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3 Hours\100 Marks

- 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**.
 - (5) Use of Non-programmable Electronic Pocket Calculator is **permissible**.

MARKS

(6×2=12)

1. (A) Attempt **any six** of the following :

- a) Define cylinder bore.
- b) State the function of Rotary valve.
- c) Why cooling system is required in an I.C. Engine ?
- d) Define mechanical efficiency.
- e) List the components in fuel feed system in petrol engine.
- f) What is purpose of Lubrication ?
- g) Why fuel feed pump is used ?
- h) Why additives are added in lubricants ?

(2×4=8)

2. (B) Attempt **any two** of the following :

- a) Classify I.C. Engine on the basis of Number of strokes, Number of cylinders, Fuel used and Camshaft layout.
- b) Compare 2.I. and C.I. engine on the basis of weight, thermal efficiency, speed and compression ratio.
- c) Draw a labeled sketch of simple carburettor.



MARKS

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

- Name the component of piston-assembly that prevents leak from one side of piston to the other side. State its two functions.
- List two advantages and two disadvantages of dry liners over wet liners.
- Draw a port timing diagram of a 2-stroke S.I. Engine and label it.
- Describe working of pressurized lubrication system.
- What is function of engine exhaust manifold? Give its material. Describe its construction with sketch.
- Distinguish between air-cooling and water-cooling system on the basis of
 - weight
 - application
 - maintenance
 - components used

3. Attempt **any two** of the following : (2×8=16)

- With neat sketch explain working of Electric Fuel Pump.
- Explain construction of Crankshaft with neat sketch.
- Explain with neat sketch working of Single Element Fuel Injection Pump.

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

- List the types of Camshaft drives. Explain any one with sketch.
- What are the mixture requirement for transient conditions?
- What is the effect of running a vehicle without pressure cap on radiator on the following parameters
 - coolant condition
 - charge formation
 - fuel consumption
 - operational difficulty
- Explain the function of thermostat with sketch.
- State two merits and two demerits of vertical Engines.



(4×4=16)

2. Attempt **any four** of the following :

- (a) Explain with neat sketch diesel fuel injector.
- (b) What is B.S.F.C. ? Give its significance.
- (c) Explain Thermosyphon type water cooling system with neat sketch.
- (d) Explain working of four stroke 2.I. Engine.
- (e) Differentiate between 2-stroke and 4-stroke engine.
- (f) Why spark plug is not used in diesel engines ? Mention the method of ignition used for 2.I. and C.I. engines .

(2×8=16)

6. Attempt **any two** of the following :

- (a) 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 at 500 mm radius = 200 N
 Power required to rotor with ignition off = 4.5 kW.
 Petrol consumption = 200 gm/minute
 Cooling water circulated = 7.5 kg/minute
 Temperature rise of cooling water = 50°C
 If the calorific value of Petrol is 46000 kJ/kg
 (i) Calculate mechanical efficiency and indicated mean effective pressure.
 (ii) Draw heat balance chart for the test in kJ/minute.



MARKS

- (d) Following readings were noted during a test on a single cylinder of two stroke petrol engine. Engine is motored by an electric motor and frictional power loss recorded on Wattmeter is 1.5 kW.
- Net brake load = 210 N
- Diameter of Brake wheel = 110 cm
- Engine speed = 595 rpm
- Fuel consumption = 2.01 kg/hr.
- Calorific value of fuel = 44000 kJ/kg.
- Find mechanical efficiency and brake thermal efficiency.
- (c) Why Morse test is not suitable for single cylinder engine? Describe the method of finding frictional power using Morse test.
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