# 17425

**11920**

**3 Hours / 100 Marks** Seat No. | | | | | | | | |

*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.** a) **Attempt any SIX of the following:** **12**

(i) Enlist the sources of water.

(ii) Define hard water and soft water.

(iii) Define Ton of refrigeration.

(iv) Give the classification of boiler based on position of hot gases and water spaces with one example.

(v) Enlist the boiler mountings and accessories. (two each).

(vi) What are the application of air? (any four)

(vii) What are the advantages of thermic fluids over steam? (Any two).

**Marks**

b) **Attempt any TWO of the following:** **8**

(i) What are the reactions that take place with hard water in lime soda process? (Any four).

(ii) What are the safe working properties of ideal refrigerants? (Any four).

(iii) What are the advantages and disadvantages of water tube boiler? (two each).

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

a) Differentiate between hot lime soda process and cold lime soda process. (Any four).

b) What is ecofriendly refrigerant? Give one example.

c) Explain with sketch fluidized bed boiler.

d) Draw neat diagram of sling psychrometer and explain it's working.

e) Explain the properties of dowtherm-A.

f) Explain reverse osmosis process for water purification with neat sketch.

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

a) A refrigeration system operates on reverse carnot cycle. The highest temperature of the refrigerant in the system is 35°c and lowest temperature is -15°c. The capacity is to be 10 tonnes. Neglect all loses. Determine the coefficient of performance.

b) Explain boiler Act with respect to

(i) Certificate of renewal

(ii) Duties of inspector.

c) How psychrometric chart is constructed?

d) With neat sketch, write construction and working of forced draft cooling tower.

e) Give any two example of thermic fluids with their temp-range.

f) Draw the neat sketch of cochran boiler and label the parts.

**Marks**

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

a) Give the types of hardness of water and how the hardness of water can be measured? Define any two.

b) What is unit of refrigeration? Give it's value in SI units.

c) What are the causes of corrosion in boiler? How corrosion due to oxygen can be prevented?

d) Wet bulb temperature of air is 22°C and dry bulb temperature is 30°C. Find

(i) Dew point temperature

(ii) Absolute humidity by using psychrometric chart.

e) Draw the neat sketch of thermic fluid heater and label it.

f) Differentiate between primary and secondary refrigerants and give one example of each.

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

a) Describe vapour absorption refrigeration system with sketch.

b) What are boiler mountings and explain any one with neat diagram.

c) 50 kg. of steam at 5 bar pressure has one kg of water in suspended form. What would be the condition of steam? Find the enthalpy of steam using steam table.

d) Define humidification and relative humidity.

e) How to prepare boiler for inspection with respect to boiler act?

f) Give the comparision of zeolite process and Ion-exchange process of water softening.(Any four points).

**Marks**

**6. Attempt any TWO of the following:** **16**

a) What is caustic embrittlement? What are the sources of caustic embrittlement and give two methods to prevent it.

b) Draw neat sketch of vapour compression refrigeration system and explain it in detail.

c) Find the enthalpy and entropy of 2kg of steam at a pressure of 14 bar when steam is 75% dry.

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