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Booklet Serial No. 801541

Test Booklet Series

REFRIGERATOR MECHANIC
OMR Examination - 2025

A

Time Allowed: 120 Minutes *Maximum Marks: 120*

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. **Please note that it is the candidate's responsibility to encode and fill in the Roll Number, Booklet Serial No. and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer /Response Sheet. Any omission/discrepancy will render the Response Sheet liable for rejection.**
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. *DO NOT* **write** *anything else* on the Test Booklet.

4. This Test booklet contains **120** items (questions). Each item comprises of four responses (answers). You will select the response which you want to mark on the Answer Sheet/Response Sheet. In case you feel that there is more than one correct response, mark the response which you consider the appropriate. In any case, choose *ONLY ONE* response for each item.
5. You have to mark all your responses *ONLY* on the separate Answer /Response Sheet provided. *See directions in the Response Sheet.*
6. *All* items carry equal marks.
7. After you have completed filling in all your responses on the Response Sheet and the examination has concluded, you should hand over to the Invigilator *only the Answer /Response Sheet.* You are permitted to take away with you the Test Booklet and *Candidate's Copy of the Response Sheet .*
8. Sheets for rough work are appended in the Test Booklet at the end.
9. While writing Centre Code and Roll No. on the top of the Answer Sheet/Response Sheet in appropriate boxes use **"ONLY BLUE/BLACK BALL POINT PEN".**
10. **Penalty for wrong answers:**

    THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY THE CANDIDATE IN THE WRITTEN TEST (OBJECTIVE TYPE QUESTIONS PAPERS).

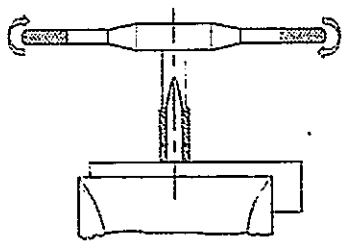
    (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, (¼) of the marks assigned to that question will be deducted as penalty.

    (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above for that question.

    (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

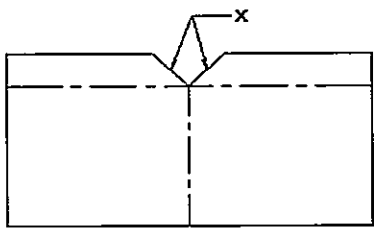
1. Which of the following is NOT a basic refrigeration cycle?
   A) Vapour compression
   B) Vapour absorption
   C) Thermo-acoustic
   D) Electrical compression

2. Identify the ongoing operation .



   A) Reaming
   B) Marking
   C) Tapping
   D) Drilling

3. In sheet metal work, the angle of the V-notch is typically represented as X. What is the value of X?



   A) 90°
   B) 60°
   C) 45°
   D) 30°

4. For air with a relative humidity of 80%
   A) The dry bulb temperature is less than the wet bulb temperature
   B) The dew point temperature is less than wet bulb temperature
   C) The dew point and wet bulb temperature are equal
   D) The dry bulb and dew point temperature are equal

5. Arrange the following AC repair tools in order of price (lowest to highest).
   1. Refrigerant Gauge Set
   2. Digital Thermometer
   3. Vacuum Pump
   4. Refrigerant Recovery Machine
   5. Manifold Gauge Set

   Which of the above is/are correct?

   A) 1, 2, 3, 4, 5
   B) 2, 5, 1, 3, 4
   C) 1, 3, 2, 5, 4
   D) 3, 1, 2, 5, 4

6. During the chemical dehumidification process of air
   A) Dry bulb temperature and specific humidity decreases
   B) Dry bulb temperature increases and specific humidity decreases
   C) Dry bulb temperature decreases and specific humidity increases
   D) Dry bulb temperature and specific humidity increases

7. What is the method of varying inductance in a coil?

A) Adjusting the core
B) Adjusting the current
C) Adjusting the resistance
D) Adjusting the voltage

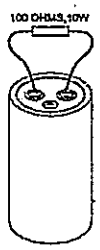
8. Match the List-I with the List-II and select the correct one.

List-I		List-II
i.	Saturated liquid	1. Before entering the compressor
ii.	Superheated vapour	2. Before passing the condenser
iii.	High pressure	3. Before entering the saturated vapour expansion valve
iv.	Dry saturated vapour	4. After passing through condenser

Which of the above is/are correct?

A) i – 1, ii - 2, iii - 3, iv - 4
B) i – 4, ii - 2, iii - 3, iv - 1
C) i – 2, ii - 3, iii - 4, iv - 1
D) i – 4, ii - 2, iii - 1, iv - 3

9. Which process is being performed with a capacitor?



A) Testing
B) Cleaning
C) Charging
D) Discharging

10. When two resistors, R_1 and R_2, are connected in series, what is their combined resistance?

A) $(R_1 - R_2)$ ohms
B) $(R_1 + R_2)$ ohms
C) $(R_1 \times R_2)$ ohms
D) (R_1 / R_2) ohms

11. The item consists of two statements; one labeled as Assertion (A) and other as Reason.

Assertion (A): Hydrogen is chosen in Electrolux refrigerator
Reason (R): It is non-corrosive and insoluble
Select the answers to these items using the code given below:

A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true and R is not the correct explanation of A
C) A is true but R is false
D) R is true but A is false

12. Match the tool with its purpose in AC repair and select the correct answer for given below.

Tool		Purpose
1. Core Tool	i.	Used for adding refrigerant to the system.
2. Vacuum Pump	ii.	Creates a vacuum to remove air and moisture from the AC system.
3. O-Ring Tool	iii.	Used to remove or install O-rings in AC system components.
4. Tube Bender	iv.	Helps in bending tubing to fit the AC system layout.
5. Pressure Gauge	v.	Measures the pressure in the AC system to diagnose problems.

