2016-651TN(R&AC)-R

QUESTION BOOKLET CODE	A

Government of India
Department of Space
LIQUID PROPULSION SYSTEMS CENTRE
Valiamala PO, Thiruvananthapuram - 695 547

WRITTEN TEST FOR SELECTION TO THE POST OF
TECHNICIAN 'B' (REFRIGERATION & A/C MECHANIC)

Date: 21.01.2017

Maximum Marks: 300 Time: 2 hours

Name of the Candidate: Roll No.:

Instructions to the Candidates

1. Candidates should read carefully the instructions in the Question booklet and OMR Answer Sheet before start answering.
2. You have been called for the written test based on the data furnished by you in the on-line application. If you have wrongly entered in the application or you do not possess the required qualification as per our advertisement, your candidature will be rejected.
3. You should sign the Admit Card/Photograph only in the presence of the invigilator in the Examination Hall.
4. The question paper is in the form of Question Booklet with 75 questions. A separate OMR sheet is provided for answering the Questions.
5. **Question Booklet series code (A/B/C/D/E) printed on the right hand top corner should be written in the OMR answer sheet in the place provided.**
6. Enter your Name and Roll Number in the Question Booklet.
7. All entries in the OMR answer sheet should be with blue/black ball point pen only.

P.T.O

8. The written test will be of objective type based on the qualification prescribed for the post with four answers indicated, of which only one will be unambiguously correct.

9. You have to select the right answer by marking the corresponding oval on the OMR answer sheet by blue/black ball point pen as per the instructions given in the OMR answer sheet.

10. All questions carry **four** marks each, **zero** marks for no answer and **one negative** mark for a wrong answer.

11. Multiple answers for a question will be regarded as a wrong answer.

12. Marking in OMR may be done with utmost care. No spare OMR sheet will be provided.

13. Computers, Calculators, mobile phones, reference books, logarithm table, electronic gadgets etc. will not be allowed inside the Examination Hall.

14. Space available in the Question Booklet can be used for rough work.

15. **On completion of the test, tear the OMR answer sheet along the perforation mark at the top and hand over the original OMR answer sheet to the invigilator and retain the duplicate copy with you.**

16. Candidates are not permitted to leave the Examination Hall during the first one and a half hour of the examination.

17. Candidates leaving the examination hall after 1150 hrs will be allowed to retain the Question Booklet.

18. After the Examination, candidates should hand over OMR Answer Sheet and Admit Card to the Invigilator.

TECHNICIAN –'B' (REFRIGERATION & AIR CONDITIONING MECHANIC)

1. Refrigerant used should be such that its normal boiling point is
   a) Greater than the temperature required
   b) Less than the temperature required
   c) Equal to the temperature required
   d) None

2. Pressure of refrigerant in the evaporator should be
   a) Equal to the atmospheric pressure
   b) Less than the atmospheric pressure
   c) Greater than the atmospheric pressure
   d) None

3. Primary refrigerant is one which is sensibly
   a) Heated in the evaporator
   b) Cooled in the evaporator
   c) Neither heated in evaporator nor cooled in condenser
   d) None

4. Secondary refrigerant is one which is
   a) Cooled by the water
   b) Cooled by the air
   c) Cooled by the primary refrigerant
   d) None

5. Of the following, which can act as a primary, secondary as well as a tertiary refrigerant
   a) Water
   b) Ammonia
   c) Freon-22
   d) None

6. Which is the primary refrigerant in central air conditioning plant
   a) Air
   b) Water
   c) Freon-22
   d) None

7. Capillary tube is the expansion valve used in refrigeration and Air Conditioning units of cooling capacity of ranges
   a) < 3 tons
   b) > 3 tons
   c) <10 tons
   d) None

8. Automatic expansion valve is used to maintain
   a) Constant temperature
   b) Constant pressure
   c) Constant volume
   d) None

9. Expansion process in the expansion valve is
   a) Free expansion
   b) Throttling
   c) Isotropic
   d) None

10. Thermostatic expansion valve is located in between the
   a) Compressor and condenser
   b) Condenser and evaporator
   c) Evaporator and the compressor
   d) None

