higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

REFRIGERATION TRADE THEORY N2

8 AUGUST 2019

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 1.1.1 A fixed amount of gas is positively contained during its passage through the machine.

1.1.2 The gas is continually and steadily flowing through the machine, undergoing change of pressure by means of dynamic effects.
(2 × 2) (4)

1.2 1.2.1 Sight glass
1.2.2 Filter dryer
1.2.3 LP/HP switch
1.2.4 Compressor
(4 × 1) (4)

1.3 It is a pressure actuating cycling control where a set of electrical contacts are opened/closed by pressure. It controls the low pressure and high pressure. (3)

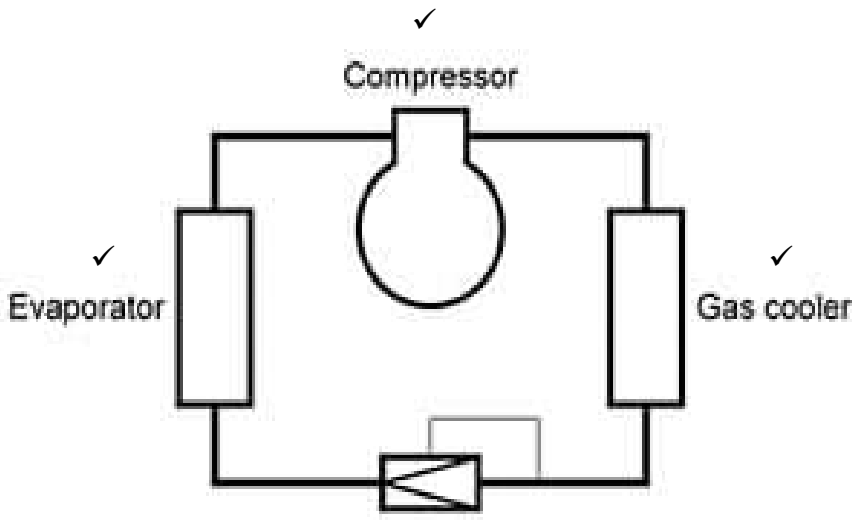
1.4
- Splash feed – with each rotation the crank dips into the oil and splashes it against the compressor walls and bushings.
- Forced feed – oil is fed to the parts under pressure with the use of an oil pump. (2 × 2) (4)

1.5
- Free-floating reed or disc valve
- Clamped reed valve
- Ring valve (3)

1.6 A shaft seal leak has a tendency to be intermittent. (2)
[20]

QUESTION 2

2.1



(4)

2.2
- The compressor removes the refrigerant from the evaporator at low pressure and compresses the refrigerant to a high temperature vapour under pressure.
- The condenser condenses the refrigerant to a liquid at constant pressure when heat is rejected.
- The refrigerant enters the evaporator at a low pressure in liquid form through the expansion valve.
- In the evaporator the refrigerant absorbs the heat by evaporation and enters the compressor at a low pressure as a vapour. (4)

2.3
- Provide practical line sizes without excessive drops.
- Ensure proper feed to evaporators.
- Protect compressors.
- There should be system efficiency maintainability and operating simplicity.
- Welded fabrication should be accomplished with good engineering.

(Any 4 × 1) (4)

2.4 2.4.1 Horizontal coil – vertical flow condenser
2.4.2 Vertical coil – vertical flow condenser

(2 × 1) (2)

2.5 It is very sensitive to wind direction. (2)

2.6
- The effect of velocity and distribution
- Counter-flow arrangement
- Parallel-flow arrangement
- Evaporator circuiting (4)

[20]

QUESTION 3

3.1
- It maintains a constant degree of suction superheat at the evaporator outlet.
- It regulates the rate of flow of the liquid refrigerant in proportion to the rate of evaporation in the evaporator. (2 × 2) (4)

3.2
- It stops liquid carry–over to the compressor.
- It ensures that the entire evaporator is used at full-loading and part-loading conditions.
- It responds quickly to wide and frequent load variations. (3 × 2) (6)

