23242

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) List the important reciprocating parts in an I.C. engine.

(b) Define cylinder row and cylinder bank.

(c) State the material of following components in an I.C. engine :

Piston, Piston Pin

(d) Sketch any one type of injector nozzle and label the parts.

(e) Write the firing order used in 4 and 6 cylinder engine.

(f) Name two service ratings of oils for S.I. and C.I. engines respectively.

(g) Define Brake thermal efficiency and Relative efficiency.

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

(a) Classify S.I. and C.I. engines on the basis of : method of charging and ignition.

(b) Draw a diagram indicating actual valve timing mechanism in 4-stroke S.I. engine.

(c) Draw a graph to indicate air-fuel mixture requirements from no load to full load condition in S.I. engine.

(d) List four properties of coolant to be employed in liquid-cooling system.

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

(a) With the help of neat sketch, describe the working principle of 4-stroke C.I. engine.

(b) Differentiate between the following engine components on the basis of working and materials used :

(i) Dry and Wet liners

(ii) Inlet and Exhaust valves

(c) State the requirements of ignition system. Enlist four major parts used in battery ignition system.

(d) State any two circuits used in two-wheeler carburettor and describe their working.

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

(a) Give the specifications of the following type of engine :

(i) any one type of two-wheeler

(ii) any one type of light motor vehicle

(b) Draw valve operating mechanism of overhead cam arrangement and label all the parts.

(c) Give the classification of mufflers depending on its applications.

(d) Describe with sketch the working of thermostat valve.

(e) The data recorded during the trial of a two stroke diesel engine are as follows :

Engine speed – 1500 rpm

Load on brakes – 110 kg

Length of brake arm – 900 mm

Determine the following :

(i) Brake torque

(ii) Power available at the brakes of the engine

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

(a) Compare camshaft drive mechanisms for 4-stroke multicylinder engines with justification.

(b) Describe the working of mechanical governor in fuel injection system with a neat sketch.

(c) Choose the relevant fuel supply system components for a common rail system with justification.

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

(a) Describe with neat sketch working principle of hydraulic dynamometer.

(b) Select lubricant with justification for –

(i) Four-stroke S.I. engine

(ii) Four-stroke C.I. engine

from given list of lubricants :

Sr. No.	Lubricant Category / Grade
1.	SAE 20 W 40
2.	SN
3.	CJ – 4
4.	CF – 4

(c) In the Morse test with a four cylinder four stroke petrol engine, the following data were obtained for a particular setting and speed :

BHP with No. 1 cylinder cut out = 21.6

BHP with No. 2 cylinder cut out = 22.3

BHP with No. 3 cylinder cut out = 22.5

BHP with No. 4 cylinder cut out = 23.0

BHP with all cylinders working = 32.0

Estimate the IHP of the engine and its mechanical efficiency.

———————