

# CBSE | DEPARTMENT OF SKILL EDUCATION

## AIR CONDITIONING & REFRIGERATION (SUBJECT CODE-827)

### Blue-print for Sample Question Paper for Class XII (Session 2020-2021)

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                          | 2                        | 1                           | 3               |
| 3                               | Information and Communication Technology Skills-IV | 1                        | 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                       |                 |
| 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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### Blue-print for Sample Question Paper for Class XII (Session 2020-2021)

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

| <b>Q. 1</b> | <b>Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)</b>   |          |
|-------------|--|----------|
| <b>i.</b>   | An active listener is one who<br>(a) Looks at who is talking<br>(b) Pays attention<br>(c) Asks questions<br>(d) All of the above   | <b>1</b> |
| <b>ii.</b>  | are the sources of motivation and inspiration<br>(a) Music and books Which<br>(b) Activities and Expansive thoughts<br>(c) Living in the present and dreaming big<br>(d) All the above               | <b>1</b> |
| <b>iii.</b> | Which one of the followings is not a personality disorder<br>(a) Paranoid<br>(b) Dreaming big<br>(c) Avoidant<br>(d) Dependent   | <b>1</b> |
| <b>iv.</b>  | How can we select the range of cells in a spreadsheet<br>(a) Using the mouse<br>(b) Using the keyboard<br>(c) Using any one of both of the above<br>(d) Using none of the above                      | <b>1</b> |
| <b>v.</b>   | Which one among the followings is a barrier in becoming a successful entrepreneur<br>(a) Plenty of funds<br>(b) Plenty of resources<br>(c) Adequate entrepreneurship training<br>(d) Fear of failure | <b>1</b> |
| <b>vi.</b>  | Which one of the followings is not a green job<br>(a) Urban growers<br>(b) Furnace operator<br>(c) Wind energy workers<br>(d) Solar cell technician  | <b>1</b> |

| <b>Q. 2</b> | <b>Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)</b>   |          |
|-------------|--|----------|
| <b>i.</b>   | Over load protector in a refrigerator is used as<br>(a) A starting device<br>(b) A safety device<br>(c) A stabilizer<br>(d) None of the above  | <b>1</b> |
| <b>ii.</b>  | In the sensible heating process of air the D.B.T. of the air is<br>(a) Increased<br>(b) Decreased<br>(c) Increased with increase in moisture content of air<br>(d) Remains unchanged | <b>1</b> |

|             |  |          |
|-------------|--|----------|
| <b>iii.</b> | Humidification of air is known as<br>(a) Decrease in moisture content of air<br>(b) Increase in moisture content of air<br>(c) No change in moisture content of air<br>(d) None of the above   | <b>1</b> |
| <b>iv.</b>  | For summer air conditioning, which one among the following psychrometric process is used<br>(a) Sensible cooling process<br>(b) Sensible heating process<br>(c) Cooling with dehumidification of air process<br>(d) Humidification process | <b>1</b> |
| <b>v.</b>   | A desert cooler is also known as<br>(a) Water cooler<br>(b) Brine cooler<br>(c) Evaporative cooler<br>(d) Water chiller  | <b>1</b> |
| <b>vi.</b>  | A current starting relay is connected in the circuit in<br>(a) Parallel with the running winding<br>(b) Series with the starting winding<br>(c) Series with the running winding<br>(d) Parallel with the starting winding                  | <b>1</b> |
| <b>vii.</b> | To limit the flow of heat into a refrigerator, which one of the followings is used<br>(a) A thermal conducting material<br>(b) A thermal insulating material<br>(c) An electric conductor<br>(d) An electric insulating material           | <b>1</b> |

|             |   |          |
|-------------|---|----------|
| <b>Q. 3</b> | <b>Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)</b>  |          |
| <b>i.</b>   | The insulating material used now-a-days in refrigerators is<br>(a) Glass wool<br>(b) PUF<br>(c) Thermocole<br>(d) None of the above   | <b>1</b> |
| <b>ii.</b>  | PUF can be used for operating temperature in the range of<br>(a) 0-100 <sup>o</sup> C<br>(b) 0-150 <sup>o</sup> C<br>(c) -100 to 100 <sup>o</sup> C<br>(d) -200 to 150 <sup>o</sup> C | <b>1</b> |
| <b>iii.</b> | The conditioned air is supplied to the conditioned space through<br>(a) Shafts<br>(b) Sheets<br>(c) Ducts<br>(d) None of the above  | <b>1</b> |
| <b>iv.</b>  | The ducts normally used are made of<br>(a) G.I. Sheets<br>(b) Cloth<br>(c) Stone<br>(d) None of the above   | <b>1</b> |