11. Evaporators with finned tubes are used in a
   a) Window air conditioner
   b) Fridge
   c) Water cooler
   d) None

12. Where is the Evaporator in a refrigeration plant fitted?
   a) Before the condenser
   b) After the condenser
   c) After the compressor
   d) None

13. Condenser in a refrigeration system decreases
   a) Pressure only
   b) Temperature only
   c) Temperature and pressure
   d) None

14. Water cooled condensers are used when tons of refrigeration is
   a) < 3
   b) <50
   c) > 100
   d) None

15. Heat lost in the condenser is due
    a) Decrease in the degree of super heat
    b) Decrease in degree of super heat +Latent heat + Increase of degree of sub-cooling
    c) Decrease in the degree of sub cooling
    d) None

16. Reciprocating compressor is used when pressure difference between condenser and evaporator is
    a) >1.5 bars
    b) <1.5 bars
    c) >3.5 bars
    d) None

17. Centrifugal compressor is used when pressure difference between condenser and evaporator is
    a) >1.5 bars
    b) <1.5 bars
    c) >3.5 bars
    d) None

18. When do we need dual compressor in a refrigeration unit?
    a) When temperature to be achieved is around $-50^{\circ}C$
    b) When temperature to be achieved is around $5^{\circ}C$
    c) When temperature to be achieved is around $-5^{\circ}C$
    d) None

19. Ammonia compressors are always
    a) Water cooled
    b) Air cooled
    c) Water as well as air cooled
    d) None

20. Degree of super heat is associated with
    a) Solids
    b) Liquids
    c) Vapors
    d) None

21. Degree of super heat is the temperature difference between
    a) The actual temperature and the boiling temperature
    b) The actual and the dew point temperature
    c) The dry bulb temperature and the wet bulb temperature
    d) Condenser temperature and evaporator temperature

22. Due to sub cooling, entropy
    a) Increases
    b) Decreases
    c) Remains the same
    d) None

23. Refrigerant leaks are generally detected by
    a) Halide leak detectors
    b) Electronic leak detectors
    c) Using soap solution
    d) Helium leak detectors

24. For how much time pressure be stored in the system for detecting outward leakage
    a) 36 hours
    b) 24 hours
    c) 18 hours
    d) None

25. Halide torch is used to detect the leakage of
    a) R-22, R-134a and R-22
    b) R-717, R-718 and R-729
    c) Carbon dioxide
    d) None

26. What is the fundamental difference between A/c and refrigerator?
    a) A/c requires rotary compressor
    b) A/c requires humidity control
    c) Refrigerator requires condenser
    d) Refrigerator requires throttling device

27. An Inverter Air conditioner
    a) Works by converting A.C to D.C
    b) Works when line supply is off
    c) Works by converting D.C to A.C
    d) Works by converting A.C to D.C and back

28. In a refrigeration cycle, the refrigerant will have the highest temperature
    a) At the evaporator outlet
    b) At the compressor outlet
    c) At the condenser outlet
    d) None of the above

29. In a refrigeration cycle, the refrigerant will have the lowest temperature
    a) At the evaporator outlet
    b) At the compressor outlet
    c) At the condenser outlet
    d) None of the above

30. Which refrigerant is the most costly?
    a) Ammonia
    b) Freon
    c) Carbon dioxide
    d) None

31. Conduction is most prominent in
    a) Fluids
    b) Solids
    c) Gases
    d) None

32. Convection is most prominent in
    a) Fluids
    b) Solids
    c) Gases
    d) None

33. Radiation is most prominent in
    a) Fluids
    b) Solids
    c) Gases
    d) None

34. One ton of refrigeration is the capacity required to convert
    a) One ton of water into one ton of ice in one hour
    b) One ton of water at 0^0 C. into one ton of ice at 0^0 C in one hour
    c) One ton of water at 0^0 C. into one ton of ice at 0^0 C in 24 hours
    d) One ton of ice at 0^0 C. into one ton of water at 0^0 C in 24 hours

