higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

REFRIGERATION TRADE THEORY N2

15 April 2020

This marking guideline consists of 7 pages.

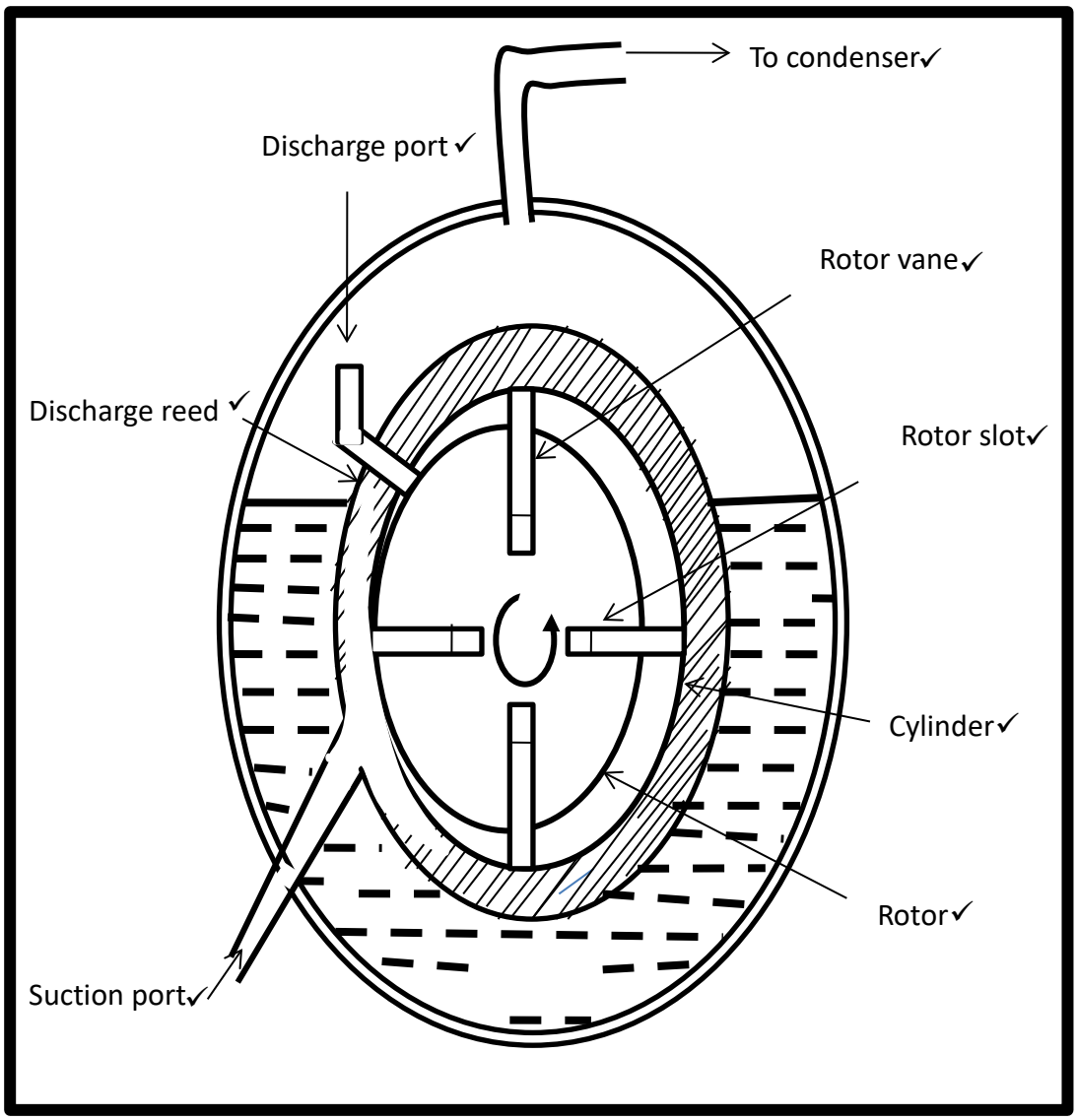
Copyright reserved

QUESTION 1

1.1
- Discharges high temperature and pressure vapour to the condenser
- Draws the vapour at low temperature and pressure from the evaporator
- Circulates the refrigerant through the system (Any 2 × 2) (4)