Choose the correct option:

A) 1 - ii, 2 - iii, 3 - i, 4 - v 5 – iv
B) 1 - iii, 2 - ii, 3 - i, 4 - iv, 5 - v
C) 1 - iv, 2 - ii, 3 - i, 4 - v, 5 – iv
D) 1 - i, 2 - v, 3 - iii, 4 - iv, 5 - ii

13. Which refrigerant is considered ozone-friendly?

A) R-22 B) R-134a
C) R-12 D) R-502

14. In gas welding, the maximum flame temperature occurs

A) At the outer cone
B) At the inner cone
C) Between the outer and inner cone
D) At the torch tip

15. Match the new air conditioning technologies with their descriptions.

	AC Technology		**Feature**
i.	Inverter Technology	1.	Reduces energy consumption by adjusting compressor speed.
ii.	Smart AC	2.	Allows remote control via smartphones, voice assistants, and AI.
iii.	Variable Refrigerant Flow	3.	Distributes refrigerant to multiple indoor units, maintaining efficiency.
iv.	Portable AC	4.	Compact and mobile unit for cooling smaller spaces.

Which of the above is/are correct?

A) i-1, ii-2, iii-3, iv-4 B) i-2, ii-1, iii-3, iv-4
C) i-3, ii-2, iii-1, iv-4 D) i-1, ii-2, iii-4, iv-3

16. Which of the following statements are true regarding industrial safety and fire fighting in occupational health?

1. Industrial safety focuses on the prevention of injuries and accidents in the workplace.
2. Fire fighting techniques are primarily concerned with preventing damage to machinery.
3. Occupational health safety includes physical, chemical, and biological hazards at the work-place.
4. Fire safety measures in an industrial setting do not require employee training.

Which of the above statements is/are true?

A) 1 and 3 only B) 2 and 4 only
C) 1, 3, and 4 only D) All are correct

17. Water at 42°C is sprayed into a stream of air at atmospheric pressure, dry bulb temperature of 40°C and a wet bulb temperature of 20°C. The air leaving the spray humidifier is not saturated. Which of the following statements is true?

A) Air gets cooled and humidified
B) Air gets heated and humidified
C) Air gets heated and dehumidified
D) Air gets cooled and dehumidified

18. What is used to provide thermal insulation in refrigeration systems?

A) Copper B) Rubber
C) Polystyrene D) Fiber glass

19. Which is the correct combination for psychrometric process?

List-I		List-II
i.	Activated alumina	1. Heating and humidification
ii.	Water injection	2. Heating and dehumidification
iii.	Steam injection	3. Cooling and dehumidification
iv.	Hygroscopic	4. Cooling and humidification

Choose the correct Answer:

A) i-2, ii-1, iii-4, iv-3 B) i-2, ii-4, iii-1, iv-3
C) i-1, ii-3, iii-2, iv-4 D) i-3, ii-2, iii-1, iv-4

20. Consider the following statements about spray humidification process.
1. Dry bulb temperature is increased
2. Total heat process remains same

Choose the correct statement is

A) 1 only B) 2 only
C) Both 1 and 2 D) Neither 1 nor 2

21. What role does the accumulator play in a refrigerator system?
A) Improves oil circulation
B) Prevents surging of refrigerant
C) Avoids hunting of refrigerant
D) Prevents liquid flood back to compressor

22. What could cause a reduction in the suction pressure of a refrigeration system?
A) Chocked air filter
B) Air filter not blocked
C) No frost in the evaporator
D) More air flow in evaporator

23. Match List–I (Process) with List-II (Type) for air refrigeration cycle and select the correct answer using the codes given below the lists:

List -I		List-II
i.	Compression	1. Isobaric
ii.	Heat rejection	2. Isothermal
iii.	Expansion	3. Isentropic
iv.	Heat absorption	4. Isenthalpic

Which of the above is/are correct?

A) i – 4, ii - 2, iii - 3, iv - 1
B) i – 3, ii - 1, iii - 3, iv - 1
C) i – 4, ii - 2, iii - 4, iv - 2
D) i – 2, ii - 1, iii - 3, iv - 4

24. Arrange the following AC systems in ascending order of cooling capacity (BTU/h).
1. Portable Air Conditioner
2. Window Air Conditioner
3. Split Air Conditioner
4. Central Air Conditioning System

Which of the above is/are correct?

A) 1, 2, 3, 4 B) 2, 1, 4, 3
C) 1, 4, 2, 3 D) 4, 3, 2, 1

25. Which defective component leads to the formation of frost in a water cooler?

A) Overload protector
B) Thermostat
C) Relay
D) Compressor

26. Consider the following statements

1. First law of thermodynamics states that energy is conserved
2. The second law of thermodynamics state that though energy is conserved its quality improves.
3. The second law of thermodynamics states that though energy is conserved its quality degrades.
4. First law of thermodynamics can tell about the feasibility of the process

Which of the above is/are correct?

A) 1 and 2
B) 2 and 4
C) 1 and 3
D) 3 and 4

27. What state is the refrigerant in when it exits the dry expansion evaporator?

A) Only liquid
B) Only vapour
C) More liquid
D) Less vapour

28. Match the type of thermometer and their properties.

	Thermometer		**Thermometric property**
i.	Constant volume thermometer	1.	Volume
ii.	Constant pressure thermometer	2.	Pressure
iii.	Electric resistance thermometer	3.	EMF
iv.	Thermocouple	4.	Resistance

Which is the above are correct?