35. In refrigeration, COP means
    a) Coefficient of pressure
    b) Coefficient of performance
    c) Cooler outlet pressure
    d) Compressor outlet pressure

36. What is the difference in working principle between a window A/c and a Split A/c?
    a) No difference
    b) Window A/c requires high insulation
    c) Split A/c requires rotary compressor
    d) Window A/c requires Freon as refrigerant

37. In a refrigeration cycle, the flow of refrigerant is controlled by
    a) Compressor
    b) Evaporator
    c) Condenser
    d) Expansion valve

38. In case of leakage of Freon, the colour of the flame of halide torch, will change to
    a) Bright green
    b) Yellow
    c) Red
    d) Orange

39. The temperature of air recorded by a thermometer, when it is not affected by the moisture present in the air, is called
    a) Wet bulb temperature
    b) Dry bulb temperature
    c) Dew point temperature
    d) Humidity temperature

40. Which of the following statement is correct?
    a) In vapour absorption refrigerator, the compression of refrigerant is avoided.
    b) Sub-cooling can be achieved by circulating more quantity of cooling water through the condenser.
    c) In vapour compression refrigeration, the vapour is drawn in the compressor cylinder during its suction stroke and is compressed adiabatically during the compression stroke.
    d) All of the above

41. During humidification process, which of the following increases.
    a) Wet bulb temperature
    b) Relative humidity
    c) Dry bulb temperature
    d) Specific humidity

42. The COP of a vapour compression plant in comparison to vapour absorption plant is
    a) More
    b) Less
    c) Same
    d) More/less depending on size of plant

43. Domestic refrigerator working on vapour compression cycle uses the following type of expansion device
    a) Electrically operated throttling valve
    b) Manually operated valve
    c) Thermostatic valve
    d) Capillary tube

44. The condition of refrigerant after passing through the expansion or throttle valve, in a vapour compression system is

a) High pressure saturated liquid
b) Wet vapour
c) Very wet vapour
d) Dry vapour

45. At lower temperatures and pressures, the latent heat of vaporisation of a refrigerant
a) Decreases
b) Increases
c) Remain same
d) Depends on other factors

46. During humidification process, dry bulb temperature
a) Remains constant
b) Increases
c) Decreases
d) None of these

47. Which of the following statement is wrong?
a) The performance of the vapour compression refrigerator varies considerably with both vaporising and condensing temperatures.
b) In vapour compression cycle, the useful part of the heat transfer is at the condenser.
c) In ammonia-hydrogen (Electrolux) refrigerator, no compressor, pump or fan is required.
d) The effect of under-cooling the liquid refrigerant is to decrease the coefficient of performance.

48. In a vapour compress.system, the condition of refrigerant before passing through the condenser is
a) Saturated liquid
b) Wet vapour
c) Dry saturated vapour
d) Superheated vapour

49. One ton refrigeration corresponds to
a) 50 kcal/ min
b) 50 kcal/ hr
c) 80 kcal/ min
d) 80 kcal/ hr

50. Which of the following refrigerant has the maximum ozone depletion potential in the stratosphere?
    a) Ammonia
    b) Carbon dioxide
    c) Sulphur dioxide
    d) Fluorine

51. The vapour pressure of refrigerant should be
    a) Higher than atmospheric pressure
    b) Lower than atmospheric pressure
    c) Equal to atmospheric pressure
    d) Could be anything

52. Pick up the wrong statement. A refrigerant should have
    a) Tow specific heat of liquid
    b) High boiling point
    c) High latent heat of vaporisation
    d) Higher critical temperature

53. In aircraft, air refrigeration Cycle is used because of
    a) Low weight per tonne of refrigeration
    b) High heat transfer rate
    c) Low temperature at high altitudes
    d) Higher coefficient of performance

54. Highest pressure encountered in a refrigeration system should be
    a) Critical pressure of refrigerant
    b) Much below critical pressure
    c) Much above critical pressure
    d) Near critical pressure

