23242

3 Hours / 70 Marks   Seat No.

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.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. **Attempt any FIVE :**   **2 × 5 = 10**

(a) Define dryness fraction and degree of superheat.

(b) Define boiler mountings. Give examples.

(c) Enlist four important components of I.C.Engine.

(d) 'Indicated power is always more than brake power.' Justify.

(e) Define Mach number.

(f) Identify the major components of domestic refrigerator.

(g) State the function of capillary tube in window air conditioner.

2. **Attempt any THREE :**   **4 × 3 = 12**

(a) Draw a neat sketch of any one water tube type boiler and label the major components.

(b) Explain construction and working of impulse turbine with neat sketch.

(c) Suggest with justification the remedies in the following situations :

    (i) Engine does not start.

    (ii) Smokey exhaust of diesel engine.

(d) Draw the layout of thermal power plant and explain its working in short.

3. Attempt any THREE : $4 \times 3 = 12$

(a) List any four pollutants in exhaust gases of I.C. engine with their effects on environment.

(b) Explain working of closed cycle gas turbine with neat sketch.

(c) A dam is constructed to provide a high head of water

    (i) Suggest the relevant turbine that used to generate power

    (ii) Sketch the turbine you suggest.

(d) A diesel engine produces brake power 5 kW at the shaft. The mechanical efficiency is observed as 35%. Determine indicated power and friction power of the engine.

4. Attempt any THREE : $4 \times 3 = 12$

(a) State the different applications of compressed air.

(b) Suggest the suitable compressor for the following application with justification.

    (i) Automobile washing centre,

    (ii) Gas turbine

(c) Describe the working of screw compressor with neat sketch.

(d) The following observations are made of centrifugal pump:

        The total manometric head = 130 m of water

        Total discharge of the pump = 0.32 m³/s

        Total input the pump = 600 kW

    Find overall efficiency of the pump.

(e) Suggest the suitable type of pump for the following cases and justify it :

(i) Transferring water from lakes to fields

(ii) Pumping lubricants in diesel engine.

5. Attempt any TWO : 6 × 2 = 12

(a) Explain with neat sketch, simple vapour compression system.

(b) It is observed that when refrigerator is switched on, the compressor does not start. Mention the possible causes with remedies.

(c) Suggest with justification the type of air conditioning system for

(i) Computer lab of 60 computer

(ii) Auditorium

(iii) ATM

6. Attempt any TWO : 6 × 2 = 12

(a) Explain velocity compounding of steam turbine with neat sketch.

(b) Classify various type of nozzles and give their applications.

(c) Explain the function of the following :

(i) Defrost heaters

(ii) Thermostat

(iii) HP/LP cutouts.

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