17408

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) Assume suitable data, if necessary.

(6) Use of Non-Programmable Electronic Pocket Calculator is permissible.

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

Marks

1. (A) Attempt any SIX :   **2 × 6 = 12**

(a) What is meant by CI engine ?

(b) Write the relation between stroke length and crank radius.

(c) List four processes required to complete 4 stroke cycle engine.

(d) Classify the IC engines on the basis of cooling systems.

(e) Write the function of water pump used in cooling system of engine.

(f) Define mechanical efficiency.

(g) Write the function of Inlet and Exhaust valve.

(h) Write the meaning of air-fuel ratio.

(B) Attempt any TWO :   **4 × 2 = 8**

(a) Draw neat sketch to show 4-strokes of petrol engine and give proper names of it.

(b) Compare 4-stroke and 2-stroke petrol engine.

(c) Why two stroke cycle engines have more fuel consumption ?

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2. **Attempt any FOUR :** **4 × 4 = 16**

   (a) Classify the IC engines on the basis of cycle of operation, fuel, method of charging, cylinder arrangement.

   (b) Write the function and material used for Cylinder block, Piston, Crank Shaft and Tappet Cover.

   (c) Draw neat sketch to show straight poppet overhead value mechanism and give names to all components.

   (d) Draw neat sketch to show slider crank mechanism and give names to it.

   (e) Compare dry and wet type cylinder liners used in IC engines.

   (f) Draw figure to show value timing diagram for 4-stroke petrol engine.

3. **Attempt any FOUR :** **4 × 4 = 16**

   (a) Draw neat sketch of gear-gear drive and explain the relation between speed of crank shaft and cam shaft.

   (b) Draw neat sketch of simple carburettor used in petrol engine and name it.

   (c) List the air fuel ratio required for starting, Idling, Normal running and acceleration in petrol engine.

   (d) How fuel is metered in diesel engine ?

   (e) Draw layout to show fuel supply system of diesel engine and name the components.

   (f) Write the location of following components with reason – fuel tank, fuel pump – mechanical type and electrical type.

4. **Attempt any FOUR :** **4 × 4 = 16**

   (a) Why ignition system is required in SI engine ?

   (b) Draw neat sketch to show circuit diagram for battery coil ignition system.

   (c) Why 1-3-4-2 firing order is preferred than 1-2-3-4 in 4 cylinder engine ?

   (d) Why cooling system is required in IC engines ?

   (e) Why air cooling is preferred in engines of two wheelers ?

   (f) State different properties of coolant.

5. **Attempt any FOUR :** **4 × 4 = 16**

(a) What is meant by positive crankcase ventilation ?

(b) What is the difference between wet sump and dry sump lubrication ?

(c) Draw neat sketch of gear type pump used in lubrication system and name the parts.

(d) List properties of lubricating oil used in lubrication system of IC engine.

(e) Define : IP, BP, FP and air standard efficiency.

(f) Write the working principle of dynamometers used to measure torque of the IC engine.

6. **Attempt any TWO :** **8 × 2 = 16**

(a) Write the procedure to conduct Morse Test and Willian's line method to measure friction power.

(b) Write the procedure to calculate Heat Balance Sheet of IC engines.

(c) A diesel engine develops 5 kW of power. Its indicated thermal efficiency is 30% and mechanical efficiency is 57%. Estimate the fuel consumption of engine in :

(i) kg/hr.
(ii) lit./hr.
(iii) indicated specific fuel consumption
(iv) brake specific fuel consumption

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