higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1550**(E)**(A10)T

NATIONAL CERTIFICATE

REFRIGERATION TRADE THEORY N2

(11041572)

10 April 2019 (X-Paper)
09:00–12:00

This question paper consists of 7 pages and 1 formula sheet.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
REFRIGERATION TRADE THEORY N2
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

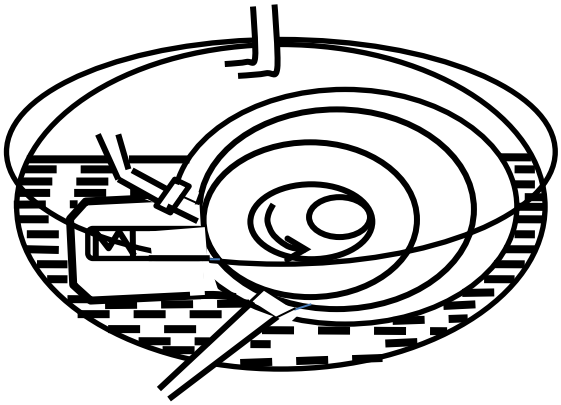
1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Write neatly and legibly.

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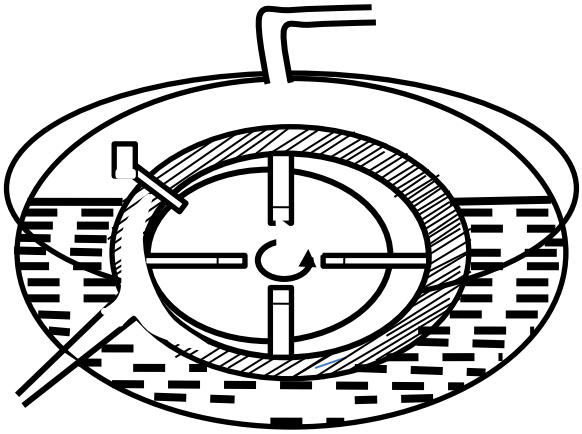
QUESTION 1

1.1 Name the types of compressors shown below and state ONE advantage of each.

1.1.1



1.1.2



(2 × 3) (6)

1.2 Explain the purpose of each of the following components of a reciprocating compressor:

1.2.1 Cylinder head

1.2.2 Shaft seal

1.2.3 Oil sight glass

(3 × 2) (6)

1.3 Inefficient pumping of a compressor may be due to failure.

State THREE situations which could result in inefficient compressor pumping.

(3 × 2) (6)

1.4 What is the purpose of gaskets in compressors? (2)

[20]

QUESTION 2

2.1 Explain the purpose of an evaporator pressure regulator and state where it is installed in the system. (3)

2.2 What is the purpose of a condenser? (2)

2.3 FIGURE 1 shows a flooded evaporator used in refrigeration systems.

Identify the numbered parts by writing the answers next to the question number (2.3.1–2.3.8) in the ANSWER BOOK.

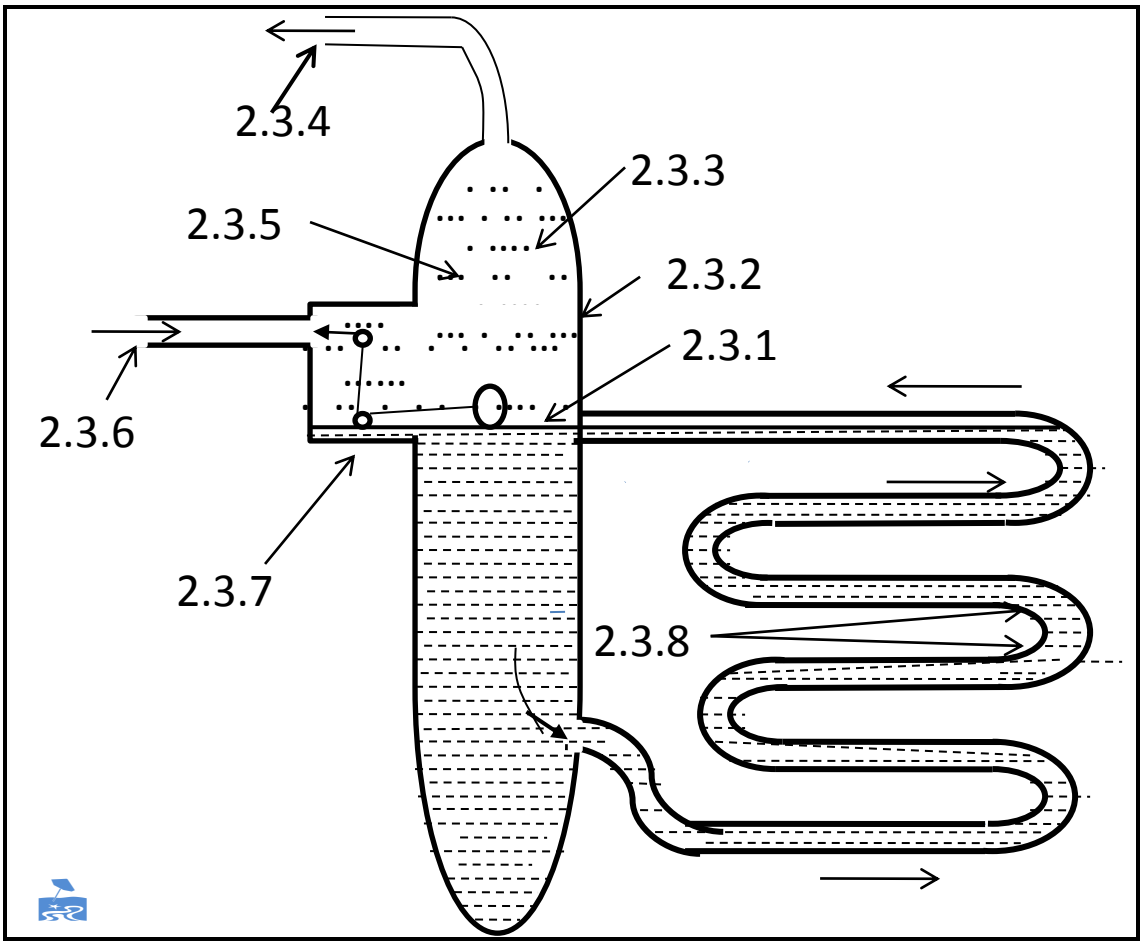


FIGURE 1 (8)