1.2
- Stopping and starting the compressor
- Varying the speed of the compressor
- Lifting the suction valves
- Bypassing hot gas
- Regulating the suction or discharge pressure (5)

1.3



(8)

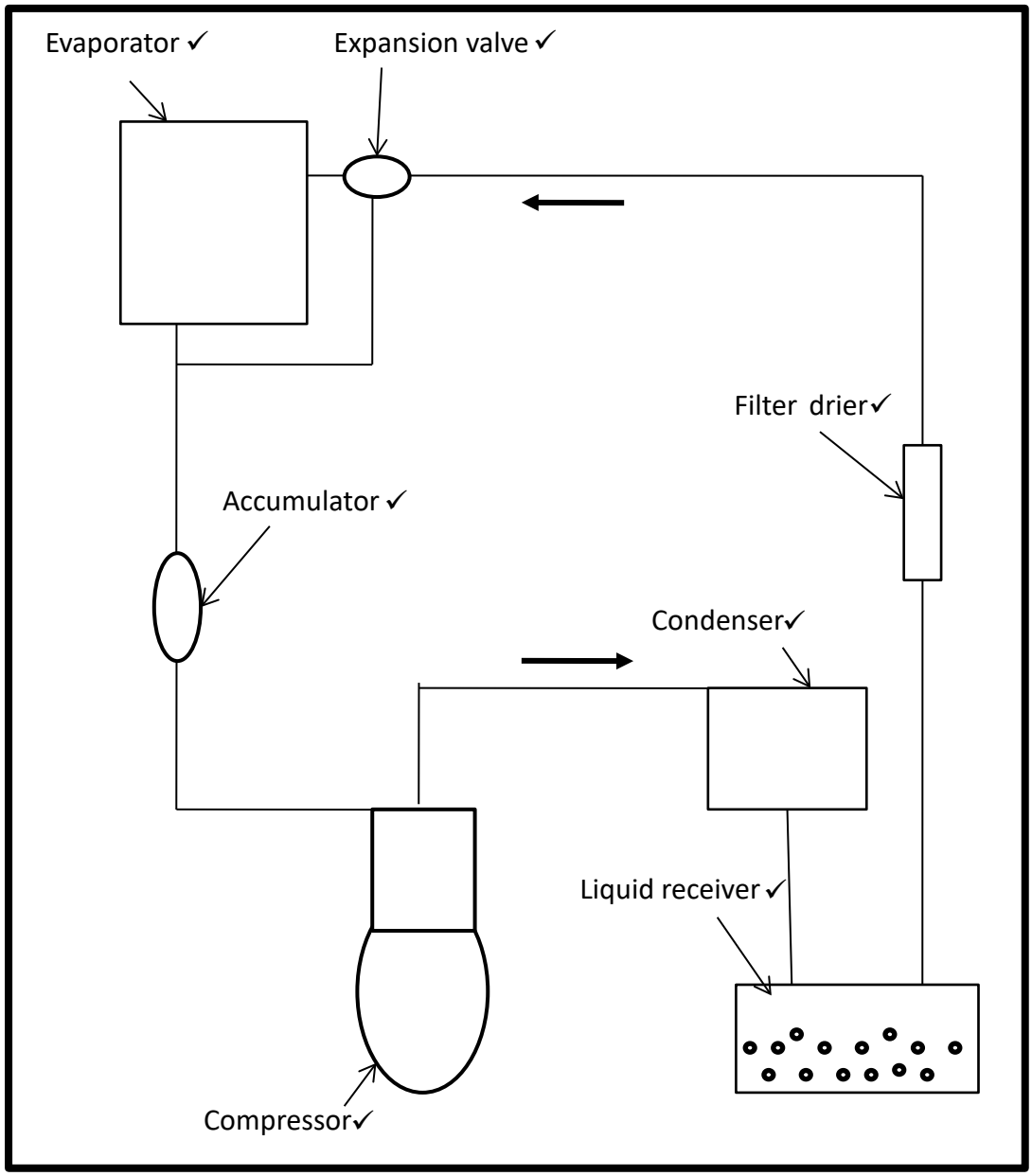
1.4 Eliminates back feeding of the discharge vapour into the cylinder (1)