A) i-2, ii-1, iii-4, iv-3
B) i-2, ii-4, iii-1, iv-3
C) i-1, ii-3, iii-2, iv-4
D) i-3, ii-2, iii-1, iv-4

29. The statements concern psychometric chart.

1. Constant relative humidity lines are uphill straight lines to the right
2. Constant wet bulb temperature lines are downhill straight lines to the right
3. Constant specific volume lines are downhill straight lines to the right
4. Constant enthalpy lines are coincident with constant dry bulb temperature lines

Which of the statements are correct?

A) 2 and 3
B) 1 and 2
C) 1 and 4
D) 2 only

30. What is the primary characteristic of an air-cooled condenser used in commercial refrigeration systems?

A) It requires a water source for cooling
B) It relies on air circulation to dissipate heat
C) It has a higher initial cost compared to water-cooled condensers
D) *It is more efficient at high load conditions*

31. Match the components in Column A (Electronic component) with column B (descriptions).

Column-A		Column-B	
i.	Rectifire	1.	Converts electrical energy into another form of energy or vice versa (e.g., sound, pressure).
ii.	Transister	2.	Regulates current flow and can amplify electrical signals.
iii.	Thermister	3.	Converts AC into DC in power supply circuits.
iv.	Transducer	4.	Changes resistance significantly with changes in temperature.

Which is the above are correct?

A) i-2, ii-1, iii-4, iv-3
B) i-4, ii-2, iii-1, iv-3
C) i-1, ii-3, iii-2, iv-4
D) i-3, ii-2, iii-1, iv-4

32. Which of the following statements about AC Induction Motors are correct?

1. A single-phase AC motor is designed to run on both split-phase and capacitor start systems.
2. A squirrel cage motor is typically used for high-speed operations.
3. Slip ring motors are preferred for low torque applications.
4. Shaded-pole motors are used for high-power applications.

Which of the statements are correct?

A) 1 and 2 only
B) 3 and 4 only
C) 1, 2, and 3 only
D) 1, 2, and 4 only

33. The heat removal rate from a refrigerated space and the power input to the compressor are 7.2 kW and 1.8 kW, respectively. The coefficient of performance (COP) of the refrigerator is

A) 4
B) 4.2
C) 3.1
D) 5

34. A measure of feeling warmth or coolness by the human body in response to the air temperature, moisture content and air motion is called

A) Dry bulb temperature
B) Effective temperature
C) Wet bulb temperature
D) Dew point temperature

35. Which is the correct combination for given below?

	Device		Use
i.	Domestic Refrigerator	1.	Used for cooling in homes, typically compact and energy efficient.
ii.	Commercial Refrigerator	2.	Circulates refrigerant by compressing it to a high-pressure, high-temperature state.
iii.	Refrigerant	3.	Larger systems used in stores or restaurants for preserving large quantities of food.
iv.	Evaporator	4.	The medium that absorbs heat from the system and releases it outside.
v.	Compressor	5.	The component where the refrigerant absorbs heat, causing cooling inside the system.

Choose the correct option:

A) i-2, ii-1, iii-4, iv-3, v-5
B) i-4, ii-2, iii-1, iv-3, v-5
C) i-1, ii-3, iii-2, iv-4, v-5
D) i-1, ii-5, iii-2, iv-3, v-4

36. Which of the following is commonly used in the descaling procedure of cooling towers?
A) Hydrochloric acid
B) Sodium hydroxide
C) Sulfuric acid
D) None

37. Which of the following method (s) is/are adopted in the design of air duct system?
1. Velocity reduction method
2. Equal friction method
3. Static regain method

Select the correct answer using the codes given below:
A) 1 only
B) 1 and 2
C) 2 and 3
D) 1, 2 and 3

38. Match the components with their commonly used materials.

Component		**Material of construction**
i.	Condenser	1. Copper or aluminium for efficient heat transfer and durability.
ii.	Fin	2. Aluminium for lightweight and excellent thermal conductivity.
iii.	Valve	3. Brass or stainless steel for strength and corrosion resistance in controlling refrigerant flow.
iv.	Body	4. Steel or aluminium for structural support and durability.

Choose the correct option:
A) i-2, ii-1, iii-4, iv-3
B) i-4, ii-2, iii-1, iv-3
C) i-1, ii-3, iii-2, iv-4
D) i-1, ii-2, iii-3, iv-4

39. What could be the reason for a compressor continuing to run after its body has overheated?
A) Failure of thermostat
B) Failure of relay
C) Failure of OLP
D) Failure of Capacitor

40. Why is a starting capacitor used in the electrical circuit of a deep freezer?
A) Reduce starting torque
B) Increase staring torque
C) Increase initial load
D) Reduce initial load

41. Identify the correct pairings of transformer types and their applications.
1. Auto transformer - Used for voltage regulation in large power systems.
2. Current transformer - Used for measuring current in high voltage circuits.
3. Potential transformer - Used in AC transmission to step up voltage.
4. Three-phase inverter - Used in electrical systems to convert AC to DC.

