22311

24225

3 Hours / 70 Marks　　Seat No. ☐☐☐☐☐☐☐☐

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answer 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 primary refrigerant and secondary refrigerant.

b) Define ton of refrigeration.

c) Define Dry steam and Wet steam.

d) State the principle of cooling towers.

e) Define :–

　i)　Relative Humidity

　ii)　Wet bulb temperature.

Marks

f) Name the salts which causes the temporary and permanent hardness in water.

g) Give the uses of compressed Air. (Any two)

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

a) Define hard water and soft water.

b) Give the advantage of multistage compression. (four points)

c) Classify boiler according to various factors. (Any four)

d) Explain with sketch the working of cyclone separator.

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

a) Give the use of the following:

    i) Pressure gauge

    ii) Economizer

    iii) Pressure reducing valve

    iv) Air pre-heater.

b) Explain the process of getting compressed air using flow sheet.

c) State duties of boiler chief inspector as per Indian boiler act.

d) Describe vapour-compression refrigeration cycle.

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

a) Describe the working of Bucket type steam Trap with sketch used in boiler steam lines.

b) Explain the parts of a cooling tower.

c) Compare water tube boiler with fine tube boiler. (Any four points)

d) Describe with sketch the working of thermic fluid heater.

e) Draw the diagram of induced draft and forced draft cooling tower.

5.   **Attempt any <u>TWO</u> of the following:**   **12**

   a) Explain Zeolite process used for water softening with neat diagram.

   b) Define coefficient of performance (COP). A refrigeration system is operated between 50°C and –25°C. The capacity of machine is 10 tonnes. Calculate COP.

   c) Explain corrosion due to dissolved oxygen. State the methods to remove dissolved oxygen from water.

6.   **Attempt any <u>TWO</u> of the following:**   **12**

   a) The following data pertain to an air conditioning system:

      i)   DBT = 30°C

      ii) WBT = 22°C.

      Determine:

      i)   Dew point temperature (°C)

      ii) % relative humidity.

      iii) Enthalpy of saturation kJ/kg dry air.

      iv) Specific volume m^3/kg Dry Air

   b) Explain the construction and working of Economizer with neat diagram.

   c) Explain the disadvantages of scale formation in boiler (four points). List the methods for the removal of scales (any two).

_____