

CBSE | DEPARTMENT OF SKILL EDUCATION

AIR CONDITIONING & REFRIGERATION (SUBJECT CODE - 827)

Blue-print for Sample Question Paper for Class - XII (Session 2024-2025)

Max. Time: 3 Hours

Max. Marks: 60

PART A - EMPLOYABILITY SKILLS (10 MARKS):

| UNIT NO. | NAME OF THE UNIT | OBJECTIVE TYPE QUESTIONS | SHORT ANSWER TYPE QUESTIONS | TOTAL QUESTIONS |
|--|--|--------------------------|-----------------------------|-----------------|
| | | 1 MARK EACH | 2 MARKS EACH | |
| 1 | Communication Skills - IV | 1 | 1 | 2 |
| 2 | Self-Management Skills - IV | 1 | 1 | 2 |
| 3 | Information and Communication Technology Skills - IV | 2 | 1 | 2 |
| 4 | Entrepreneurial Skills - IV | 1 | 1 | 2 |
| 5 | Green Skills - IV | 1 | 1 | 2 |
| TOTAL QUESTIONS | | 6 | 5 | 11 |
| NO. OF QUESTIONS TO BE ANSWERED | | Any 4 | Any 3 | 07 |
| TOTAL MARKS | | 1 x 4 = 4 | 2 x 3 = 6 | 10 MARKS |

PART B - SUBJECT SPECIFIC SKILLS (50 MARKS):

| UNIT NO. | NAME OF THE UNIT | OBJECTIVE TYPE QUESTIONS | SHORT ANS. TYPE QUES.- I | SHORT ANS. TYPE QUES.- II | DESCRIPTIVE/ LONG ANS. TYPE QUESTIONS | TOTAL QUESTIONS |
|--|--|--------------------------|--------------------------|---------------------------|---------------------------------------|-----------------|
| | | 1 MARK EACH | 2 MARKS EACH | 3 MARKS EACH | 4 MARKS EACH | |
| 1 | Psychrometry | 4 | 1 | 1 | -- | 6 |
| 2 | Heat transfer & Air Distribution | 5 | 1 | 1 | 1 | 8 |
| 3 | Components of Refrigeration Systems | 8 | 1 | 1 | 1 | 11 |
| 4 | Electric Controls | 5 | -- | -- | 1 | 6 |
| 5 | Commercial Applications | 5 | 1 | -- | 1 | 7 |
| 6 | Air-Conditioning Systems & Maintenance | 5 | 1 | -- | 1 | 7 |
| TOTAL QUESTIONS | | 32 | 5 | 3 | 5 | 45 |
| NO. OF QUESTIONS TO BE ANSWERED | | 26 | Any 3 | Any 2 | Any 3 | 34 |
| TOTAL MARKS | | 1 x 26 = 26 | 2 x 3 = 6 | 3 x 2 = 6 | 4 x 3 = 12 | 50 MARKS |

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AIR CONDITIONING & REFRIGERATION (SUBJECT CODE - 827)

Sample Question Paper for Class XII (Session 2024-2025)

Max. Time: 3 Hours

Max. Marks: 60

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **24 questions** in two sections – Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **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.**
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A - OBJECTIVE TYPE QUESTIONS (30 MARKS):**
 - i. This section has 06 questions.
 - ii. There is no negative marking.
 - iii. Do as per the instructions given.
 - iv. Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (30 MARKS):**
 - i. This section contains 18 questions.
 - ii. A candidate has to do 11 questions.
 - iii. Do as per the instructions given.
 - iv. Marks allotted are mentioned against each question/part.