1.5 Moisture contributes to the formation of sludge, acids, deposit of copper on bearings and can cause freeze-ups in expansion valves. (2)

[20]

QUESTION 2

2.1

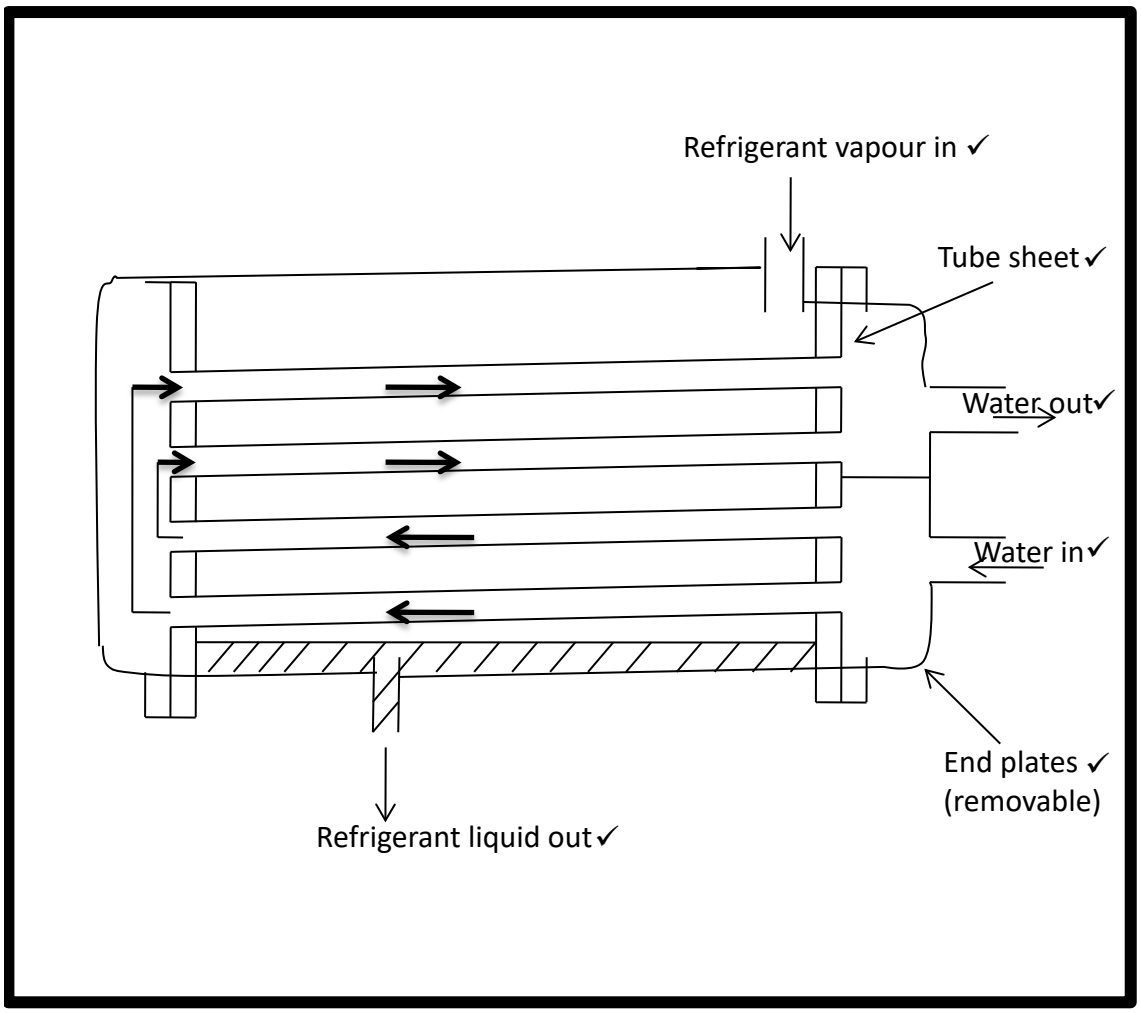


(7)