|             |  |          |
|-------------|--|----------|
| <b>v.</b>   | Which one of the following is also a current type relay<br>(a) Potential relay<br>(b) Hot wire relay<br>(c) Solid state relay<br>(d) None of the above | <b>1</b> |
| <b>vi.</b>  | Which one of the followings is not a secondary refrigerant<br>(a) Water<br>(b) Ammonia<br>(c) Air<br>(d) Brine   | <b>1</b> |
| <b>vii.</b> | Which one of the followings is used as refrigerant in an ice plant<br>(a) Air<br>(b) Water<br>(c) NH <sub>3</sub><br>(d) CO <sub>2</sub>               | <b>1</b> |

|             |   |          |
|-------------|---|----------|
| <b>Q. 4</b> | <b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>  |          |
| <b>i.</b>   | Evaporator of a refrigerator is also known as<br>(a) Freezer<br>(b) Condenser<br>(c) Capillary tube<br>(d) Compressor   | <b>1</b> |
| <b>ii.</b>  | Which one of the following types of condenser is used in a window air conditioner?<br>(a) Air cooled condenser<br>(b) Water cooled condenser<br>(c) Evaporative condenser<br>(d) None of the above    | <b>1</b> |
| <b>iii.</b> | Constant pressure expansion valve is also known as<br>(a) Float valve<br>(b) Automatic expansion valve<br>(c) Thermostatic expansion valve<br>(d) Solenoid valve                                      | <b>1</b> |
| <b>iv.</b>  | Which one of the followings is used as a refrigerant control device in a refrigerator<br>(a) Capillary tube<br>(b) High side float valve<br>(c) Low side float valve<br>(d) Automatic expansion valve | <b>1</b> |
| <b>v.</b>   | Drier in a refrigeration system is used to<br>(a) Clean the evaporator<br>(b) Absorb the moisture from refrigerant<br>(c) Add the moisture to refrigerant<br>(d) Clean the condenser                  | <b>1</b> |
| <b>vi.</b>  | In an evaporative condenser which of the following is used as cooling medium<br>(a) Air<br>(b) Water<br>(c) Combination of air and water both<br>(d) None of the above                                | <b>1</b> |

| <b>Q. 5</b> | <b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>   |          |
|-------------|--|----------|
| <b>i.</b>   | When discharge pressure of the compressor becomes excessive which one of the following operates<br>(a) H.P. Cutout<br>(b) L.P. Cutout<br>(c) Both H.P. and L.P. Cutout<br>(d) Oil pressure cutout                                | <b>1</b> |
| <b>ii.</b>  | The low pressure control protects the system against the following<br>(a) Leak of air in the system<br>(b) Extreme compression ratio<br>(c) Freezing up of the evaporator<br>(d) All of the above                                | <b>1</b> |
| <b>iii.</b> | For ice making, the ice can, after freezing are dipped in hot water, this process is known as<br>(a) Sensible heating<br>(b) Sensible cooling<br>(c) Thawing<br>(d) Cleaning of ice  | <b>1</b> |
| <b>iv.</b>  | Non-ferrous metals are never used with one of the following refrigerants<br>(a) R-12<br>(b) R-22<br>(c) NH <sub>3</sub><br>(d) CO <sub>2</sub>   | <b>1</b> |
| <b>v.</b>   | The butter prepared from the cream removed from the milk is stored at a temperature range of<br>(a) 0 to 10 <sup>0</sup> C<br>(b) -17.8 to -33 <sup>0</sup> C<br>(c) -10.3 to -5 <sup>0</sup> C<br>(d) 10.5 to 15 <sup>0</sup> C | <b>1</b> |
| <b>vi.</b>  | Pasteurization of milk is carried out to<br>(a) Kill the virus<br>(b) Kill the pathogenic bacteria<br>(c) Make the milk white<br>(d) None of the above   | <b>1</b> |

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

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

### **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.**

|              |   |          |
|--------------|---|----------|
| <b>Q. 7</b>  | Explain the any two types of verbal phrases with the help of suitable examples. | <b>2</b> |
| <b>Q. 8</b>  | Self-motivation is important! Why?  | <b>2</b> |
| <b>Q. 9</b>  | Write down the steps involved in saving a spreadsheet in PDF format.            | <b>2</b> |
| <b>Q. 10</b> | What are the common entrepreneurial competencies? (any four)                    | <b>2</b> |
| <b>Q. 11</b> | What is the role of GREEN JOBS in the society?                                  | <b>2</b> |

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

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

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

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

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

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