SECTION A: OBJECTIVE TYPE QUESTIONS

| | | |
|-------------|--|----------|
| Q. 1 | Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks) | |
| i. | What is positive thinking? | 1 |
| ii. | Explain spreadsheet? | 1 |
| iii. | Who is an Entrepreneur? | 1 |
| iv. | Who is a green collar worker? | 1 |
| v. | Give the full form of MINTS? | 1 |
| vi. | Mention the steps to open a workbook? | 1 |

| | | |
|-------------|--|----------|
| Q. 2 | Answer any 5 out of the given 7 questions (1 x 5 = 5 marks) | |
| i. | A current starting relay is connected in the circuit in (a) Parallel with the running winding (b) Series with the starting winding (c) Series with the running winding (d) Parallel with the starting winding | 1 |
| ii. | In the sensible heating process of air the D.B.T. of the air is (a) Increased (b) Decreased (c) Increased with increase in moisture content of air (d) Remains unchanged | 1 |
| iii. | Humidification of air is known as (a) Decrease in moisture content of air (b) Increase in moisture content of air (c) No change in moisture content of air (d) None of the above | 1 |
| iv. | A desert cooler is also known as (a) Water cooler (b) Brine cooler (c) Evaporative cooler (d) Water chiller | 1 |
| v. | To limit the flow of heat into a refrigerator, which one of the followings is used (a) A thermal conducting material (b) A thermal insulating material (c) An electric conductor (d) An electric insulating material | 1 |
| vi. | For summer air conditioning, which one among the following psychrometric process is used (a) Sensible cooling process (b) Sensible heating process (c) Cooling with dehumidification of air process (d) Humidification process | 1 |
| vii. | Over load protector in a refrigerator is used as (a) A starting device (b) A safety device (c) A stabilizer (d) None of the above | |

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| Q. 3 | Answer any 6 out of the given 7 questions (1 x 6 = 6 marks) | |
| i. | Which one of the followings is used as refrigerant in an ice plant (a) Air (b) Water (c) NH ₃ (d) CO ₂ | 1 |

| | | |
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| ii. | Which one of the followings is not a secondary refrigerant (a) Water (b) Ammonia (c) Air (d) Brine | 1 |
| iii. | The insulating material used now-a-days in refrigerators is (a) Glass wool (b) PUF (c) Thermocole (d) None of the above | 1 |
| iv. | PUF can be used for operating temperature in the range of (a) 0-1000 C (b) 0-1500C (c) -100 to 1000C (d) -200 to 1500C | 1 |
| v. | Which one of the following is also a current type relay (a) Potential relay (b) Hot wire relay (c) Solid state relay (d) None of the above | 1 |
| vi. | The conditioned air is supplied to the conditioned space through (a) Shafts (b) Sheets (c) Ducts (d) None of the above | 1 |
| vii | The ducts normally used are made of (a) G.I. Sheets (b) Cloth (c) Stone (d) None of the above | |

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| Q. 4 | Answer any 5 out of the given 6 questions (1 x 5 = 5 marks) | |
| i. | Evaporator of a refrigerator is also known as (a) Freezer (b) Condenser (c) Capillary tube (d) Compressor | 1 |
| ii. | Which one of the following types of condenser is used in a window air conditioner? (a) Air cooled condenser (b) Water cooled condenser (c) Evaporative condenser (d) None of the above | 1 |
| iii. | Constant pressure expansion valve is also known as (a) Float valve (b) Automatic expansion valve (c) Thermostatic expansion valve (d) Solenoid valve | 1 |
| iv. | Which one of the followings is used as a refrigerant control device in a refrigerator (a) Capillary tube (b) High side float valve (c) Low side float valve (d) Automatic expansion valve | 1 |
| v. | Drier in a refrigeration system is used to (a) Clean the evaporator | 1 |

| | | |
|------------|--|----------|
| | (b) Absorb the moisture from refrigerant (c) Add the moisture to refrigerant (d) Clean the condenser | |
| vi. | In an evaporative condenser which of the following is used as cooling medium (a) Air (b) Water (c) Combination of air and water both (d) None of the above | 1 |