2.4 Briefly describe the operation of the flooded evaporator in QUESTION 2.3 used to cool air with the refrigerant inside the tubes. (7)

[20]

QUESTION 3

3.1 State THREE requirements that must be kept in mind when sizing the condenser drain line. (3 × 2) (6)

3.2 Explain the operation of the constant-pressure expansion valve. (8)

3.3 State ONE disadvantage of the valve in QUESTION 3.2. (2)

3.4 Describe the working principle of a thermostat. (4)

[20]

QUESTION 4

4.1 State the purpose of each item below in a refrigeration system.

4.1.1 Vacuum pump

4.1.2 Manifold gauges

4.1.3 Electronic leak detector

4.1.4 Pipe cutter

(4 × 1) (4)

4.2 Explain the airflow through each of the following:

4.2.1 Axial fan

4.2.2 Centrifugal fan

(2 × 2) (4)

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4.3 FIGURE 2 shows a cross section of a centrifugal fan.

Identify the components by writing the answer next to the question number (4.3.1–4.3.5) in the ANSWER BOOK.

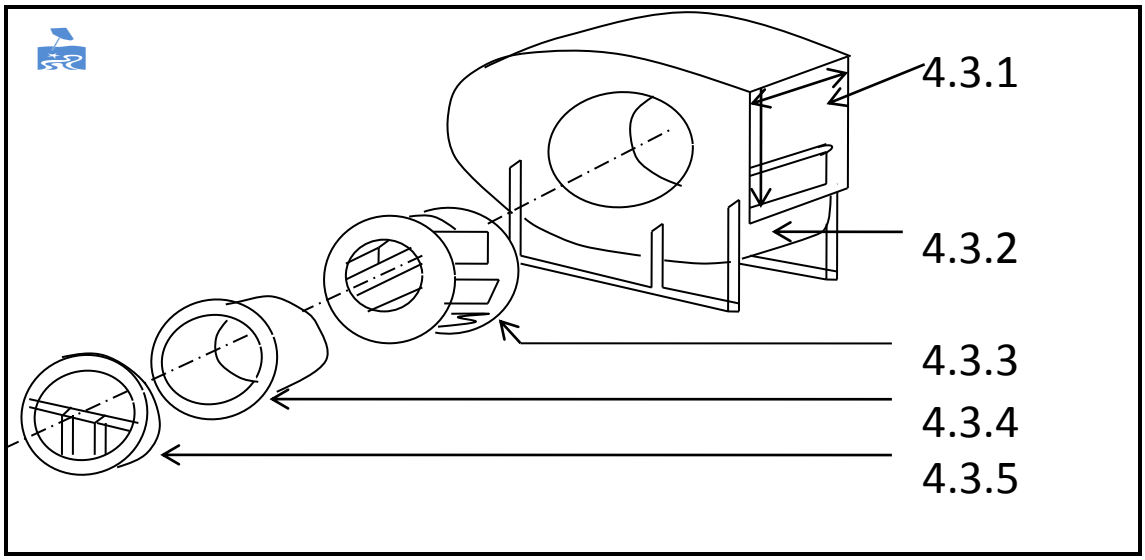


FIGURE 2

(5 × 1) (5)

4.4 Indicate where each of the following refrigerants are used:

4.4.1 R600a

4.4.2 R134a

4.4.3 R404 or 407

(3 × 1) (3)

4.5 Explain what moisture does to a refrigeration system. (2)

4.6 State TWO methods of pressure testing. (2)

[20]

QUESTION 5

5.1 Define each of the following control terms:

5.1.1 Hunting

5.1.2 Closed-loop control system

5.1.3 Dead zone

(3 × 2) (6)

5.2 What corrective action should be taken when a leak is found on a brazed joint? (4)

5.3 Briefly explain each of the following terms regarding causes of food deterioration and spoilage:

5.3.1 Dehydration

5.3.2 Canning

(2 × 2) (4)

5.4 The entire plant on a site fails to start.

5.4.1 Give THREE possible causes of the fault. (3)

5.4.2 State the corrective action for each of the problems in QUESTION 5.4.1. (3)

[20]

TOTAL: 100

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REFRIGERATION TRADE THEORY N2

FORMULA SHEET

1. OHM'S LAW/OHM SE WET

$I=\frac{V}{R}$ $V=R\times I$

$R_T = R_1+ R_2+ R_3$

$\frac{1}{R_T}=\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}$

2. POWER /DRYWING

$P = V \times 1$

$P = I^2R$

$P = \frac{V^2}{R}$

3. HEAT/HITTE

$Q = m \times c \times \Delta t$ $Q_T = Q_1 + Q_2$

$℃ = (℉ - 32) \times \frac{5}{9}$

$K= 273+ ℃$

4. AREAS AND VOLUMES/OPPERVLAKKE EN VOLUMES

$A = \frac{\pi}{4}D^2$ $V = A \times L$

$A = L \times B$

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