22308

21222

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

15 minutes extra for each hour

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 : **5 × 2 = 10**

(a) Define clearance volume and total volume of cylinder.

(b) Classify IC engine on the basis of (i) method of charging (ii) camshaft layout

(c) State two functions of flywheel.

(d) List any four requirements of fuel injection system.

(e) State firing order of 4 and 6 cylinder engines.

(f) List any two limitations of cooling system.

(g) Define volumetric efficiency.

2. Attempt any THREE : **3 × 4 = 12**

(a) Illustrate with sketch the working of two stroke petrol engine.

(b) Describe the actual valve timing diagram of 4 stroke petrol engine.

(c) Explain the working principle of simple carburettor with sketch.

(d) Elaborate the working of splash lubrication system with sketch.

3. Attempt any THREE : **3 × 4 = 12**

(a) Describe the working of 4-stroke C.I. engine with sketch.

(b) Illustrate with sketch the working of overhead cam valve operating mechanism.

(c) Describe the working of battery ignition system with circuit diagram.

(d) Compare battery and magneto ignition system on the basis of the following :

(i) Efficiency (ii) Suitability

(iii) Maintenance (iv) Space

4. Attempt any THREE : **3 × 4 = 12**

(a) Select I.C. engine for light motor vehicle with justifications (any 4 points).

(b) Distinguish between camshaft drives of gear drive and chain drive (any four points).

(c) Draw a sketch of exhaust system and label the parts.

(d) Illustrate the working of pressurized water cooling system with sketch.

(e) In a four cylinder engine, cylinder bore is 60 mm and 65 mm stroke.

Calculate : (i) four cylinder engine capacity in CC and (ii) clearance volume of 4 cylinder engine if compression ratio is 8.

5. Attempt any TWO : **2 × 6 = 12**

(a) Choose material for piston, connecting rod, cylinder block and cylinder head with their justification.

(b) Describe the working of mechanical governor with sketch.

(c) Select air-fuel ratio requirements of petrol engine for the following conditions and justify your answers :

(i) At starting (ii) At Idling

(iii) At half throttle (iv) At full throttle

6. Attempt any TWO : **2 × 6 = 12**

(a) Describe the procedure for heat balance sheet.

(b) Select a lubrication system for racing car and explain the same with sketch.

(c) In a test of a four cylinder four stroke petrol with 80 mm bore and 100 mm stroke the following results were obtained at a particular speed ;

Fuel consumption = 120 gm/minute

B.P. with all cylinder working = 21 kW

B.P. with cylinder no. 1 cut out = 14.5 kW

B.P. with cylinder no. 2 cut out = 14.2 kW

B.P. with cylinder no. 3 cut out = 14 kW

B.P. with cylinder no. 4 cut out = 14.5 kW

Calculate :

(i) I.P. of the engine

(ii) Indicated thermal efficiency of the engine, if the calorific value of fuel is 42000 kJ/kg

(iii) Relative efficiency, if the clearance volume of each cylinder is 110×10^3 mm^3.
