

22311

22223

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 the term temporary hardness and total hardness.
 - b) List out types of boiler accessories. (any four)
 - c) State different types of compressor.
 - d) State any two application of refrigerant in industry.
 - e) Define dry bulb temperature and wet bulb temperature.
 - f) List out types of steam.
 - g) State the uses of industrial water. (any two)

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Distinguish between zeolite and lime soda process. (any four)
 - b) Describe boiler act w.r.t.
 - i) Certificate of renewal
 - ii) Boiler accidents
 - iii) Transfer of boiler
 - iv) Boiler repairs
 - c) Explain the working of cyclone separator with neat labelled diagram.
 - d) Describe vapour absorption refrigeration cycle of Li-Br absorption system with neat labelled sketch.
- 3. Attempt any THREE of the following:** **12**
- a) Draw neat sketch of Ion-exchange process for demineralization of water.
 - b) Compare water tube boiler and fire tube boiler. (any four)
 - c) Suggest type of industrial air required in combustion process and also explain method of formation of suggested type.
 - d) Draw a neat sketch of induced draft cooling tower.
- 4. Attempt any THREE of the following:** **12**
- a) Mention different types of thermic fluids other than steam with their temperature ranges.
 - b) Distinguish between single stage and multistage air compressors. (any four)
 - c) Draw neat sketch of Babcock and Willcox boiler.
 - d) State the selection criteria for ideal refrigerant. (any four)
 - e) Differentiate between humidity and relative humidity. (any four)

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

- a) A 5 tonne R12 plant maintains a cold store at -14°C . The refrigerant flow rate is 0.13 kg/sec . The vapors leaves the evaporators with 6°C superheat. Cooling water available at 30°C . A suction line heat exchanges subcools the refrigerant before throttling. Find
- i) The compressor discharge temperature
 - ii) The COP (Coefficient of Performance)
 - iii) The amount of subcooling in $^{\circ}\text{C}$.
- b) 50 ml of water sample consumed 14 ml of 0.01 M EDTA before boiling and 5 ml of the same EDTA after boiling. Calculate temporary hardness, total hardness and permanent hardness.
- c) Describe working of thermic fluid heater with neat sketch. Compare thermic fluid heater with steam boiler. (any two)

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

- a) In a chemical process 200 m^3 of air per minute at 15°C DBT and 75% relative humidity is heated until its temperature is 25°C find
- i) Relative humidity of heated air
 - ii) Wet bulb temperature of heated air
 - iii) Heat added to air per minute
- b) State various defects of boiler feed water. Write chemical reaction for preventations of corrosion.
- c) Draw a neat sketch of pressure gauge of steam boiler and state the function of pressure gauge and water level indicator.
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