

12097

21314

3 Hours / 100 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any **SIX** of the following: 12
- i) Define the term clearance volume.
 - ii) Why camshaft speed is half of crank speed in four stroke engine?
 - iii) State any two disadvantages of over cooling of I.C. engine.
 - iv) Define thermal efficiency.
 - v) What is the basic function performed by a carburettor?
 - vi) State the purpose of lubrication.
 - vii) State the functions of throttle valve in carburettor.
 - viii) What do you mean by petrol lubrication?

P.T.O.

- b) **Attempt any TWO of the following:** **8**
- i) Explain the working of the four stroke petrol engine with neat sketch.
 - ii) Compare four stroke and two stroke engine (four points).
 - iii) Explain the working of electrical fuel pump with a neat sketch.
2. **Attempt any FOUR of the following:** **16**
- a) Enlist the engine components (any eight).
 - b) Draw a neat labelled sketch of overhead valve mechanism.
 - c) Draw a port timing diagram of two stroke S.I. engine and label it.
 - d) Explain the working of splash lubrication system.
 - e) What is valve? List types of valve? Which valve is bigger? Justify. Also write the material of each valve.
 - f) How pressure cap of radiator works? Explain its three constructional detail.
3. **Attempt any TWO of the following:** **16**
- a) State various air-fuel ratios required as per load conditions specified below:
 - i) cold starting
 - ii) idling speed
 - iii) normal running
 - iv) high speed and sudden acceleration.
 - b) Explain different types of camshaft drives with neat sketch.
 - c) Enlist the different types of fuel injectors used in diesel engine? Explain any one with neat diagram.

- 4. Attempt any FOUR of the following:** **16**
- a) Compare dry liner and wet liner (four points).
 - b) State two merits and demerits of vertical engines.
 - c) What are the methods of water cooling system? Explain any one with neat sketch.
 - d) State the functions of the thermostat? Where it is located?
 - e) Describe the requirements of fuel injection system.
- 5. Attempt any FOUR of the following:** **16**
- a) Explain the working of Solex carburettor with neat sketch.
 - b) Define:
 - i) BSFC
 - ii) Indicated power.
 - c) Compare air cooling and water cooling system (four points).
 - d) Classify I.C. engines on the basis:
 - i) No. of strokes
 - ii) No. of cylinder
 - iii) Type of cooling
 - iv) Cycle of operations.
 - e) Draw diagram of two stroke petrol engine and label it.
 - f) Draw valve timing diagram of four stroke engine and label it.

6. Attempt any TWO of the following:**16**

- a) Explain theoretically how you are going to prepare heat balance sheet of an I.C. engine? Enlist the methods of calculating indicated power of an engine.
- b) The following observations were obtained during diesel engine trial:
- i) Cylinder diameter = 24 cm
 - ii) Stroke = 40 cm
 - iii) Speed = 250 r.p.m.
 - iv) Brake load = 70 kg
 - v) Brake drum diameter = 2.1 m
 - vi) Mean effective pressure = 6.3 kg/cm^2
 - vii) Oil consumed = $110 \text{ cm}^3/\text{min}$
 - viii) Specific gravity of oil = 0.78
 - ix) Calorific value of oil = 10500 Kcal/kg

Determine:

- i) Brake horsepower
- ii) Indicated horsepower
- iii) Mechanical efficiency
- iv) Brake thermal efficiency.

- c) The following observations were obtained during trial on single cylinder four stroke oil engine:

Duration of trial	= 60 min
Cylinder bore	= 30 cm
Stroke	= 45 cm
Total fuel used	= 8000 gm
Calorific value of the fuel	= 10500 Kcal/kg
Total no. of revolutions	= 12600
Mean effective pressure	= 6.5 kg/cm ²
Brake load	= 160 kg
Drum radius	= 1 m
Total wt. of cooling water	= 550 kg
Temp. rise of cooling water	= 45° C
Total wt. of air consumed by engine	= 364 kg
Temp. difference of exhaust	= 280° C
Gases through the calorimeter	
Sp. heat of exhaust gases	= 0.24

Draw heat balance sheet for the engine.

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