Which of the above is/are correct?
A) 1 and 2 only
B) 2 and 3 only
C) 1 and 4 only
D) All are correct

42. Match List–I (Refrigerant) with List-II (miscibility with oil) and select the correct answer using the codes given below the lists:

List -I		**List-II**
i.	R-11	1. Partial miscibility
ii.	CO_2	2. Good miscibility
iii.	R-22	3. No miscibility

Which of the above is/are correct?
A) i – 2, ii - 3, iii - 1
B) i – 3, ii - 1, iii – 2
C) i – 1, ii - 2, iii - 3
D) i – 1, ii - 3, iii - 2

43. The phenomenon that enables cooling towers to cool water to a temperature below the dry bulb temperature of air is termed as

A) Chemical dehumidification
B) Adiabatic evaporative cooling
C) Cooling and dehumidification
D) Sensible cooling

44. Which of the following factors are to be considered while selecting a microcontroller?

1. Memory requirements
2. Processing speed required
3. Number of input/output pins

Which of the above statements are correct?

A) 1 and 2 only
B) 1 and 3 only
C) 2 and 3 only
D) 1, 2 and 3

45. What function does the damper serve in a frost-free refrigerator?

A) Adjusting temperature
B) Adjusting the air flow
C) Adjusting door
D) Adjusting timer

46. In an inverter refrigerator, what role does the pulse-width modulation (PWM) control technique play?

A) As voltage control
B) As frequency control
C) As speed control
D) As power control

47. Match the air conditioning problems with their respective solutions and select correct one.

Problem	**Possible Solution**
i. Insufficient cooling	1. Check and clean the air filters or ensures adequate refrigerant levels.
ii. Water leakage from the indoor unit	2. Inspect and clean the drainage system; ensure no blockages.
iii. Unusual noises from the AC	3. Verify electrical connections, the thermostat settings, and the power supply.
iv. AC not turning on	4. Clean the evaporator coil and the air filters; ensure there is no mold or debris build-up.
v. Bad odour from the AC	5. Inspect for loose components or damaged fan blades and tighten or repair as needed.

Choose the correct option:

A) i-2, ii-1, iii-4, iv-3, v-5
B) i-4, ii-2, iii-1, iv-3, v-5
C) i-1, ii-2, iii-4, iv-5, v-3
D) i-1, ii-2, iii-3, iv-4, v-5

48. Arrange the cooling technologies in descending order of energy efficiency.

1. Air-source heat pump
2. Water-cooled chiller
3. Evaporative cooling system
4. Ground-source heat pump

Which of the above is/are correct?

A) $3 \rightarrow 2 \rightarrow 1 \rightarrow 4$
B) $2 \rightarrow 1 \rightarrow 3 \rightarrow 4$
C) $4 \rightarrow 2 \rightarrow 1 \rightarrow 3$
D) $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

49. Match List–I (optimum design condition for comfort) with List-II (parameter value) and select the correct answer using the codes given below the lists:

	List-I		List-II
i.	Effective temperature for Summer A/C	1.	22 (°C)
ii.	Effective temperature for Winter A/C	2.	21.7 (°C)
iii.	DBT for summer A/C	3.	25 (°C)

Which of the above is/are correct?

A) i–2, ii - 1, iii - 3
B) i–3, ii - 2, iii – 1
C) i–1, ii - 2, iii - 3
D) i–1, ii - 3, iii - 2

50. Which of the following correctly describes thermal insulation types and their properties?
1. Fiberglass insulation is known for its high thermal conductivity and is primarily used for sound-proofing.
2. Mineral wool insulation provides both thermal and fire resistance.
3. Aerogel insulation has one of the lowest thermal conductivities, making it ideal for extreme conditions.
4. Spray foam insulation is often used in industrial applications due to its low durability.

Which of the statement is/are correct?

A) 1 and 2 only
B) 2 and 3 only
C) 1, 3, and 4 only
D) All are correct

51. Which type of refrigeration system is typically used in an ice plant?
A) Absorption refrigeration system
B) Vapor compression refrigeration system
C) Evaporative cooling system
D) Gas expansion system

52. What is the primary advantage of the Cassette Type Air Conditioning system?
A) It provides heating and cooling through large ducts.
B) It is ceiling-mounted, ensuring efficient and uniform cooling distribution in rooms.
C) It is installed in windows and is compact in size.
D) It requires no external ventilation for operation.

53. Match List–I (optimum design condition for comfort) with List-II (parameter value) and select the correct answer using the codes given below the lists:

	List-I		List-II
i.	Fans	1.	System that increases air pressure and forces air through ducts.
ii.	Blowers	2.	Device that regulates the flow of air and ensures proper ventilation
iii.	Air washer	3.	Equipment used to cool, humidify, and clean the air through water spraying.

Which of the above is/are correct?

A) i–2, ii - 1, iii - 3
B) i–1, ii - 2, iii – 3
C) i–3, ii - 2, iii - 1
D) i–1, ii - 3, iii - 2

54. Which property is considered ideal for POE lubricant in refrigeration systems?
A) Hygroscopic
B) Miscible with HFCs
C) Forms acid with moisture
D) Toxic gas produced during brazing

55. Which of the following is a correct characteristic of a window AC unit?
1. It is ideal for large, open spaces and requires separate ductwork.
2. It is generally more energy-efficient than split systems in larger installations.
3. It is a self-contained unit and often used for cooling individual rooms.
4. It operates primarily on water-cooled condensers.

Which of the above statement are correct?

A) 1 and 2 only
B) 2 and 3 only
C) 3 and 4 only
D) All are correct

56. In air-conditioning systems, air may be cooled and dehumidified by
1. Spraying chilled water to air in the form of fine mist.
2. Circulating chilled water or brine in a tube placed across the air flow.
3. Placing the evaporator coil across the air flow.

