

CBSE Class 12 Air-Conditioning and Refrigeration 2024 - Set 351

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

Maximum Marks: 60

General Instructions

- (i) Please read the instructions carefully.
- (ii) This question paper consists of 24 questions in two Sections: Section A and Section B.
- (iii) Section A has Objective Type Questions whereas Section B contains Subjective Type Questions.
- (iv) Out of the given $(6 + 18) = 24$ questions, a candidate has to answer $(6 + 11) = 17$ questions in the allotted maximum time of 3 hours.
- (v) All questions of a particular section must be attempted in the correct order.
- (vi) Section A: Objective Type Questions (30 marks). This section has 6 questions. There is no negative marking. Follow the instructions given; marks are mentioned against each question/part.
- (vii) Section B: Subjective Type Questions (30 marks). This section has 18 questions; answer 11. Follow the instructions given; marks are mentioned against each question/part.

Section A

1. Answer any 4 questions out of the given 6 questions on Employability Skills : ($4 \times 1 = 4$)

1(i). What is a row in a spreadsheet ?

1(ii). What is decisiveness ?

1(iii). Write the name of any two green house gases.

1(iv). Write one exclamatory sentence.

1(v). What is stress ?

1(vi). Is "text" a type of data ?

2. Answer any 5 out of the given 7 questions : ($5 \times 1 = 5$)

2(i). Glycols are also known as :

- (A) Primary refrigerants (B) Brines
(C) Freezing solutions (D) Antifreeze solutions

2(ii). A sling psychrometer is used to measure which one of the following ?

- (A) D.P.T. of air (B) W.B.T. of air
(C) D.B.T. and W.B.T. of air simultaneously (D) D.B.T. of air

2(iii). Pure water is filled in which one of the following components for making the ice ?

- (A) Brine tank (B) Condenser
(C) Evaporator (D) Ice can

2(iv). The thermal conductivity of an insulating material should be :

- (A) extremely high (B) extremely low
(C) moderately high (D) Thermal conductivity has no roll in insulating materials.

2(v). H.P cutout is essential in _____ refrigeration systems.

- (A) Air cooled condenser (B) Water cooled condenser
(C) Both (A) and (B) (D) Natural convection condensers

2(vi). Capacity of a packaged air conditioning system lies between : _____

- (A) 0.75 TR to 1.5 TR (B) 1.5 TR to 2.5 TR
(C) 5.0 TR to 50 TR (D) More than 100 TR

2(vii). Which one among the following is a secondary refrigerant when it is used above 0°C ?

- (A) Ammonia (B) Water
(C) Air (D) Brine

3. Answer any 6 out of the given 7 questions : ($6 \times 1 = 6$)

3(i). Which one among the following is not a primary refrigerant ?

- (A) NH_3 (B) H_2O
(C) CHClF_2 (D) CCl_2F_2

3(ii). In the sensible heating process of air the DBT of air is

- (A) increased without affecting moisture content of air. (B) increased with increase in moisture content of air.
(C) increased (D) decreased

3(iii). Freezing tanks are used in which one of the following ?

- | | |
|----------------------|-------------------|
| (A) Air conditioners | (B) Water coolers |
| (C) Refrigerators | (D) Ice plants |

3(iv). For a good air distribution system, the flow of air should be preferably :

- | | |
|--|---|
| (A) towards the head of the occupants. | (B) towards the feet of the occupants. |
| (C) towards the back of the occupants. | (D) towards the faces of the occupants. |

3(v). The air conditioning used for winter is :

- | | |
|------------------|---------------|
| (A) Refrigerator | (B) Heat pump |
| (C) Heat engine | (D) Heater |

3(vi). In a voltage relay which one among the following is used ?

- | | |
|--|--------------------|
| (A) Electromagnetic coil | (B) Bi-metal strip |
| (C) Electromagnetic coil and bi-metal strip both | (D) An I.C. |

3(vii). Which one among the following devices is used as an expansion device in a window air conditioner ?

- | | |
|----------------------------------|-----------------|
| (A) Automatic expansion valve | (B) Float valve |
| (C) Thermostatic expansion valve | (D) Capillary |

4. Answer any 5 out of the given 6 questions : (5 × 1 = 5)

4(i). Which one among the following components is used to remove the latent heat of refrigerant ?

- | | |
|----------------|----------------|
| (A) Compressor | (B) Evaporator |
| (C) Condenser | (D) Capillary |

4(ii). Humidification of air is performed to achieve which one of the following ?

- | | |
|---|---|
| (A) Decrease the moisture content of air. | (B) Increase the moisture content of air. |
| (C) Increase the DBT of air with increase in moisture content of air. | (D) Decrease the DBT of air with decrease in moisture content of air. |

4(iii). Which one among the following components is used to convert liquid refrigerant into vapour refrigerant ?

- | | |
|----------------|----------------|
| (A) Compressor | (B) Evaporator |
| (C) Condenser | (D) Capillary |

4(iv). To supply the conditioned air from conditioning plant to the occupied space which one among the following is used ?

