

17425

21718

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 steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

1. (A) Attempt any SIX of the following : 12
- (a) What is mean by demineralisation ?
  - (b) What is mean by scale and sludge ?
  - (c) Define Ton of refrigeration and coefficient of performance.
  - (d) Enlist different boiler accessories. (any two)
  - (e) List the methods of scale removal. (any two)
  - (f) What are different uses of process air ? (any two)
  - (g) List different thermic fluids. (any four)
- (B) Attempt any TWO of the following : 08
- (a) Explain in detail the process of reverse osmosis.
  - (b) Describe air refrigeration cycle.
  - (c) Draw neat sketch of Babcock and Wilcox boiler.

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

- (a) Explain Hot Lime Soda Process used for water treatment.
- (b) Explain vapour absorption refrigeration.
- (c) Draw neat sketch of fluidized bed boiler.
- (d) Describe the construction of cooling tower.
- (e) Give the advantages of multistage compression.
- (f) Explain boiler corrosion caused by dissolved oxygen. How it can be prevented ?

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

- (a) List the properties of R-22 and Lithium bromide refrigerants.
- (b) Explain in detail about preparation of boiler for inspection.
- (c) Discuss in detail use of humidity chart.
- (d) Define humid heat and humid volume.
- (e) Explain in detail process of getting instrument air.
- (f) Give the use of stream trap and pressure reducing valve.

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

- (a) How priming and foaming can be prevented ?
- (b) What are secondary refrigerants ?

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- (c) Explain the working of waste gas fired boiler.
- (d) Explain working of spray pond.
- (e) Explain construction and working of thermic fluid heater.
- (f) A refrigerator is working on reversed Carnot cycle between the temperature of  $30\text{ }^{\circ}\text{C}$  to  $-10\text{ }^{\circ}\text{C}$  with capacity of 10 tons. Find C.O.P.

5. Attempt any FOUR of the following :

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- (a) Give the classification of refrigerants.
- (b) Explain the working of air preheater with diagram.
- (c) Compare water tube boiler and fire tube boiler. (any 4 points)
- (d) Draw the diagram of induced draft cooling tower and mark the parts.
- (e) Find the enthalpy and entropy of 1 kg of steam at a pressure of 10 bar, when steam is dry and saturated.
- (f) Explain the causes for caustic embrittlement.

6. Attempt any TWO of the following :

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- (a) Explain Ion-exchange process for water treatment.
- (b) Explain the selection criterion for ideal refrigerants. (8 points)

P.T.O.

- (c) Explain the Indian Boiler Act with respect to the following points :
- (i) Duties of Chief Inspector.
  - (ii) Certificate of renewal.
  - (iii) Boiler accidents.
  - (iv) Registration of boiler.
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