2.2
- Inlet: Low-pressure liquid
- Outlet: Low-pressure vapour (2)

2.3
- Nonexplosive
- Nonflammable
- Nonpoisonous
- Easy locatable leaks
- Low boiling point
- Stable gas
- Well-balanced latent heat of evaporation value per unit of weight
- Minimum pressure difference between the evaporation and condensing pressures (Any 5 × 1) (5)

2.4



(6)
[20]

QUESTION 3

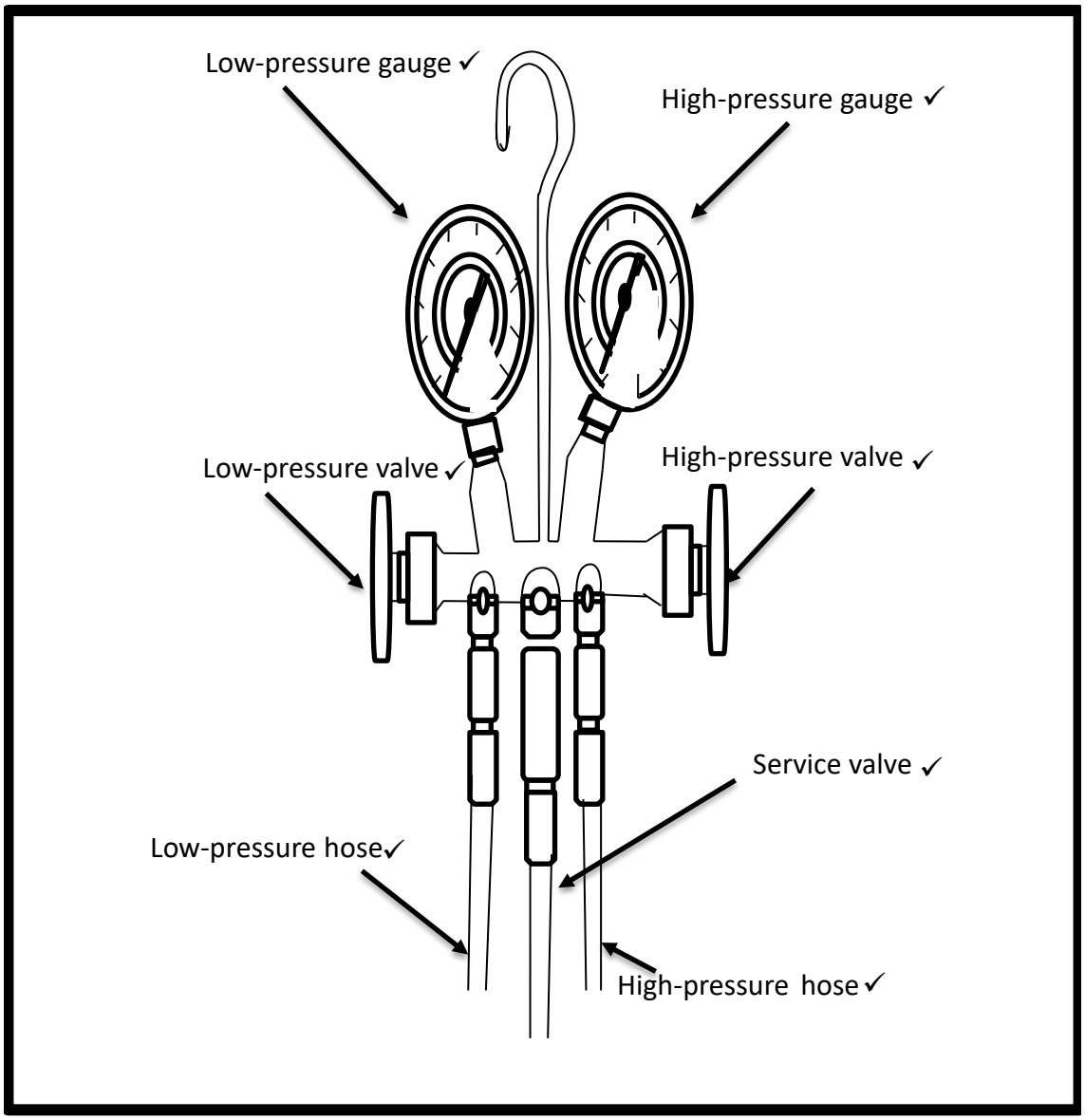
3.1 3.1.1 Reduces any vibration that might travel from the compressor into the lines (suction line)