Which of the above statements are correct?

A) 1 and 2 only
B) 1 and 3 only
C) 2 and 3 only
D) 1, 2 and 3

57. In an arc welding process, welding speed is doubled. Assuming all other process parameters to be constant, the cross sectional area of the weld bead will
A) Increase by 25%
B) Increase by 50%
C) Reduce by 25%
D) Reduce by 50%

58. Match List–I (types of cooling tower) with List-II (operation) and select the correct answer using the codes given below the lists:

	List -I		**List-II**
i.	Natural draft	1.	Fan is installed centrally at the top
ii.	Induced draft	2.	Based on free convection heat transfer
iii.	Forced draft	3.	Hot water sprayed from the top
iv.	Cross flow	4.	An exhaust fan placed at the base

Which of the above is/are correct?

A) i–2, ii - 1, iii–3, iv-4
B) i–1, ii - 2, iii–3, iv-4
C) i–1, ii - 4, iii–3, iv-2
D) i–2, ii - 1, iii–4, iv-3

59. Arrange the following pressure control valves in ascending order based on their setpoint pressures:
1. Back-pressure regulator
2. Relief valve
3. Pressure-reducing valve
4. Pressure-relief switch

Which of the above is/are correct?

A) 1, 3, 4, 2
B) 3, 1, 4, 2
C) 4, 1, 3, 2
D) 1, 4, 3, 2

60. How does the capillary length change when retrofitting a CFC-based unit with an HFC-based unit?
A) 30% less of old capillary
B) 10% less of old capillary
C) 20% less of old capillary
D) 20% more of old capillary

61. Match List –I (Refrigerator problems) with List-II (possible reason) and select the correct answer using the codes given below the lists:

	List -I	List-II
i.	Uneven Cooling	1. Faulty defrost system
ii.	Excessive Frost Buildup	2. Blocked air vents
iii.	Water Leakage	3. Cracks or tears on gasket
iv.	Door Seal Problems	4. Clogs formation or leaks

Which of the above is/are correct?

A) i – 2, ii - 1, iii – 4, iv - 3
B) i – 4, ii - 2, iii – 3, iv-1
C) i – 1, ii - 4, iii – 3, iv-2
D) i – 3, ii - 1, iii – 4, iv-2

62. The moisture in a refrigerant is removed by
A) Evaporator
B) Safety relief valve
C) Dehumidifier
D) Driers

63. Which one of the following is a CFC refrigerant?
A) R744
B) R290
C) R502
D) R718

64. Which of the following statements about the construction of an evaporator is true?
1. The evaporator transfers heat from the refrigerant to the surrounding air, cooling the air in the process.
2. The direct expansion (DX) evaporator is used only in industrial refrigeration systems.
3. Flooded evaporators operate by maintaining a constant refrigerant level in the system.
4. The efficiency of an evaporator is not influenced by the flow rate of the refrigerant.

Which of the above statement are correct?

A) 1 and 3 only
B) 2 and 4 only
C) 1 and 4 only
D) All are correct

65. A Comfort Air Conditioning System primarily focuses on:
A) Maintaining constant airflow in commercial kitchens.
B) Providing consistent temperature and humidity control for personal comfort in indoor environments.
C) Preventing contamination in controlled environments like clean rooms.
D) Cooling large machinery in industrial plants.

66. Which of the following materials is commonly used for ductwork in HVAC systems?
A) Copper
B) Galvanized steel
C) PVC
D) Aluminum foil

67. Why the filler metal does not melt and flow into the joint in bronze welding of copper?
A) Excess use of flux
B) Due to excess of polished surface
C) Surface coated with oxides or oily material
D) Excessive heating of metal's surface

68. Match the Column A (Refrigerant) with Column B (colour code).

Column-A		Column-B	
i.	Ammonia	1.	Light Blue
ii.	Methyl Chloride	2.	Orange
iii.	Freon-12	3.	White
iv.	Freon-22	4.	Green
v.	Freon-113	5.	Purple

Choose the correct option:
A) i-2, ii-1, iii-4, iv-3, v-5
B) i-4, ii-2, iii-1, iv-3, v-5
C) i-1, ii-2, iii-3, iv-4, v-5
D) i-1, ii-3, iii-2, iv-4, v-5

69. Consider the following statement for refrigeration and air conditioning:
1. In a refrigeration machine, heat exchanger that absorbs heat is connected to a conditioned space.
2. A refrigeration cycle operating reversibly between two heat reservoirs has the highest coefficient of performance.
3. The lower the refrigeration required and the higher the temperature of heat rejection to the surroundings, the larger the power consumption.

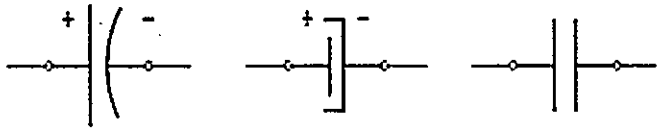
Which of the above is correct?
A) 1 and 2 only
B) 1 and 3 only
C) 2 and 3 only
D) 1, 2 and 3

70. What is the advantage of super heating the vapour in suction line?
A) Increase the refrigerating effect
B) Decrease the refrigerating effect
C) Increase density
D) Decrease specific volume

71. Which of the following statements about the types of condensers used in refrigeration is true?
1. Water-cooled condensers are used in smaller, domestic refrigeration systems.
2. Air-cooled condensers use a fan to cool the refrigerant in the condenser coils.
3. Evaporative condensers combine both air and water to reduce heat.
4. Condensers are generally used to reduce the pressure of refrigerants.