3.3 3.3.1 It reduces the noise level✓ – discharge line✓

3.3.2 It prevents refrigerant-return to the compressor✓ – suction line✓

3.3.3 It reduces any vibration that might travel from the compressor into the system✓ – suction line✓

(3 × 2) (6)

3.4 It limits the suction pressure in the compressor to a maximum value. (2)

3.5
- Floating
- ON – OFF
- Proportional (Any 2 × 1) (2)

[20]

QUESTION 4

4.1
4.1.1 D
4.1.2 C
4.1.3 A
4.1.4 B
(4 × 1) (4)

4.2
4.2.1 Grooved roller
4.2.2 Cutting wheel
4.2.3 Fast action
4.2.4 Tighten knob
4.2.5 Reamer plate
(5 × 1) (5)

4.3
4.3.1 Vacuum pump
4.3.2 Swaging tool
4.3.3 Multimeter
4.3.4 Manifold gauges
4.3.5 Barometer
4.3.6 Pinch-off tool
4.3.7 Electronic leak detector
(7 × 1) (7)

4.4
- Determine which refrigerant best meets the requirements of a job.
- Check if a certain refrigerant is required.
- Check if any refrigerant is preferred by the client. (Any 2 × 2) (4)

[20]

QUESTION 5

5.1
5.1.1 Refers to the rapid cooling of a product from harvesting or slaughtering to the storage temperature.

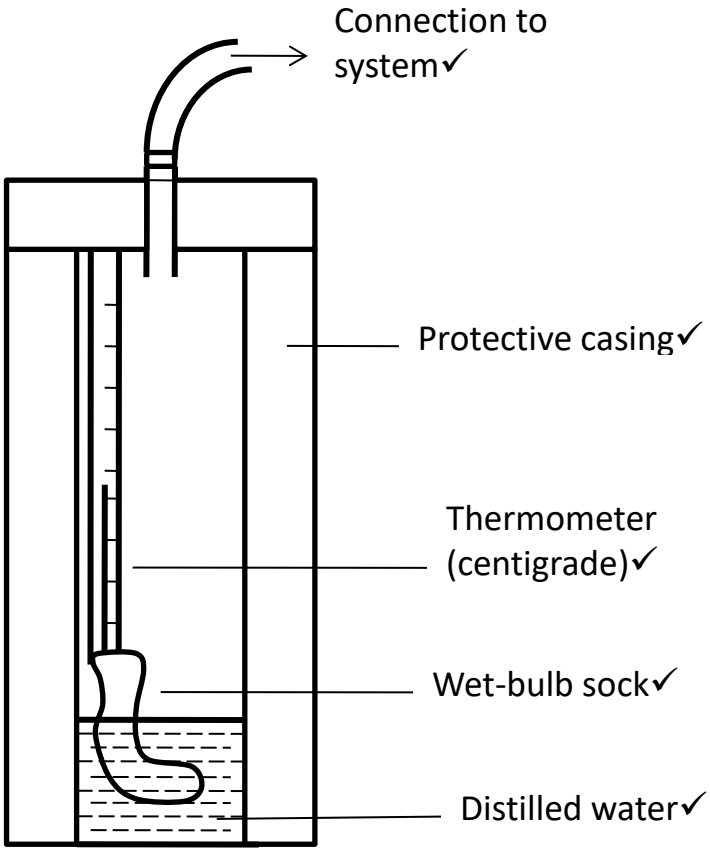
5.1.2 Vegetables and fruits must be cleaned and washed to remove dirt, insects, juices and any other foreign matters before chilling or freezing.
(2 × 2) (4)

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5.2
- When it has become homogenised due to water in the oil
- When it has changed colour or is obviously dirty
- When the pump has been standing for a long time absorbing moisture

(Any 2 × 2) (4)

5.3



(5)

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

5.5 5.5.1
- Short of refrigerant
- Thermostat setting too low
- Thermostat contacts stuck
- Excessive load
- Inefficient compressor

(Any 3 × 1) (3)

5.5.2
- Check for leaks and recharge the unit
- Readjust
- Repair or replace thermostat
- Check heat load
- Check compressor valve and repair or replace

(Any 3 × 1) (3)

[20]

TOTAL: 100

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