viii) State any two merits of vertical engines.

   b) **Attempt any TWO of the following:**   8

   (i)   Classify I.C. engines on the basis of following:

       (1) Fuel used

       (2) Cycle of operation

       (3) Method of charging

       (4) Ignition

    (ii)   Compare 4-stroke engine and 2-stroke engine

    (iii) Define scavenging, what is the need of scavenging, describe any one method of scavenging.

2. **Attempt any FOUR of the following:**   **16**

  a) Differentiate between dry liners and wet liners.

  b) Give I.C. engine nomenclature.

  c) Compare actual and theoretical valve timing diagrams for 4-stroke C.I. engine.

  d) Distinguish between crankshaft and cam-shaft.

  e) Name the method of manufacturing for following components.

    (i)   Connecting rod

    (ii) Camshaft

    (iii) Piston

    (iv) Gasket

  f) Describe the method, used to cool the valve in I.C. engines.

3. **Attempt any FOUR of the following:**   **16**

  a) Explain construction and working of simple carburettor.

  b) Explain with a neat sketch any one type of camshaft and valve arrangement.

  c) Explain working principle of mechanical governer in fuel injection pump.

  d) Compare petrol and diesel fuel supply system.

  e) State different types of air cleaners and explain any one in detail.

  f) State different types of fuel injection systems and explain any one in detail.

Marks

4. Attempt any FOUR of the following: **16**

   a) Explain working of magneto ignition system.

   b) State the need of cooling system, compare air cooling system and water cooling system.

   c) List different properties of coolant.

   d) State the function of water expansion tank, explain with a neat sketch the working principle.

   e) List the components used in exhaust system and explain the function of any two components.

   f) List the requirement of ingnition system used in S.I. engines.

5. Attempt any FOUR of the following: **16**

   a) Explain with a neat sketch eddy current dynamometer.

   b) Explain splash lubrication system with a neat sketch.

   c) What is the need of P.C.V. (positive crankcase ventilation) describe the working of the same.

   d) State various engine performance parameters and describe any two of them.

   e) State various components of lubricating system, also state their functions.

   f) Classify lubricating oils and name the oils used in modern engines.

6. Attempt any TWO of the following: **16**

   a) Explain Willian's line method and Morse test for calculating frictional power.

   b) A 4-cylinder, 4-stroke cycle engine having cylinder diameter 100 mm and stroke 120 mm was tested at 1600 rpm and the following readings are obtained.

      Fuel consumption = 0.27 litres/min.

      Specific gravity of fuel = 0.74

      B.P. = 31.4 KW, Mech. Effi. = 80%

      Calorific value of fuel = 44000 KJ/Kg

Determine,

(i)   bsfc,

(ii) imep,

(iii) Brake thermal efficiency

c) The following observations were recorded during a trial on 4-stroke diesel engine: power absorbed by non firing engine when,

Driven by an electric motor = 10 KW

Speed of the engine = 1750 rpm

Brake torque = 327.4 Nm

Fuel used = 15 Kg/hr

Calorific value of fuel = 42000 KJ/Kg

Air supplied = 4.75 Kg/min

Cooling water circulated = 16 Kg/min

Outlet temp. of cooling water = 65.8°C

Temp. of exhaust gas = 400°C

Room temp. = 20.8°C

Specific heat of water = 4.19 KJ/Kg.K

Specific heat of exhaust gases = 1.25 KJ/KgK

Determine,

(i)   bp

(ii) Mechanical efficiency

(iii) bsfc

(iv) Draw up heat balance sheet on KW basis.

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