Which of the above statement are true?
A) 1 and 2 only
B) 2 and 3 only
C) 1, 2, and 3 only
D) All are correct

72. Which component these symbols represent?



A) Motor
B) Relay
C) Capacitor
D) Overload protector

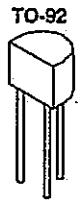
73. Arrange the refrigerants in descending order of Global Warming Potential (GWP).
1. R-410A
2. R-134a
3. R-22
4. R-32

Which of the above is/are correct?

A) 3 → 2 → 1 → 4
B) 2 → 1 → 3 → 4
C) 1 → 3 → 2 → 4
D) 4 → 1 → 2 → 3

74. What is the primary function of a Heat Recovery Wheel (HRW) in an HVAC system?
A) To control humidity levels in the air.
B) To recover waste heat from exhaust air and transfer it to incoming fresh air to improve energy efficiency.
C) To filter out particulate matter from the air.
D) To provide additional cooling to the incoming air stream.

75. What is the name of component used in electronic circuit?



A) Zener diode
B) Vacuum tube
C) Transistor
D) Voltage regulator

76. Consider the following in cascade system
1. Different refrigerants are used in individual cascade cycle.
2. There is no mixing of refrigerants and no migration of refrigerant.
3. Higher COPs compared to multistage systems can be obtained
4. Operating pressure need not be too higher or too low

Which of the above is correct?

A) 1 and 2 only
B) 1 and 3 only
C) 2 and 3 only
D) 1, 2 and 4

77. Which of the following is an advantage of Thermo-Acoustic refrigeration over conventional refrigeration systems?
A) Requires no moving parts
B) Uses hazardous refrigerants
C) More energy-efficient than conventional systems
D) Requires complex heat exchangers

78. The Bypass Factor of an air conditioning system refers to:
A) The percentage of air that does not undergo cooling in the cooling coil.
B) The total amount of heat added by the building's internal sources.
C) The total heat removal efficiency of the condenser.
D) The amount of energy saved during peak cooling hours.

79. Which tool is used for bending, seaming and forming of sheet metal?
A) Bench vice
B) Hand vice
C) Stakes
D) Shear

80. Arrange the following refrigerant flow control devices in descending order of their capacity to handle flow rate:
1. Solenoid valve
2. Capillary tube
3. Thermostatic expansion valve (TXV)
4. Electronic expansion valve (EEV)

Which of the above is/are correct?
A) 4, 3, 1, 2
B) 1, 2, 4, 3
C) 3, 4, 1, 2
D) 2, 1, 4, 3

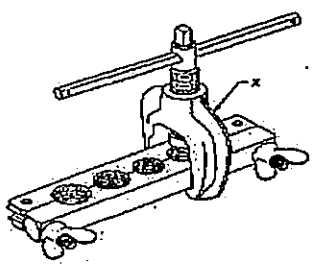
81. Which method is commonly used to control the capacity of commercial compressors?
A) Bypass valve
B) Overload protector
C) Temperature switch
D) Power transformer

82. Which of the following statements about PTC thermistors is/are true?
I. Resistance increases with an increase in temperature.
II. They are used in overcurrent protection circuits.
III. PTC thermistors are not used for temperature sensing in cold climates.
IV. They have a negative temperature coefficient.

Which of the above statement are correct?
A) I, II only
B) I, III only
C) II, IV only
D) I, II, III only

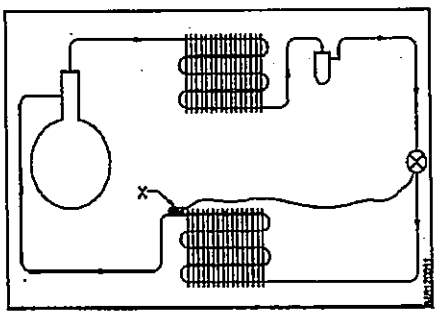
83. Which of the following is true about the Electronic Expansion Valve (EEV)?
A) It operates based on a *mechanical spring mechanism*
B) It is used to regulate refrigerant flow by adjusting a stepper motor
C) It is only used in domestic refrigeration
D) It operates in a fixed, non-variable capacity

84. What is the part marked as X in the flaring set?



A) Flaring block
B) Flaring yoke
C) Wing nut
D) Chamfer

85. What is the part marked as X in vapour compression system?



A) Evaporator
B) Feeler bulb
C) Capillary tube
D) Expansion value

86. Which of the following statements regarding Variable Frequency Drives (VFDs) is/are correct?

I. VFDs are used to control the speed of induction motors.
II. VFDs allow for precise motor speed control without mechanical systems.
III. VFDs change the motor's frequency to adjust its speed.
IV. VFDs are typically used only in HVAC systems.

Which of the above statement are correct?

A) I, II, III only
B) II, III, IV only
C) I, III only
D) I, II, III, IV

87. Which of the following is a key characteristic of scroll compressors used in commercial refrigeration?

A) They use pistons and cylinders to compress refrigerant
B) They have a low efficiency at full load
C) They produce less vibration compared to reciprocating compressors
D) They are not suitable for refrigeration applications

88. Arrange the temperature in ascending order for a vapor-compression refrigeration cycle:

1. Condensing temperature range (°C)
2. Evaporating temperature range (°C)
3. Superheat temperature range (°C)
4. Subcooling temperature range (°C)

Which of the above is/are correct?

