

# 22311

**11920**

**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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (6) Use of Steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

- 1. Attempt any FIVE of the following: **10****
- a) State the uses of Industrial water. (any four).
  - b) Define hard water and soft water.
  - c) Define enthalpy of steam with its unit.
  - d) List out types of thermic fluid. (any four)
  - e) List out uses of air in industry. (any four)
  - f) Define coefficient of performance.
  - g) Define dry bulb and wet bulb temperature.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Give the chemical reaction that takes place with hard water in lime soda process. (any four)
  - b) Classify boilers according to various factors. (any four)
  - c) Explain the working of super heater.
  - d) Name any four psychometric process and represent them on psychometric chart.
- 3. Attempt any THREE of the following:** **12**
- a) Draw the diagram for zeolite process used for the softening of boiler feed water.
  - b) “Rate of softening of water in Ion Exchange method is high,” Give reason.
  - c) Differentiate between water tube boiler and fire tube boiler. (four points)
  - d) Explain the working of cyclone separator with labelled diagram.
- 4. Attempt any THREE of the following:** **12**
- a) List the methods for scale and sludge removal. (two points each)
  - b) Explain working of water level indicator with neat sketch.
  - c) Explain boiler act with respect to
    - (i) Duties of chief inspector
    - (ii) Registration of boiler.
  - d) Explain the method for obtaining instrument air in industry.
  - e) Give the advantages of multistage compression.

- 5. Attempt any TWO of the following:** **12**
- a) Describe with a neat diagram the working of a simple vapour compression refrigeration system. Represent the cycle on P–V and T–S diagram.
  - b) State the factors to be considered while selecting refrigerants. (any six)
  - c) The following data pertain to an air conditioning system.
    - (i) DBT = 30°C
    - (ii) WBT = 22°CDetermine:
    - (i) Dew point temperature.
    - (ii) Relative humidity.
- 6. Attempt any TWO of the following:** **12**
- a) Find the enthalpy of 5 kg of steam at a pressure of 10 bar
    - (i) When the steam is dry and saturated.
    - (ii) When the steam is 80% dry.
  - b) Explain the construction and working of induced draft cooling tower with neat sketch.
  - c) A refrigerator is working on reversed carnot cycle between temperature of 30°C to –10°C with capacity of 10 tonnes. Calculate.
    - (i) The COP
    - (ii) Define ton of refrigeration
    - (iii) Give the industrial application of refrigeration (any four)
-