22308

11920

3 Hours / 70 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) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define clearance volume and swept volume.

(b) State any four specifications of LMV engine.

(c) State function of the following components :

(i) Cam Shaft

(ii) Crank Shaft

(d) List four functions of carburettor.

(e) List any four functions of exhaust system.

(f) State any two limitations of engine cooling system.

(g) Define volumetric efficiency.

2. Attempt any THREE of the following : **12**

(a) Compare 2-stroke and 4-stroke engines. (Any 4 points)

(b) Explain the working of overhead valve arrangement with sketch.

(c) Describe the working of fuel injector with sketch.

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

3. Attempt any THREE of the following : **12**

(a) Describe working principle of 4-stroke petrol with sketch.

(b) Describe the construction of gear drive of camshaft drive arrangement with sketch.

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

(d) Sketch high voltage connection between distributor and spark plugs of multi-cylinder engine with direction of rotation of distributor shaft assembly. Label the sketch.

4. Attempt any THREE of the following : **12**

(a) Show I.C. engine nomenclature with neat sketch.

(b) State the materials used for piston with justification.

(c) Select firing order for 4-cylinder engine with justification.

(d) Explain the working of electrically driven fan in cooling system.

(e) 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 calorific value of fuel used is 42000 kJ/kg, calculate

(i) Ip

(ii) Mechanical efficiency

(iii) Brake Thermal efficiency

5. Attempt any TWO of the following : **12**

(a) Statement : Valve cooling is necessary in some I.C. engines. Justify the statement by giving reasons and explain its working with sketch.

(b) Explain the working of S.U electrical fuel pump with sketch.

(c) Draw sketches showing fuel metering in the inline type F-I. P and Explain its working.

6. Attempt any TWO of the following : **12**

(a) Explain the working principle of the following dynamometers with suitable sketches, if necessary :

(i) Hydraulic dynamometer

(ii) Eddy Current dynamometer

(b) Explain the selection of lubricating oil on the basis of viscosity and service rating.

(c) An I.C engine develops a brake power of 26.2 kW. Following observations were made during a trial :

Power required to motor the engine = 4.5 kW

Cooling water circulated = 7.5 kg/min.

Specific heat of water = 4.187 kJ/kgk

Petrol consumption = 200 gm/minute

Temperature rise of cooling water = 50°C

If calorific value of petrol is 46,000 kJ/kg, draw heat balance sheet for the test on percentage basis.
