



Tertiary and Vocational Education Commission
Refrigeration and Air Conditioning Technology- Part II
NCT Equivalence Examination



1.0

- i. What are the four general sources of heat to calculate the heat load of the commercial refrigerator space? (04 Marks)
- ii. Determine the heat flow rate in watts through a wall 3 meter by 6 meter if the U factor for the wall is $0.37 \text{ W/m}^2\text{K}$ and the temperature on one side of the wall is $4 \text{ }^\circ\text{C}$ while the temperature of the other side is $35 \text{ }^\circ\text{C}$. (08 Marks)
- iii. While undertaking a survey of the design of an air conditioning system for a building, what are the factors to be considered (08 Marks)

2.0

- i. Briefly explain, what is Hazards and Risk? (02 Marks)
- ii. What are the three steps for hazard management? (06 Marks)
- iii. Give ten (08) examples of common safety faults found in refrigeration and air conditioning workshop. (08 Marks)
- iv. List ten (08) major item provided in this MSDS information sheet. (04 Marks)

3.0

- i. Sketch the flow diagram of refrigeration cycle illustrating the use with a liquid-suction heat exchanger in a small cold room. (04 Marks)
- ii. Sketch a typical refrigeration cycle on a pressure enthalpy (p-h) diagram for the above refrigeration plant. (06 Marks)
- iii. What is the most suitable metering device for variable heat load used with a direct expansion evaporator coil (DX evaporator coil)? (02 Marks)
- iv. Briefly explain the above metering device with the help of a diagram. (08 Marks)

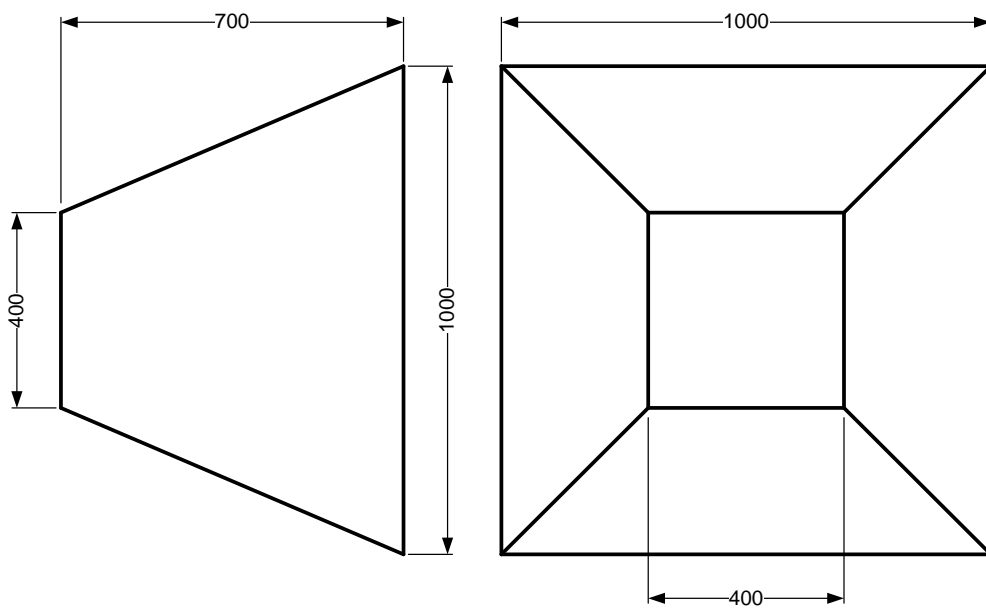
4.0

- i. Room air at 23°C dry bulb and 18°C wet bulb is mixed in equal proportions by volume with fresh outside air at 29°C dry bulb and 60% saturation. This mixed air stream is then cooled until its wet bulb temperature is reduced to 15°C and 80%RH. Determine the following.
- ii. Final dry bulb temperature
- iii. Specific enthalpy change that has taken place during cooling
- iv. Total amount of condensate that would have been collected per kg of dry air

Plot the processes on the psychrometric chart and attach it to your answer sheet. (20 Marks)

5.0

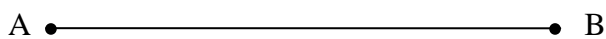
- i. Fig 03 shows, two views of a transition piece. Construct to scale 1:10 the surface development of the piece C (12 Marks)



All dimensions are in mm

Fig 03

- ii. Construct a regular Hexagon on a given line AB. (50 mm) (08 Marks)



6.0

- i. Draw a typical diagram for refrigeration system having here evaporators, different temperature, and a single condensing unit. The evaporator temperatures are -18°C , 2°C , 7°C (05 Marks)
- ii. Show location of manual shut off valves that permit isolation of the individual evaporator for maintenance. (on above diagram) (03 Marks)
- iii. Briefly explain the “Direct Stage” and “Cascade” System used for low temperature application. (04 Marks)
- iv. What important things are considered during the service of refrigeration equipment? (08 Marks)

7.0

- i. What is the purpose of an equalizing grids installing in the duct system? (03 Marks)
- ii. Briefly explain how to adjust the volume rate of flow to the desired quantity in an air distribution system. (05 Marks)
- iii. State the sound and vibration generating sources in air handling systems and discuss how to attenuate the sound and vibration buildings (04 Marks)
- iv. Discusses the importance of sound attenuating in air handling systems (04 Marks)
- v. Explain in brief, the impotence of splitter dampers in a distribution network (04 Marks)

8.0

- i. With the aid of simple sketches, discuss any two the following type of air conditioning systems (09 Marks)
 - a) All-air system
 - b) All-water system
 - c) Air-water system
- ii. What are the single zone systems and multi zone system? (04 Marks)
- iii. Briefly explain the difference between the unitary air conditioning systems and central air conditioning systems (04 Marks)

- iv. State the main components of an air conditioning plant and briefly explain any one component (03 Marks)

9.0

- i. Define the following terms,
- a) Data (02 Marks)
 - b) Information (02 Marks)
- ii. What is information management? (04 Marks)
- iii. Explain the importance of Planning to an organization. (06 Marks)
- iv. What is the SWOT analysis? (06 Marks)

10.0

- i. A skilled technician has been promoted as an Assistant Manager. What are the new skills required by this assistant manager (other than the technical competencies). (04 Marks)
- ii. How organizations assess competencies? (05 Marks)
- iii. Explain code of practices and code of ethics related to your profession. (04 Marks)
- iv. What are the factors to be considered while scheduling your workshop operations for next week? (04 Marks)