17408

21314

3 Hours / 100 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.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any <u>SIX</u> of the following:** **12**

i) State two merits of horizontal engine.

ii) Define swept volume.

iii) Define I.C. engine.

iv) What is scavenging?

v) What is need of lubrication system?

vi) Define volumetric efficiency.

vii) What is function of oil control ring?

viii) List four circuits used in solex carburettor.

Marks

b) **Attempt any <u>TWO</u> of the following:** **8**

i) Draw a neat labelled sketch of two - stroke S. I. engine (upward stroke only)

ii) Classify I. C. engine on the basis of:

1) Cycle of operation

2) Ignition

3) Cooling

4) Cylinder arrangement.

iii) Describe the working of four - stroke C. I. engine.

2. Attempt any <u>FOUR</u> of the following: **16**

a) Compare 4-stroke and 2-stroke engine.

b) State one function and one material used for piston and oil sump.

c) Draw a schematic diagram of cylinder head-cut section and label it.

d) Describe valve cooling with a sketch.

e) Draw and explain valve timing diagram of 4-stroke S.I. engine.

f) Compare dry and wet liners (four points)

3. Attempt any <u>FOUR</u> of the following: **16**

a) Describe the overhead valve and overhead cam arrangement.

b) Draw and describe layout of pump feed for petrol engine.

c) Draw a layout of common rail system for diesel engine. State 2-merits of the same.

d) Describe fuel metering in the inline type of fuel injection pump.

e) Draw a sketch of S.U. electrical pump. State 1 merit and 1 demerit of the same.

f) Why fuel filter and air filter are necessary for an engine?

Marks

4. Attempt any FOUR of the following: **16**

a) What are requirements of Ignition system?

b) Describe the working of magneto ignition system with neat sketch.

c) State the need of firing order in multicylinder engine. State firing order for 4 and 6 cylinder engines.

d) Compare air and water cooling system on the basis of:

i) Cooling efficiency

ii) Weight

iii) Maintenance

iv) Application.

e) Describe construction and working of water pump.

f) Why water expansion tank is needed in liquid cooling system? State advantage of the same.

5. Attempt any FOUR of the following: **16**

a) Draw a layout of lubrication system for a multi-cylinder engine.

b) Classify lubricating oils on the basis of viscosity and service rating.

c) Describe the use of oil filter and oil pressure gauge in a lubrication system.

d) State the need of positive crankcase ventilation system. Draw a schematic diagram for the same.

e) List four engine performance parameters. Describe two of them.

f) List the dynamometer types. Describe working principle of one type.

Marks

6. Attempt any <u>TWO</u> of the following: **16**

a) Explain morse test and Willian's line method for finding frictional power of an engine.

b) Following readings were noted during a test on a single cylinder 2-stroke diesel engine. Engine is motored and frictional power loss of engine is 1.5 kW. Net brake load = 227 N, Brake drum diameter = 100 cm, Engine speed = 500 rpm, Fuel consumption = 2.04 kg / hr. Calorific value of fuel = 42,000 kJ/kg. Find mechanical efficiency and brake thermal efficiency.

c) Following observations were taken during a test on single cylinder 4-stroke cycle engine.

Duration of test = 1 hour

Fuel consumption = 7kg

Speed = 200 rpm.

I.M.E.P. = 6.1 bar

Stroke = 450 mm,

Bore = 300 mm

C.V. of fuel = 45 MJ/kg.

Net brake load = 1.5 kN

Brake Drum diameter = 1.83 m

Determine:

i) I. P.

ii) B. P.

iii) Mechanical efficiency

iv) Brake thermal efficiency.