higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

REFRIGERATION TRADE THEORY N2

28 November 2022

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 It's a compressor where the crankshaft sticks out through the compressor housing so that an external motor can be coupled to the shaft. (2)

1.2
1.2.1 Compressor
1.2.2 Condenser
1.2.3 Liquid receiver
1.2.4 Filter dryer
1.2.5 Sight glass
(5 × 1) (5)

1.3
- Condenser (1.2.2) – rejects the heat from the refrigeration system.
- Filter dryer (1.2.4) – is used to trap and remove all dirt and moisture in a refrigeration system.
- Sight glass (1.2.5) – is used to observe the condition and level of the refrigerant in a refrigeration system. (3 × 2) (6)

1.4 To prevent costly damage to the compressor due abnormal operating conditions. (2)

1.5
- Electrical interlocks
- Oil-pressure safety switch
- Low-pressure switch
- Time-delay relay
- Motor-temperature sensor
- Overload and single-phase switch
- Head-temperature sensor (Any 5 × 1) (5)

[20]

QUESTION 2

2.1
2.1.1 D
2.1.2 C
2.1.3 A
2.1.4 E
2.1.5 B
(5 × 1) (5)

2.2 2.2.1 To reduce or eliminate vibrations of the pipes, thus reducing the risk of broken pipes.

2.2.2 To separate the oil contained in the discharge refrigerant and to return the separated oil back to the compressor crankshaft.
(2 × 2) (4)

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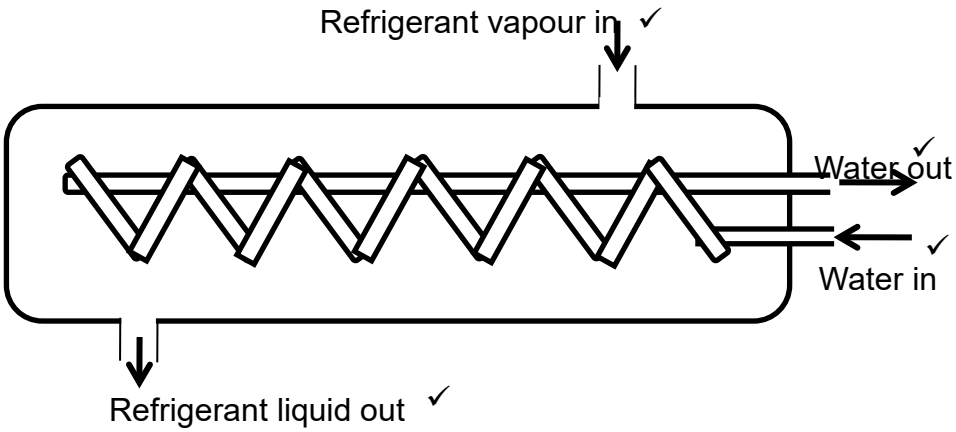
2.3 2.3.1
- Expansion valve inlet – liquid refrigerant
- Expansion valve outlet – mixture of liquid and vapour

2.3.2
- Evaporator inlet – liquid refrigerant
- Evaporator outlet – vapour refrigerant

(2 × 2) (4)

2.4
- Conduction
- Convection
- Radiation (3)

2.5



(4)
[20]

QUESTION 3

3.1 Constant pressure expansion valve means a valve that maintains a constant pressure in the evaporator. (2)

3.2 Automatic expansion valve (1)

3.3
- The constant pressure expansion valve maintains a constant pressure in the evaporator.
- It is designed and constructed to maintain a constant evaporating pressure.
- The flow of the refrigerant into the evaporator is based on the pressure of the refrigerant in the evaporator.
- As the pressure increases, the valve closes and allows fewer refrigerants to flow through it. (Any 3 × 2) (6)

3.4 3.4.1 High-pressure gauge
3.4.2 High-pressure valve stem
3.4.3 Service hose
3.4.4 High-pressure side hose
3.4.5 Low-pressure side hose
3.4.6 Low-pressure valve stem
3.4.7 Low-pressure gauge

