

313339

12425

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) Name the salts which cause the temporary and permanent hardness in water.
- (b) Define ton of refrigeration.
- (c) Define wet bulb and dry bulb temperature.
- (d) What is R-22 ? Give its properties.
- (e) Name four important refrigerants used in industries.
- (f) Define hard water and soft water.
- (g) Give any two advantages of thermic fluid over steam.



2. Attempt any THREE of the following : 12

- (a) Explain the working of forced draft cooling tower with labelled diagram.
- (b) State selection criteria for refrigerant.
- (c) A refrigeration system is operated in between 40 °C and –15 °C, the capacity of machine is 10 tonnes. Find out C.O.P.
- (d) State duties and responsibilities of plant maintenance department.

3. Attempt any THREE of the following : 12

- (a) Explain Zeolite process of water treatment with neat diagram.
- (b) Explain vapour compression refrigeration cycle.
- (c) State any eight industrial uses of air.
- (d) Explain humidification and dehumidification.

4. Attempt any THREE of the following : 12

- (a) Give uses of the following :
 - (i) Steam trap
 - (ii) Water level indicator
 - (iii) Safety valve
 - (iv) Economizer
- (b) State reactions involved in Ion exchange process.
- (c) Explain using a flow sheet the process of getting compressed air.
- (d) Explain shutdown maintenance in detail.
- (e) Explain Reverse Carnot Cycle in detail.

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

- (a) Discuss Indian Boiler Act regarding following points :
 - (i) Registration of Boiler
 - (ii) Certificate of Renewal
 - (iii) Transfer of Boiler
 - (iv) Penalty
- (b) Calculate specific enthalpy and entropy of 1 kg of steam at pressure 10 bar.
 - (i) When steam is dry saturated
 - (ii) When steam is 75% dry
- (c) State types of maintenance and explain preventive and predictive maintenance.

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

- (a) Explain hot lime soda method for water treatment with neat diagram.
 - (b) Define :
 - (i) Scale and Sludge formation
 - (ii) Caustic Embrittlement
 - (iii) Priming
 - (iv) Foaming
 - (v) Temporary hardness
 - (vi) Permanent Hardness
 - (c) Explain construction and working of Lancashire Boiler with neat diagram.
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