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) Assume suitable data, if **necessary**.
(5) Use of Non-programmable Electronic Pocket Calculator is **permissible**.
(6) Mobile Phone, Pager and any other Electronic Communication devices are **not permissible** in Examination Hall.

Marks

1. Attempt **any five** :   **(4×5=20)**

   a) Write the definition of I.C. engine and give examples for external and internal combustion engine.

   b) Write the location and function of following components of I.C. engines.
      i) Tappet cover   ii) Timing cover

   c) Write about relation between speed of cam shaft and crank shaft with its reason.

   d) Draw a layout for gravity fuel feed system used in motor cycle vehicle.

   e) Write the firing order used in 4 cylinder engine with its designing parameters.

   f) Why cooling system is required in I.C. engines ?

   g) Define Indicated Power with its formula for 2 stroke engine and 4 stroke engine.

2. Attempt **any four** :   **(4×4=16)**

   a) What is Scavenging of Engine ? What are its types ?

   b) Write the working principle of four stroke cycle petrol engine with suitable diagram.

   c) Compare 4-stroke SI and CI engine.

   d) Explain working of 2 stroke cycle petrol engine.

   e) Classify the I.C. engine on the basis of cycle of operation, fuel, ignition, cooling method, cylinder arrangement.

   f) What are the various applications of I.C. engines ?

3. Attempt **any four** :   **16**

   a) Differentiate between Dry and Wet liner.

   b) Draw neat sketch of straight poppet overhead value mechanism and name the parts.

Marks

c) Write the location and function of following components of the engine :

   i) Cylinder head   ii) Cam shaft

  iii) Cylinder liner   iv) Main bearings

d) Draw value timing diagram for petrol engine.

e) Draw layout of pump feed fuel supply system of carburetted engine of a car.

f) What is meant by rich mixture, lean mixture and stoichiometric mixture air fuel ratio ? Also write different air fuel ratios required.

4. Attempt **any four** :   **(4×4=16)**

a) Draw neat sketch of A.C. mechanical fuel pump used in petrol engine and write its working.

b) List the six requirements of diesel fuel injection system.

c) Draw neat sketch of jerk pump system and name the components.

d) Write the function of inlet and exhaust manifold with its location.

e) Draw layout of battery ignition system and name the parts.

f) List the properties of coolents used in cooling system of engine.

5. Attempt **any four** :   **(4×4=16)**

a) Explain the function of expansion tank used in cooling system.

b) Write the difference between water cooling and liquid cooling system of I.C. engine.

c) Explain the working of temperature gauge.

d) Write the function and location of thermostat value, pressure cap, temperature indicator and fan belt.

e) List the parts which are to be lubricated in the I.C. engine.

f) Write the function of oil filter, oil pump, pressure regulator, cam shaft used in lubrication system.

6. Attempt **any four** :   **(4×4=16)**

a) Define – mechanical efficiency, brake thermal efficiency, volumetric efficiency and air standard efficiency.

b) Draw neat sketch of rope brake dynamometer and name the parts.

c) Explain Morse test used to find IP.

d) How friction power is found by Willians line method of single cylinder diesel engine ?

e) Explain heat balance sheet of I.C. engine.

f) Explain the working principle of eddy current dynamometer brass.

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