| | | |
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| Q. 5 | Answer any 5 out of the given 6 questions (1 x 5 = 5 marks) | |
| i. | When discharge pressure of the compressor becomes excessive which one of the following operates (a) H.P. Cutout (b) L.P. Cutout (c) Both H.P. and L.P. Cutout (d) Oil pressure cutout | 1 |
| ii. | The low pressure control protects the system against the following (a) Leak of air in the system (b) Extreme compression ratio (c) Freezing up of the evaporator (d) All of the above | 1 |
| iii. | For ice making, the ice can, after freezing are dipped in hot water, this process is known as (a) Sensible heating (b) Sensible cooling (c) Thawing (d) Cleaning of ice | 1 |
| iv. | Non-ferrous metals are never used with one of the following refrigerants (a) R-12 (b) R-22 (c) NH ₃ (d) CO ₂ | 1 |
| v. | The butter prepared from the cream removed from the milk is stored at a temperature range of (a) 0 to 100 C (b) -17.8 to -330 C (c) -10.3 to -5 0 C (d) 10.5 to 150 C | 1 |
| vi. | Pasteurization of milk is carried out to (a) Kill the virus (b) Kill the pathogenic bacteria (c) Make the milk white (d) None of the above | 1 |

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| Q. 6 | Answer any 5 out of the given 6 questions (1 x 5 = 5 marks) | |
| i. | Dip tanks are used in the (a) Cold storage (b) Milk dairies (c) Refrigerators (d) Ice plants | 1 |
| ii. | A.H.U. is used in (a) A central air conditioning plant (b) A refrigerator (c) A water cooler (d) A deep freezer | 1 |

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| iii. | In all water system the working fluid used is (a) Air (b) Water (c) Air and water both (d) A refrigerant | 1 |
| iv. | The function of a filter in the air conditioning system is (a) To cool the air (b) To heat the air (c) To clean the air (d) All of the above | 1 |
| v. | A blower in an air conditioning system is used to handle large quantities of (a) Refrigerant (b) Conditioned air (c) Water (d) All of the above | 1 |
| vi. | Central air conditioning system is used for (a) Summer air conditioning only (b) Winter air conditioning only (c) Year round air conditioning (d) None of the above | 1 |

SECTION B: SUBJECTIVE TYPE QUESTIONS

Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks)

Answer each question in 20 – 30 words.

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| Q. 7 | Differentiate between simple sentence and complex sentence? | 2 |
| Q. 8 | Explain the five factor model. | 2 |
| Q. 9 | Write the steps to print the worksheet? | 2 |
| Q. 10 | Explain the concept of 'Startup India' | 2 |
| Q. 11 | Explain the concept of 'Electric Vehicle Programme'. | 2 |

Answer any 3 out of the given 5 questions in 20 – 30 words each (2 x 3 = 6 marks)

| | | |
|-------|--|---|
| Q. 12 | What is an Insulating material? Explain. | 2 |
| Q. 13 | Write the name of the psychrometric process which can be used for summer air conditioning. | 2 |
| Q. 14 | Write the names of various refrigerant control devices. | 2 |
| Q. 15 | Write the names of various commercial applications of refrigeration. | 2 |
| Q. 16 | Write about the function of a fan in an air conditioning system. | 2 |

Answer any 2 out of the given 3 questions in 30– 50 words each (3 x 2 = 6 marks)

| | | |
|-------|--|---|
| Q. 17 | Explain the desirable properties of an ideal refrigerant. | 3 |
| Q. 18 | Explain the different modes of heat transfer. | 3 |
| Q. 19 | Explain sensible cooling process with the help of psychrometric chart. | 3 |

Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)

| | | |
|-------|--|---|
| Q. 20 | Explain central air conditioning system. | 4 |
| Q. 21 | Explain the factors which contribute to the heat load (cooling load on apparatus) in an air conditioned space. | 4 |
| Q. 22 | Explain shell and tube type condenser with a neat sketch. | 4 |
| Q. 23 | Draw layout of a cold storage. | 4 |
| Q. 24 | Explain current type starting relay with a neat sketch. | 4 |