

17408

15162

3 Hours / 100 Marks

Seat No.

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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. (A) Attempt any SIX :

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- (a) State any four specification of H.M.V. Engine.
- (b) Give any two demerits of vertical engine.
- (c) State any four applications of I.C. engine.
- (d) Define I.C. Engine.
- (e) Write two advantages of pressure cap.
- (f) Define volumetric efficiency.
- (g) State material and function of connecting rod.
- (h) List any two requirements of fuel injection system.

(B) Attempt any TWO :

08

- (a) Distinguish between 2-stroke and 4-stroke cycle engine. (minimum four points)
- (b) Classify I.C. engine on basis of
 - (i) Method of charging
 - (ii) Camshaft layout
 - (iii) Cylinder arrangement
 - (iv) Ignition
- (c) Explain working principle of C.I. engine with neat sketch.

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2. Attempt any FOUR :**16**

- (a) Give engine nomenclature.
- (b) State the necessity of valve cooling with neat sketch.
- (c) Mention the function and manufacturing method for following engine components :
 - (i) Camshaft
 - (ii) Crank Shaft
 - (iii) Flywheel
 - (iv) Gasket
- (d) Explain working of overhead valve mechanism with neat sketch.
- (e) Compare camshaft and crankshaft.
- (f) State the difference between dry liner and wet liner. (minimum four points)

3. Attempt any FOUR :**16**

- (a) Explain importance of intake manifold with neat sketch.
- (b) Explain working principle of solex carburettor.
- (c) State the functions of nozzle and state their types.
- (d) Explain working of mechanical governor in FIP.
- (e) Explain working of S.U. Electrical fuel pump.
- (f) Compare petrol and diesel fuel supply system. (minimum four points)

4. Attempt any FOUR :**16**

- (a) Explain working of magneto ignition system.
- (b) State different types of Silencer. Explain any one type of silencer.
- (c) Discuss need of firing order for multicylinder engine.
- (d) State any four coolant additives with their function.
- (e) Compare water and air cooling system (minimum four points)
- (f) Explain working of bourdon tube type temperature indicator with neat sketch.

5. Attempt any FOUR :**16**

- (a) Explain construction and working of splash lubrication system.
- (b) Describe working of positive crank case ventilation with suitable diagram.
- (c) Give a layout of dry sump lubrication system and explain its working.
- (d) State additives of lubricating oil with their function. (minimum 4 points)
- (e) Define the following :
 - (i) Brake power
 - (ii) Indicated power
 - (iii) Mechanical efficiency
 - (iv) Relative efficiency
- (f) State working principle of rope brake dynamometer with neat sketch.

6. Attempt any TWO :**16**

- (a) State the necessities of heat balance sheet and give procedure in detail to prepare heat balance sheet.
- (b) A four stroke engine with four cylinders, bore 80 mm and stroke 100 mm was tested at 3500 rpm and following data were recorded :

Fuel Consumption = 300 gm/minute

Indicated mean effective pressure = 1 MPa

Engine torque developed = 140 N-m

If the calorific value of fuel used is 42000 kJ/kg. Calculate

- (i) I.P. of the engine
- (ii) Mechanical efficiency
- (iii) Brake thermal efficiency
- (c) In a test of a four – cylinder four stroke petrol engine with 80 mm bore and 100 mm stroke the following results were obtained at particular speed :

Fuel consumption = 120 gm/minute

B.P. with all cylinders working = 21.0 kW

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

B.P. with cylinder no. 2 cut out = 14.3 kW

B.P. with cylinder no. 3 cut out = 13.9 kW

B.P. with cylinder no. 4 cut out = 14.7 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 $96 \times 10^3 \text{ mm}^3$.
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