- | | |
|------------|-----------------|
| (A) Canals | (B) Open spaces |
| (C) Fans | (D) Ducts |

4(v). Which one among the following is not an electromagnetic relay ?

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|----------------------------|---|
| (A) Current starting relay | (B) Voltage starting relay |
| (C) Hot wire relay | (D) Current and voltage starting relay both |

4(vi). Which one among the following points are not to be considered in designing of a cold storage ?

- | | |
|-------------------------|-------------------------|
| (A) Storage temperature | (B) Relative humidity |
| (C) Air motion | (D) Number of occupants |

5. Answer any 5 out of the given 6 questions : (5 × 1 = 5)

5(i). Which one among the following is a safety control ?

- | | |
|--------------------|------------------------|
| (A) Solenoid Valve | (B) Overload protector |
| (C) Capacitor | (D) Float valve |

5(ii). Which one among the following filters are extensively used in industrial areas to absorb harmful soluble gases ?

- | | |
|--------------------------------|---------------------|
| (A) Wet filters | (B) Dry filters |
| (C) Centrifugal dust collector | (D) Electric filter |

5(iii). The function of an expansion device in a refrigeration system is to

- | | |
|---|---|
| (A) convert vapour refrigerant into liquid refrigerant. | (B) convert liquid refrigerant into vapour refrigerant. |
| (C) increase the pressure of liquid refrigerant. | (D) reduce the pressure of liquid refrigerant. |

5(iv). The heat transfer in solids takes place by which one of the following modes of heat transfer ?

- | | |
|-----------------|----------------|
| (A) Evaporation | (B) Conduction |
| (C) Convection | (D) Radiation |

5(v). Which one among the following fans is employed with duct systems ?

- | | |
|---------------------|--------------------|
| (A) Ceiling fan | (B) Axial flow fan |
| (C) Centrifugal fan | (D) Propeller fan |

5(vi). In air blast freezers, the air temperature ranging from _____

- | | |
|------------------------|-----------------------|
| (A) – 40 °C to – 80 °C | (B) – 24 °C to – 40°C |
| (C) 0 °C to – 40 °C | (D) 0 °C to – 24 °C |

6. Answer any 5 out of the given 6 questions : (5 × 1 = 5)

6(i). An overload protector protects the compressor motor by :

- | | |
|-----------------------|--|
| (A) Excessive current | (B) Overheating |
| (C) Overcooling | (D) Excessive current and overheating both |

6(ii). Which one among the following is a psychrometric process ?

- | | |
|---------------------------|-------------------------|
| (A) Humidification of air | (B) Distribution of air |
| (C) Cleaning of air | (D) Ventilation of air |

6(iii). Fins are used on heat transfer surfaces due to one among the following reasons :

- | | |
|---|--|
| (A) To make the surface clean | (B) To decrease the rate of heat transfer |
| (C) To increase the rate of heat transfer | (D) To maintain the constant rate of heat transfer |

6(iv). In a domestic refrigerator which one among the following types of condensers is used ?

- | | |
|-----------------------------------|----------------------------------|
| (A) Natural convection air cooled | (B) Forced convection air cooled |
| (C) Water cooled | (D) Evaporative |

6(v). F.C.U. is used in which one among the following air conditioning systems ?

- | | |
|----------------------------------|--------------------|
| (A) All water system | (B) DX system |
| (C) All water and DX system both | (D) All air system |

6(vi). Which one among the following is not an essential component of a cold storage ?

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|----------------|----------------|
| (A) Compressor | (B) Condenser |
| (C) Capillary | (D) Evaporator |

Section B

Answer any 3 out of the given 5 questions on
Employability Skills in 20-30 words each : ($3 \times 2 = 6$)

7. Who are the professional entrepreneurs ?
8. What is the need to format cells and contents ?
9. How can we promote the waste exchange ?
10. What is a sentence ? Write an example.
11. Write any two ways to maintain positive attitude.

Answer any 3 out of the given 5 questions in 20-30
words each : ($3 \times 2 = 6$)

12. Write the name of the refrigeration system employed in an ice plant and cold storage.
13. Explain air-water (combined) system used in air-conditioning.
14. Explain the function of an air cooled condenser in a refrigeration system.
15. Write the name of psychrometric process which is performed by a domestic air cooler.
16. What is convection ? Explain.

Answer any 2 out of the given 3 questions in 30-50
words each : ($2 \times 3 = 6$)

17. Explain plate surface evaporator with a neat sketch.
18. What is a thermal insulating material ? Write the functions of insulating materials used for a refrigerated space.
19. Explain De-humidification process with the help of psychrometric chart.

Answer any 3 out of the given 5 questions in 50-80
words each : ($3 \times 4 = 12$)

20. Explain the principle of evaporation cooling.
21. Explain ejector system of air-distribution with a neat sketch.
22. Explain automatic expansion valve with a neat sketch.
23. What is an air conditioning system ? Give classification of air conditioning systems.
24. Explain low pressure cutout with a neat sketch.

- End of Question Paper -