55. The refrigerant used for absorption refrigerators working on heat from solar collectors is a mixture of water and
    a) Carbon dioxide
    b) Sulphur dioxide
    c) Lithium bromide
    d) *R-12*

56. Vertical lines on pressure-enthalpy chart show constant
    a) Pressure lines
    b) Temperature lines
    c) Total heat lines
    d) Entropy lines

57. Dry bulb temperature is the temperature of air recorded by a thermometer, when
    a) It is not affected by the moisture present in the air
    b) Its bulb is surrounded by a wet cloth exposed to the air
    c) The moisture present in it begins to condense
    d) None of the above

58. The optimum effective temperature for human comfort is
    a) Higher in winter than in summer
    b) Lower in winter than in summer
    c) Same in winter and summer
    d) Not dependent on season

59. Which of the following statement is correct for ammonia as a refrigerant?
    a) It is toxic to mucous membranes.
    b) It requires large displacement per TR compared to fluoro carbons.
    c) It reacts with copper and its alloys.
    d) All of these

60. The capacity of a domestic refrigerator is in the range of
    a) 0.1to 0.3 TR
    b) 1 to 3 TR
    c) 3 to 5 TR
    d) 5 to 7 TR

61. Formation of frost on evaporator in refrigerator
    a) Results in loss of heat due to poor heat transfer
    b) Increases heat transfer rate
    c) Is immaterial
    d) Can be avoided by proper design

62. The suction pipe diameter of refrigerating unit compressor in comparison to delivery side is
    a) Bigger
    b) Smaller
    c) Equal
    d) Smaller/bigger depending on capacity

63. A thermostatic expansion valve in a refrigeration system
    a) Ensures the evaporator completely filled with refrigerant of the load
    b) Is suitable only for constant load systems
    c) Maintains different temperatures in evaporator in proportion to load
    d) None of the above

64. On the pressure-enthalpy diagram, condensation and desuperheating is represented by a horizontal line because the process
    a) Involves no change in volume
    b) Takes place at constant temperature
    c) Takes place at constant entropy
    d) Takes place at constant pressure

65. The change in evaporator temperature in a refrigeration cycle, as compared to change in condenser temperature, influences the value of C.O.P.
    a) More
    b) Less
    c) Equally
    d) Unpredictable

66. Which of the following cycles uses air as the refrigerant?
    a) Ericson
    b) Stirling
    c) Carnot
    d) Bell Coleman

67. Freon group of refrigerants are
    a) Inflammable
    b) Toxic
    c) Non-inflammable and toxic
    d) Nontoxic and non-inflammable

68. The boiling point of ammonia is
    a) -10.5°C
    b) -30°C
    c) -33.3°C
    d) -77.7°C

69. For obtaining high COP, the pressure range of compressor should be
    a) High
    b) Low
    c) Optimum
    d) Any value

70. The freezing point of sulphur dioxide is
    a) -56.6°C
    b) -75.2°C
    c) -77.7°C
    d) -135.8°C

71. In actual air-conditioning applications for R-12 and R-22, and operating at a condenser temperature of 40° C and an evaporator temperature of 5° C, the heat rejection factor is about
    a) 1
    b) 1.25
    c) 2.15
    d) 5.12

72. The vapour compression refrigerator employs the following cycle
    a) Rankine
    b) Carnot
    c) Reversed Rankine
    d) Reversed Carnot

73. The C.O.P. of a refrigerator working on a reversed Carnot cycle is (where T_1 = Lowest absolute temperature, and T_2 = Highest absolute temperature)
    a) $T_1 / (T_2 - T_1)$
    b) $(T_2 - T_1)/T_1$
    c) $(T_1 - T_2)/T_1$
    d) $T_2/ (T_2 - T_1)$

74. A bootstrap air cooling system has
    a) One heat exchanger
    b) Two heat exchangers
    c) Three heat exchangers
    d) Four heat exchangers

75. The minimum temperature to which water can be cooled in a cooling tower is
    a) Dew point temperature of air
    b) Wet bulb temperature of air
    c) Dry bulb temperature of air
    d) Ambient air temperature

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Space for rough work

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