higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLUMBING THEORY N2

24 November 2022

This marking guideline consists of 6 pages.

Copyright reserved

QUESTION 1: COLD-WATER SUPPLY

1.1
- Soft water is acidic and easily corrodes certain metal pipes
- Soap lathers well in soft water. (2)

1.2
- It conserves soap.
- It improves the quality of ware.
- It improves the taste and odour of water. (3)

1.3
- Collection from a source such as a river or a valley at the foot of a mountain range.
- Sedimentation by adding a coagulant to get rid of colloidal matter or suspended mud.
- Filtration to pass water through a series of filtering media to clean it.
- Storing the water for the consumers' consumption. (4)

1.4 The primary function of water towers is to pressurize water for distribution. Elevating the water high above the pipes that distribute it throughout the surrounding building or community ensures that hydrostatic pressure, driven by gravity, forces the water down and through the system. (1)

1.5
- Pillar fire hydrant
- Underground fire hydrant
- Indoor fire hydrant
- Hose reel fire extinguisher (4)

1.6
- They take up little space due to their small size.
- They reduce labour and material costs.
- They are easily accessible for repairs.
- They increase pressure at the draw-off point. (4)

1.7
- It automatically expels trapped air in the pipeline
- ensures the smooth flow of water in the pipeline and smooth functioning of the reticulation system. (2)

[20]

QUESTION 2: HOT-WATER SUPPLY

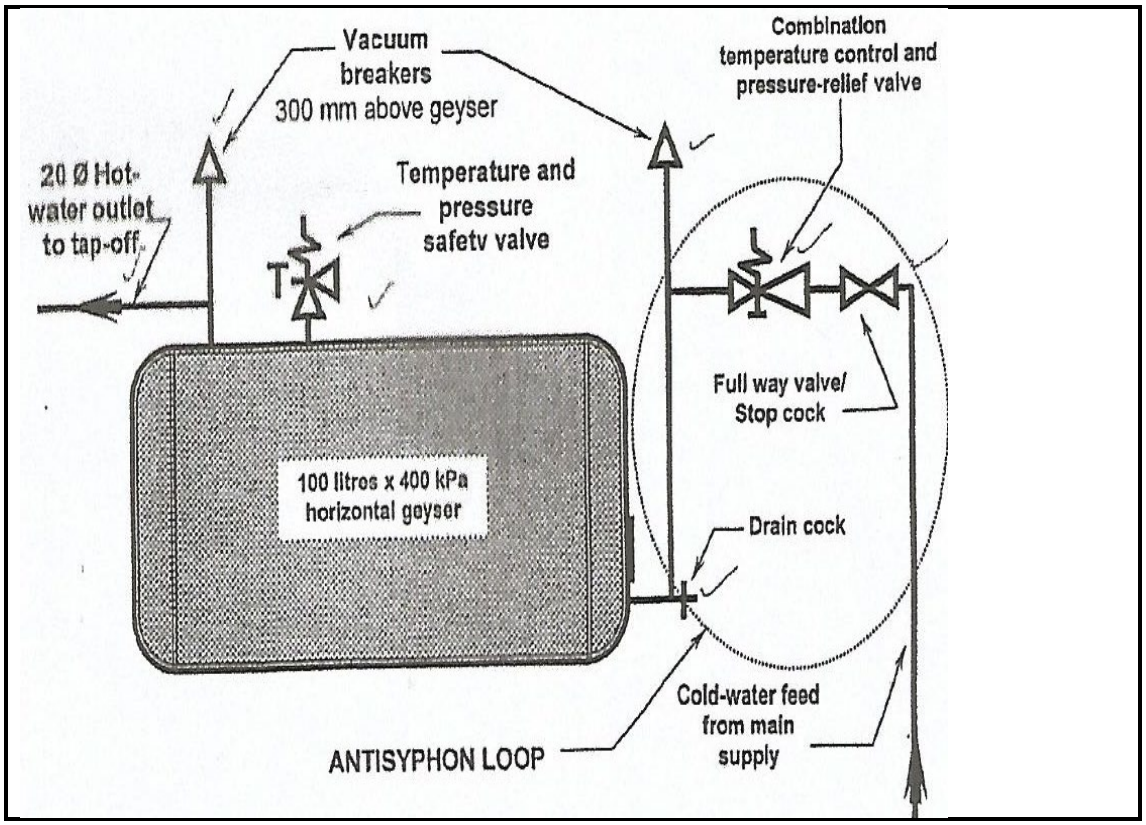
2.1 2.1.1 Black
2.1.2 Red

(2 × 1) (2)

2.2
- When different heat sources are being considered as alternative supply
- When the current geyser needs to be upgraded in terms of volume
- Where a constant supply of hot water is demanded (Any 2 × 1) (2)

2.3
- It is not very efficient in periods of no direct sunlight.
- It is costly to install.
- It adds weight to the roof structure. (3)

2.4



(7)

ALLOCATION OF MARKS	
Overall impression	1
Labelling	8÷2=4
Neatness	2
TOTAL MARKS	**7**

2.5
- It reduces the incoming mains pressure
- to a pre-set pressure rating
- and maintain and control this pressure
- when the system is not in use.