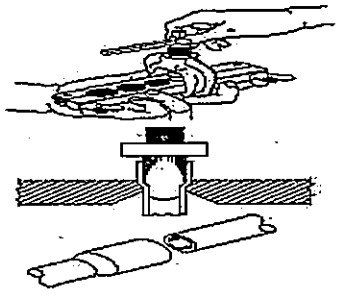
A) 2 → 4 → 3 → 1
B) 2 → 3 → 4 → 1
C) 4 → 2 → 3 → 1
D) 3 → 4 → 2 → 1

89. Which of the following is a key advantage of a flooded chiller over a DX chiller?

A) Requires more refrigerant to operate
B) Has a simpler and more cost-effective system
C) Provides better efficiency and uniform temperature control
D) Is smaller in size and more compact

90. Which material used for making integrated circuit?
A) Copper
B) Silicon
C) Gallium
D) Carbon

91. Which process of copper tubing is in progress?



A) Flaring
B) Reaming
C) Swaging
D) Pinching

92. Arrange the following refrigeration and air conditioning repair tools by size (smallest to largest).
1. Multimeter
2. Refrigerant Recovery Machine
3. Vacuum Pump
4. Leak Detector
5. Brazing Torch

Which of the above is/are correct?
A) 1, 4, 5, 3, 2
B) 1, 5, 4, 3, 2
C) 4, 1, 2, 5, 3
D) 1, 4, 3, 2, 5

93. Which substance absorbs heat and directly changes its state from solid to vapour?
A) Ice
B) Dry ice
C) Primary refrigerants
D) Secondary refrigerants

94. Match the tool used in AC system with their function and select the correct answer.

	Tool		**Functions**
1.	Tube Bender	i.	To flush refrigerant line
2.	Pressure Test Kit	ii.	Curving a tube in an AC
3.	Nitrogen Regulator	iii.	Detects leaks in an AC
4.	Flare Tool	iv.	Cut the copper pipe

Which of the above is/are correct?
A) 1 – iii, 2 - iv, 3 - i, 4 - ii
B) 1 - i, 2 - ii, 3 - iii, 4 – iv
C) 1 - iv, 2 - ii, 3 - i, 4 – iii
D) 1 - ii, 2 - iii, 3 - i, 4 - iv

95. Overcharging a refrigeration system with refrigerant can cause:
A) Increased cooling performance
B) Increased head pressure
C) Compressor burnout
D) Both B and C

96. What is the main feature of a Precision Air Conditioning System?
A) It is used for maintaining high temperatures in industrial applications.
B) It is designed to control temperature, humidity, and air cleanliness with high accuracy in environments like data centers.
C) It operates on a fixed compressor speed for temperature regulation.
D) It only controls the air quality without temperature regulation.

97. Consider the following in case of evaporator of a vapour compression refrigeration system:
1. A low temperature is maintained so that heat can flow from external fluid.
2. Refrigeration effect is produce as refrigerant liquid vaporize.
3. A low pressure is maintained so that the compressor can run.

Which of the above is correct?

A) 1 B) 2
C) 3 D) 1 and 2

98. In a typical starting procedure for a Central Air Conditioning Plant, which component should be started first?
A) Chiller compressor
B) Air handling unit (AHU)
C) Cooling tower fans
D) Electrical power supply to the control panel

99. In a Direct Expansion (DX) chiller, the refrigerant:
A) Is expanded inside the cooling coil in the air-handling unit
B) Flows through a flooded evaporator to absorb heat
C) Directly evaporates in the evaporator coil within the chilled water system
D) Is used as a cooling medium for the chiller motor

100. Moisture should be removed from refrigerants to avoid
1. Compressor seal failure
2. Freezing at the expansion valve
3. Restriction to the refrigerant flow
4. Corrosion of steel parts

Which of the above is correct?

A) All are correct
B) 2 and 3
C) 3 and 4
D) 1 and 2

101. Match the tool with the AC system component and select the correct one.

	Tool		Function
1.	Multimeter	i.	Tightening or loosening bolts and screws
2.	Refrigerant Gauge Set	ii.	Measuring electrical current, voltage, and resistance
3.	Wrench	iii.	Charging and checking refrigerant levels in the system
4.	Vacuum Pump	iv.	Removing air and moisture from the refrigerant system

Which of the above is/are correct?

A) 1 -i, 2 - iii, 3 - iv, 4 - ii
B) 1 - iii, 2 - ii, 3 - i, 4 - iv
C) 1 - ii, 2 - iv, 3 - i, 4-iii
D) 1 - ii, 2 - iii, 3 - i, 4 -iv

102. Which component of a refrigeration system is used to control refrigerant flow?

A) Compressor
B) Expansion valve
C) Condenser
D) Evaporator

103. Arrange the following materials by their max operating temp in descending order:

1. Fiberglass
2. PVC Louvers
3. Aluminum Alloy Fan Blades
4. Stainless Steel Fasteners

Which of the above is/are correct?

