higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# NATIONAL CERTIFICATE (VOCATIONAL)

## REFRIGERATION PRACTICE
### NQF LEVEL 3

(6030053)

**9 March 2018 (X-Paper)**
**09:00–12:00**

**This question paper consists of 5 pages.**

Copyright reserved

**TIME: 3 HOURS**
**MARKS: 100**

---

**INSTRUCTIONS AND INFORMATION**

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Write neatly and legibly.

---

Copyright reserved 

## QUESTION 1

1.1 Define the following terms:

1.1.1 Temperature

1.1.2 Density

(2 × 2) (4)

1.2 What form of heat energy is applied when an amount of heat is transferred to a mass or substance which results in a charge of phase? (1)

1.3 Calculate the amount of heat required to produce 20 kg of water vapour in KJ from water at 35 °C (assuming the boiling point of water to be 100 °C). (5)

1.4 Calculate the density if 4 kg of hydrogen occupying 14,2 $m^3$. (2)

1.5 Explain the refrigeration machine. (3)

1.6 What amount of work is done in kW, if force applied to a mass is 2 730 N and it moves that mass over a distance of 8 m? (2)

1.7 If the work done in QUESTION 1.6 is in 6 minutes what is the amount of power required? (2)

1.8 Give the specific names of the following:

1.8.1 An instrument used to measure the atmospheric pressure

1.8.2 A closed space where there is no air coming in or out

(2 × 1) (2)

1.9 Define the term *pressure.* (2)

1.10 Calculate the mass flow of 25 $m^3$/s of air at a specific volume of 0,72 $m^3$kg (2)

**[25]**

## QUESTION 2

2.1 What is the difference between the terms *trouble shooting* and *servicing* of a plant? (4)

2.2 Explain what happens in a plant when the evaporator is blocked by dirt. (3)

2.3 Name the three-step procedure in fault finding. (3)

**[10]**

Copyright reserved 

## QUESTION 3

3.1 In accordance with their dominant characteristics, refrigerants are categorised into groups.

Name the groups and their dominant characteristics. (8)

3.2 What is the objective of SANS 10147 standard? (6)

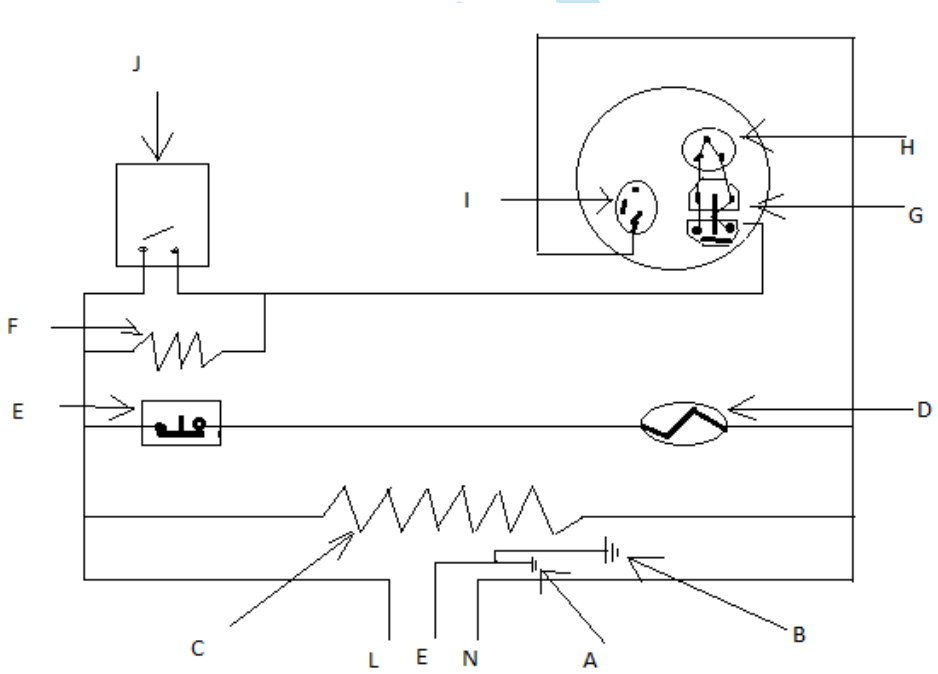
3.3 In which group does ammonia refrigerant belong? (1)

**[15]**

## QUESTION 4

4.1 Explain the operating principle of a circuit breaker. (2)

4.2 The FIGURE below shows the parts of a combination refrigerator/freezer diagram. Identify the parts and components labelled A–I. Write only the answer next to the letters (A–I) in the ANSWER BOOK.




(9)

4.3 The thermostat in FIGURE 1 above is normally a double-pole switch.

Explain in your own words, the operation of the thermostat when the circuit is energised. (3)

4.4 Is the component labelled F a resistive or an inductive load? (1)

4.5 Motivate the answer in QUESTION 4.4. (2)

4.6 What is the purpose of component G in the FIGURE above? (2)

4.7 Explain the operation of the low pressure high pressure safety switch. (6)
**[25]**

## QUESTION 5

5.1 Name FIVE basic types of compressors used in the refrigeration and air conditioning industry. (5 × 2) (10)

5.2 After dismantling the parts you discover that the crankshaft bearings are worn.

What do you think could have caused this? (1)

5.3 Why should the plant room be ventilated? (1)

5.4 Name ONE purpose of a technical drawing. (1)

5.5 What does it mean if the scale of a drawing is 1 : 100 in mm? (1)

5.6 What is defrosting of a refrigeration system? (2)
**[16]**

## QUESTION 6

6.1 What is the purpose of automatic dosing plant in water treatment? (3)

6.2 What would you call the process when metals are destroyed by chemicals or electrochemical means? (2)

6.3 Give ONE factor that accelerates the process in QUESTION 6.2 above. (1)

6.4 Explain an open circuit in a water cooling system. (3)
**[9]**

**TOTAL: 100**

Copyright reserved