(4)

2.6
- It can lead to pollution if the domestic water is drawn into the water mains.
- It can lead to failure of the immersion heating element when the water level drops below the element level.

(2)
[20]

QUESTION 3: DRAINAGE

3.1
- The preliminary or open test
- The final test inspection

(2)

3.2
- Fewer connections to the underground drain are required.
- There are fewer vent pipes projecting through the roof.
- The pipework arrangement and installation are simplified therefore the building is not disfigured by unnecessary pipes.
- The labour and material costs of the one-pipe system are cheaper than for the two-pipe system.

(4)

3.3
- They should not cause electrolytic corrosion due to any association with dissimilar metals.
- No obstruction should form in these pipes.
- They should be installed in a way that no bend forms an acute angle.
- They should have access to internal cleaning.
- The vent pipes should not be less than100 mm in diameter.
- They should be installed in a way that the gradients are within the limits.
- They should be safely supported at intervals along their length without restraining thermal movement. (Any 5 × 1) (5)

3.4
- The outlet of any WC trap that discharges to such a stack is more than 1,5 m above the invert of the bend at the base of such a stack.
- The outlet of any sanitary fixture that discharges into such a stack is more than 2 m above the invert of the bend.
- The stub stack serves more than one group of sanitary fixtures. (3)

3.5
- A one-pipe system is a system of piping between sanitary fixtures and the underground drain
- in which both soil water and waste water are discharged down a common stack
- where any trap venting may be via a common vent stack. (3)

3.6
- In cases where the drainpipe may be subjected to heavy vehicle loading, reinforced precast or a cast in-situ concrete slab of a thickness of at least 100 mm
- and wide enough to prevent excessive superimposed loads from being transferred directly to the pipe, shall be placed over the drain. (2)

3.7 3.7.1 Three storeys (1)

3.7.2 Three (1)

3.7.3 (a) Lavatory basin

(b) Grease trap

(2 × 1) (2)

3.7.4
- The piping arrangements are complicated.
- There are more vent pipes and anti-syphon pipes projecting through the roof.
- The outlet of any WC trap that discharges to such a stack is more than 1.5 m above the invert of the bend at the base of such stack.

(Any 2 × 1) (2)

3.8 Fall over 13 m
= 13 × $\frac{1}{40}$✓
= 0,325 m✓

Invert depth at next change
= 0,66 + 0,325✓
= 0,985 m✓ (4)

3.9
- At a point within 1,5 m of the connection to the point of disposal
- Within every 25 m on a straight-run drain
- At the head of the drain
- At the head of any branch drain longer than 6 m
- Immediately before and after a drain runs under a building
- Change of direction that exceeds 45º if a long radius bend is not used
- On a stub stack in a closed drainage system (Any 6 × 1) (6)

[35]

QUESTION 4: SHEET-METAL WORK AND FLASHING

4.1
- Flashing is a strip of material that is placed between the roof and brickwork
- for the purpose of waterproofing. (2)

4.2
- Cover flashing
- Apron flashing
- Stepped flashing
- Raked flashing
- Soakers
- Eave flashing
- Vent pipe flashing (Any 6 × 1) (6)

4.3
- Aluminium
- Galvanised iron
- Steel
- Copper
- Lead (5)

4.4
- Between the brickwork of a chimney stack and the roof
- Around vent pipes
- At the bottom of dormer windows and the roof
- Around skylights and the roof
- Where parapet walls extend up next to the roof (Any 2 × 1) (2)

[15]

QUESTION 5: CALCULATIONS

5.1 Volume of water
= length × width × height
= 1,35 × 1,5 × 1,4✓
= 2,835 m³✓ (2)

5.2 Mass of water
= density × volume
= 1 000 × 2,84✓
= 2 840 kg✓

Total mass
= mass of water + mass of tank
= 2 835 + 120✓
= 2 955 kg✓ (4)

5.3 Area of material
= 2(short sides) + 2(long sides) + (base)
= 2(1,35 × 1,4) + 2(1,5 × 1,4) + (1,35 × 1,5)✓
= 2(1,89) + 2(2,1) + (2,03)✓
= 3,78 + 4,2 + 2,03✓
= 10,01 m²✓ (4)
[10]

TOTAL: 100

Copyright reserved