3.1.2 Prevents the accumulation of liquid refrigerant in the compressor crankcase during shutdown (suction line)

3.1.3 Removes all dirt and trapped objects that can do harm in the system (liquid line)

(3 × 3) (9)

3.2



(7)

3.3 3.3.1 Used to cut piping of the refrigeration system to avoid kinks

3.3.2 Used to bend pipes of the system

(2 × 1) (2)

3.4 Inability to cope with suction or appreciable load changes (2)

[20]

QUESTION 4

4.1
- Use oil to obtain a better finish.
- Do not exert too much pressure at once but rather gradually increase the force.
- Take care not to damage the threads on the yoke.
- Keep the swaging tools clean and well-oiled when not in use.
- Do not hammer on it.
- Replace the swaging tools if damaged. (Any 4 × 1) (4)

4.2
- Do not expose the cylinder to a direct flame.
- Keep the cylinders in an upright position.
- Use eye-protection goggles.
- Do not allow refrigerant to escape in a confined room.
- Do not heat refrigerant to a temperature exceeding 52 °C. (5)

4.3 4.3.1 A plant hunts when it changes continuously from one extreme to the other (rapid cycle).

4.3.2
- A plant cycles when its capacity exceeds the requirements at an instant in time.
- A plant cycles when it switches on and off due to lower load conditions. (Any ONE) (2 × 2) (4)

4.4 It will result in broken valves and damage to bearings due to bad lubrication. (2)

4.5
- Mineral oil
- PAG oil
- Alkylbenzene
- Ester oil (Any 2 × 1) (2)

4.6 Centrifugal fan
- Less noise
- Efficient operation at high pressure (3)

[20]

QUESTION 5

5.1
- Provides practical line size without excessive drops
- Protects the compressor by preventing liquid refrigerant from entering it during operation and shut down
- Ensures proper feed to the evaporator (3)

5.2 A reciprocating compressor delivers the refrigerant vapour in pulses.✓ These pulses create noise.✓ To break up these pulses and reduce the noise level a muffler can be installed in the system.✓ (3)

5.3 In the discharge line (1)

5.4 5.4.1
- Low voltage to unit
- Starting rely open
- Starting winding open (Any TWO)

5.4.2
- Overcharge of refrigerant
- Coil dirty
- Thermostat faulty (Any TWO)

5.4.3
- Overload protection faulty
- Loose wiring (Any TWO)

(3 × 2) (6)

5.5
- The inlet filter on the liquid line may be blocked with dirt restricting the flow of refrigerant.
- The valve orifice size may be too small.
- There may be frozen moisture blocking the valve seat.
- The needle valve may be stuck shut in closed position.
- The valve may be out of adjustment.
- There may be wax deposits on the valve seat (oil not suitable for low-temperature work). (Any 5 × 1) (5)

5.6
- Adds or recovers refrigerant
- Checks operating pressures (2)

[20]

TOTAL: 100

Copyright reserved