

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	1	7
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			6
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

CBSE | DEPARTMENT OF SKILL EDUCATION

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 active listening primarily concerned with? a) Offering criticism b) Showing indifference c) Providing empathy and support d) Interrupting the speaker	1
ii.	How can one maintain a positive outlook during challenging situations? a) Ignoring the situation b) Analyzing what is going wrong and finding solutions c) Dwelling on past mistakes d) Avoiding friends and family	1
iii.	What is LibreOffice Calc primarily used for? a) Word processing b) Creating presentations c) Creating and editing spreadsheets d) Drawing vector graphics	1
iv.	How is entrepreneurship described in terms of its characteristics? a) A random and chaotic endeavor b) A strictly regimented process c) An economic activity focused on profit-oriented organizations d) A purely artistic pursuit	1
v.	What is one of the benefits of green jobs? a) Increasing pollution levels b) protect and restore ecosystems c) Expanding carbon footprint d) Encouraging waste generation	1
vi.	Which of the following is NOT a valid data type in LibreOffice Calc? a) Text b) Numeric c) Date d) Sound	1
Q. 2	Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)	
i.	How is sensible heating represented on the psychrometric chart? a) By a vertical line extending from left to right b) By a horizontal line extending from left to right c) By a vertical line extending from right to left d) By a horizontal line extending from right to left	1
ii.	Heat is transferred within a stationary medium primarily by a) Convection b) Radiation c) Conduction d) Advection	1
iii.	Which of the following is NOT a type of condenser? a) Air-cooled condenser b) Water-cooled condenser c) Evaporative condenser d) Expansion valve condenser	1
iv.	What are the essential components of an ice plant? a) Compressor, condenser, evaporator, and controls b) Compressor, evaporator, brine tank, and louvres c) Compressor, condenser, expansion device, and evaporator d) Compressor, brine tank, louvres, and controls	1

v.	Which type of relay is primarily used with fractional horsepower motors and is actuated by changes in current flow in the running winding? a) Current starting relay b) Hot wire relay c) Voltage starting relay d) Magnetic relay	1
vi.	What is the function of the shell in a shell and coil condenser? a) To contain the refrigerant b) To increase the pressure of the refrigerant c) To circulate water d) To provide additional cooling surface	1
vii.	Which refrigerant is non-flammable, non-toxic, and has a low greenhouse effect? a) R-11 b) R-12 c) R-22 d) R-134a	
Q. 3	Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)	
i.	In large cold storages, how are the rooms typically cooled? a) By direct refrigerant in cooling coils b) By air circulation through louvers c) By chilled brine pumped through pipes d) By evaporative cooling process	1
ii.	What is the primary function of thermal insulating materials in refrigeration systems? a) To increase the heat flow from surroundings b) To isolate the refrigerated space from surroundings c) To promote heat gain d) To reduce the strength of walls and ceiling	1
iii.	Desert cooler works on the principle of a) Refrigeration b) Evaporative cooling c) Cooling and dehumidification d) Heating and humidification.	1
iv.	Which type of condenser is used for small installations up to approximately 50 TR capacities? a) Air-cooled condenser b) Double-tube condenser c) Evaporative condenser d) Shell and coil condenser	1
v.	What is the purpose of air agitation in the ice-making process as described? a) To increase the freezing temperature of water b) To remove dissolved gases and solid impurities from the water c) To accelerate the melting process of ice d) To maintain a constant temperature during freezing	1
vi.	How does a voltage-starting relay differ from a current-starting relay in its connection to the motor circuit? a) It is connected in series with the running winding. b) It is connected in series with the starting winding. c) It is connected in parallel with the starting winding. d) It is connected in parallel with the running winding.	1
vii.	What remains constant during the process of sensible heating? a) Relative Humidity b) Specific Humidity c) Dry Bulb Temperature d) Dew Point Temperature	