A) $3 \longrightarrow 4 \longrightarrow 1 \longrightarrow 2$
B) $4 \longrightarrow 1 \longrightarrow 3 \longrightarrow 2$
C) $1 \longrightarrow 4 \longrightarrow 3 \longrightarrow 2$
D) $4 \longrightarrow 3 \longrightarrow 2 \longrightarrow 1$

104. Which type of compressor is generally used in larger refrigeration systems?

A) Screw Compressor
B) Rotary Compressor
C) Reciprocating Compressor
D) Scroll Compressor

105. Match List -I with List-II and select correct answer

	List-I		List-II
i.	Bell Coleman Refrigeration	1.	Expansion Cylinder
ii.	Reverse Carnot Cycle	2.	Heat Pump
iii.	Milk Chilling Plant	3.	Brine
iv.	Superheating Refrigeration Cycle	4.	Decrease COP

Choose the correct Answer:

A) i-1, ii-2, iii-3, iv-4
B) i-4, ii-2, iii-3, iv-1
C) i-1, ii-3, iii-2, iv-4
D) i-3, ii-2, iii-1, iv-4

106. When calculating the heating load for a system, which of the following is most important?
A) Size of the building and insulation quality
B) Amount of refrigerant used in the system
C) Type of compressor used in the system
D) Outdoor temperature only

107. Excessive oil in the evaporator leads to:
A) Increased cooling capacity
B) Blocked refrigerant flow
C) Enhanced heat transfer
D) Reduced system noise

108. Match the tool with the part it is used to repair and select the correct one.

	Tool		Part of AC System
1.	Clamp Meter	i.	Condenser or Compressor
2.	Refrigerant Scale	ii.	Evaporator Coil
3.	Refrigerant Injector	iii.	Measures refrigerant weight and amount.
4.	A/C Hose Connector	iv.	Checks current flow

Which of the above is/are correct?
A) 1 -iv, 2 - iii, 3 - ii, 4 - i
B) 1 - iii, 2 - ii, 3 - i, 4 - iv
C) 1 - iv, 2 - ii, 3 - i, 4 - iii
D) 1 - i, 2 - ii, 3 - iii, 4 - iv

109. During refrigerant recovery, why should a recovery cylinder not be overfilled?
A) To avoid contamination
B) To prevent cylinder rupture due to pressure
C) To improve recovery speed
D) To maintain proper oil levels

110. What is the typical pressure range for the DH evaporators in refrigeration systems?
A) 30-45 bar
B) 5-10 bar
C) 1-5 bar
D) 50-60 bar

111. When troubleshooting a central air conditioning system, what is the first step in identifying the problem?
A) Immediately replacing the air handling unit
B) Checking the electrical connections for faults
C) Conducting a visual inspection to identify any obvious issues such as leaks or blockages
D) Increasing the cooling load to see if it resolves the issue

112. Which of the following components is used for high-precision temperature control in refrigeration systems?
A) Thermister
B) Thermocouple
C) Capacitor
D) Transistor

113. Match List-I (Basic components of aqua-ammonia refrigeration system) with List-II (Function of component in the system) and select the correct answer and select correct answer

	List-I		List-II
i.	Generator	1.	Dehydration
ii.	Analyzer	2.	Removal of vapour from strong aqua-ammonia system
iii.	Rectifier	3.	Producing dry ammonia vapor by removing traces of water particles completely
iv.	Receiver	4.	Formation of liquid ammonia from high pressure vapour

Choose the correct Answer:

A) i-1, ii-2, iii-3, iv-4

B) i-4, ii-2, iii-3, iv-1

C) i-1, ii-3, iii-2, iv-4

D) i-2, ii-1, iii-3, iv-4

114. Arrange the following pressure control devices in ascending order based on their typical operating pressure range:

1. Evaporator pressure regulator
2. Condenser pressure regulator
3. High-pressure cutout switch
4. Low-pressure cutout switch

Which of the above is/are correct?

A) 1, 4, 2, 3

B) 4, 1, 2, 3

C) 2, 1, 3, 4

D) 4, 3, 1, 2

115. What is ensured before mounting condenser in car AC?

A) Accessibility for future service

B) Condenser top line to TEV inlet

C) Condenser in line with car radiator

D) Condenser bottom line to discharge line

116. What is the effect of longer suction and liquid piping in AC?

A) No pressure rise

B) More pressure drop

C) Less pressure drop

D) Medium pressure rise

117. Which motor is used to drive the condenser fan of out-door unit in ductable split air conditioner?

A) Capacitor start capacitor run motor

B) Three phase induction motor

C) Permanent split motor (PSC)

D) Shaded pole motor

118. Match List-I(Electronic component) to List-II (Function) and select correct answer

List-I			**List-II**
i.	Resistor	1.	Stores electric charge
ii.	Capacitor	2.	Regulates current flow and provides resistance
iii.	Diode	3.	Amplifies signals or acts as a switch
iv.	Transistor	4.	Emits light when current flows through it.
v.	LED	5.	Allows current to flow in one direction only

Choose the correct Answer:

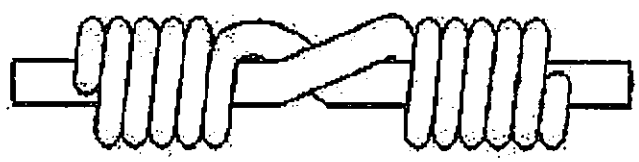
A) i-2 ii-1 iii-4 iv-5 v-3

B) i-4 ii-2 iii-3 iv-1 v-5

C) i-1 ii-3 iii-2 iv-4 v-5

D) i-3 ii-2 iii-1 iv-4 v-5

119. Which joint is used in overhead lines for extending the length of the wire?



A) Dove tail joint

B) Plain tap joint

C) Western union joint

D) Duplex cross tap joint

120. How the ability of a conductor is called if it induces the voltage in the same conductor?

A) Self inductance

B) Conductance

C) Capacitance

D) Resistance

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