(7 × 1) (7)

3.5
- Have a low pour point.✓
- Have a good emulsion (sludge) resistance (Low wax content)✓
- Have a low carbon reduction value (Good thermal stability).✓
- Be free of impurities.✓
- Mix less or does not mix with the refrigerant (Good chemical stability).✓
- Have good lubricating qualities.✓
- Be free of moisture.✓
- Low viscosity: Maintain good oiling properties at high temperature and also good fluidity at low temperature to provide good lubricating film at all times.✓

(ANY FOUR) (4)

[20]

QUESTION 4

4.1
4.1.1 Outlet
4.1.2 Scroll
4.1.3 Impeller
4.1.4 Inlet
4.1.5 Bearing support

(5 × 1) (5)

4.2
4.2.1 True
4.2.2 False
4.2.3 True
4.2.4 True
4.2.5 True

(5 × 1) (5)

4.3 It is a device used to produce a continuous flow of air. (2)

4.4
- The axial-flow fans
- The mixed-flow fans
- The cross-flow fans
- The propeller fans
- The centrifugal fans

(Any 4 × 1) (4)

4.5
- When it becomes homogenised due to water in the oil
- When it changes colour or is obviously dirty
- When the pump has been standing for a long time or has absorbed moisture

(Any 2 × 2) (4)

[20]

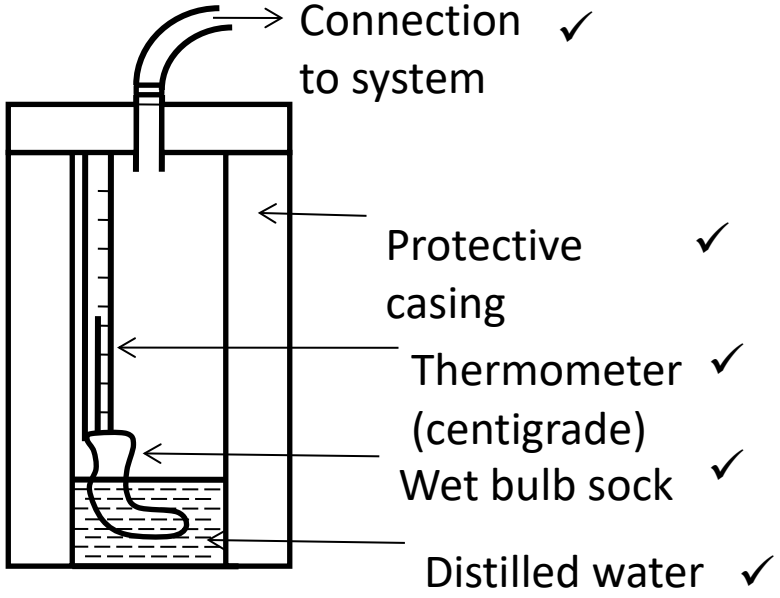
QUESTION 5

5.1
- R600a
- R502
- R22
- R134a
- R404a
- R410a

(Any 4 × 1) (4)

5.2
- Install service manifold.
- Attach refrigerant cylinder to centre connection hose, and open valve on low side of manifold.
- Place cylinder in upright position.
- Crack suction service valve two turns off back seat.
- Open valve on refrigerant cylinder and weigh in desired charge.
- When correct charge has been added, close low side of the manifold valve on refrigerant cylinder. (6)

5.3



(5)

5.4 It is recommended to be used for field work. (1)

5.5 5.5.1
- Bench test the motor- replace if not running
- Check electrical supply-replace faulty wires
- Check electronic control board-replace if not functioning

5.5.2 Check for leaks and blockages and correctly charge plant.

5.5.3
- Check all valves
- Check thermostatic valve condition
- Clean system
- Charge correctly

5.5.4 Replace filter drier as it is clogged.

(4 × 1) (4)
[20]

TOTAL: 100

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