Q. 4	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	What is the primary purpose of an Oil Pressure Failure Safety Switch? a) To regulate refrigerant flow b) To prevent motor overheating c) To stop the compressor if oil pressure is insufficient d) To control evaporator temperature	1
ii.	Which method is NOT effective for humidification? a) Using re-circulated spray water without preheating of air b) by using heated spray water c) Directly spraying water into the room d) Pre-heating air and then washing with re-circulated water	1
iii.	The commonly used CFC free refrigerant used in domestic refrigerator is a) NH b) Water c) R-134a d) Hydrogen.	1
iv.	What is the typical air velocity around the human body for comfort? a) 2.5 m/s b) 5 m/s c) 7.5 m/s d) 10 m/s	1
v.	Which component is NOT typically found in a central station air-conditioning system? a) Cooling and de-humidifying coils b) Heating coils c) Blowers with motors d) Refrigerators	1
vi.	What are the primary disadvantages of using carbon dioxide (R-744) as a refrigerant? a) High refrigerating effect and low pressures b) Low operating pressures and refrigerating effect c) High operating pressures and low refrigerating effect d) Flammable and toxic	1
Q. 5	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	The insulating material used now-a-days in deep freezers is a) Glass wool b) PUF (Polyurethane Foam) c) Thermocole d) Asbestos	1
ii.	What is the function of a High Pressure Control (H.P. Cut Out) in a refrigeration system? a) Regulates refrigerant flow b) Stops the compressor at excessive discharge pressure c) Controls evaporator temperature d) Prevents freezing in the condenser	1
iii.	What is the boiling point of R-12 at atmospheric pressure? a) -29°C b) -33.3°C c) -41°C d) 47.6°C	1
iv.	In which air-conditioning system is the air treating plant located remotely, and air is distributed through ducts?- a) All-air system b) All-water system c) Direct-expansion system d) Heat pump system	1

v.	What is the function of the fan in a forced convection air-cooled condenser? a) To circulate refrigerant b) To remove heat from the condenser c) To circulate air through the condenser d) To increase pressure in the condenser	1
vi.	What is the function of an exhauster in an air-conditioning system? a) To blow air into the system b) To remove air or gases from a space by suction c) To heat the air d) To cool the air	1
Q. 6	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	Which process follows the path along the constant wet bulb temperature line on the psychrometric chart? a) Sensible Heating b) Cooling and Dehumidification c) Adiabatic Humidification d) Heating and Humidification	1
ii.	Latent heat gain in a conditioned space can result from a) Heat from electronic devices b) Heat from lighting c) Moisture entering through permeable walls d) Heat from solar radiation	1
iii.	What is the function of a starting capacitor in a motor circuit? a) To regulate motor speed b) To provide power to the motor c) To briefly increase motor starting torque d) To control motor temperature	1
iv.	Which fan type is best suited for handling a wide range of air volumes against medium discharge pressures? a) Propeller fans b) Tube axial fans c) Vane axial fans d) Centrifugal fans	1
v.	In a district air conditioning system, what is a common environmental challenge? a) Extreme cold b) High humidity c) Saline humidity d) Low wind conditions	1
vi.	What is the color code for R-22 cylinders? a) White b) Orange c) Green d) Blue	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.

Q. 7	Why is active listening important?	2
Q. 8	Why is maintaining a positive attitude important for students?	2
Q. 9	How can Ojasvi edit the name of an item in his spreadsheet?	2
Q. 10	Why entrepreneurship is considered both an art and a science?	2
Q. 11	What are green jobs and in which sectors can they be found?	2

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

Q. 12	What is the result of mixing warm, high-humidity air with cold air in terms of psychrometric properties?	2
Q. 13	Define sensible heat gain.	2
Q. 14	What type of condenser is preferred when there is an adequate supply of clean and inexpensive water?	2
Q. 15	How batch pasteurization is typically accomplished in dairy plants?	2
Q. 16	How does a central station air-conditioning system distribute conditioned air?	2

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

Q. 17	Describe the indirect method of humidification using an air washer.	3
Q. 18	Why is purging necessary in refrigeration systems?	3
Q. 19	Explain the modes of heat transfer and their relevance to air conditioning systems.	3

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

Q. 20	Discuss the importance of refrigerant driers in maintaining the efficiency and longevity of refrigeration systems.	4
Q. 21	Explain the differences between absorbents and adsorbents used in chemical dehumidification and provide examples of each.	4
Q. 22	Describe the importance of air distribution systems in achieving desired air conditioning outcomes.	4
Q. 23	Describe the function and operation of overload protectors in electrical circuits.	4
Q. 24	Compare and contrast the refrigeration requirements and methods used in the preservation of dairy products, meat products, poultry products, fishery products, and fruits and vegetables. What specific temperatures and storage conditions are necessary for each category?	4