

22214

24225

3 Hours / 70 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.
  - (8) Use of steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

1. Attempt any FIVE of the following :

**10**

- (a) Define thermodynamics work, give its unit.
- (b) State the function of the turbine and list any two applications.
- (c) List the applications of Refrigeration system.
- (d) Differentiate between Boiler Mountings and Accessories.
- (e) Define Ton of Refrigeration.
- (f) State the use of Piston rings in IC engines.
- (g) What is Mac number in relation to De-laval nozzle ?



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

- (a) Draw the neat sketch of Cochran boiler.
- (b) State the need of compounding of steam turbines and give its types.
- (c) State the effects of pollution on environment due to steam power plant.
- (d) Draw the schematic sketch of Water tubes, Heaters, Baffles and Blow-off-cock as part of Babcock and Wilcox Boiler and label it.

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

- (a) List four applications of gas turbine.
- (b) Explain working of closed cycle gas turbine with neat sketch.
- (c) Explain the working of 4-stroke diesel engine with neat sketch.
- (d) A dam is constructed to provide a high head of water
  - (i) Name the relevant turbine that used to generate power.
  - (ii) Sketch the turbine you suggest.

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

- (a) List four uses of compressed air.
- (b) In Diesel engine heat is supplied at a rate of 11.50 kw. Engine produces brake power at a rate of 3.2 kw. Estimate brake thermal efficiency.
- (c) State four Applications of Rotary Compressor.
- (d) Explain working of centrifugal compressor with neat sketch.
- (e) A turbine is operating on 130 m of water head. The discharge is  $3.5 \text{ m}^3/\text{s}$ . Find the power developed by the turbine neglecting the losses. Take density of water as  $9.81 \text{ kN/m}^3$ .

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

- (a) Explain Window air conditioning system with neat sketch.
- (b) It was observed that when refrigerator is switched on, the compressor does not start. Mention the possible causes with remedies.
- (c) Explain the working of starting relay.

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

- (a) Add a short note on methods of Energy saving in Refrigeration and Air Conditioning system.
  - (b) Explain constructional features and working of typical centrifugal pump with a sketch.
  - (c) Differentiate between Impulse turbine and Reaction turbine.
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