higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

PLUMBING THEORY N2

(11022052)

16 April 2021 (X-paper)
09:00–12:00

Calculators may be used.

This question paper consists of 6 pages and 3 diagram sheets.

215Q1A2116

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
PLUMBING 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. Sketches must be large, neat, fully labelled and in good proportion.
5. Answer QUESTION 3.6 on DIAGRAM SHEET 1 and QUESTION 4 on DIAGRAM SHEET 2.
6. Use only a black or blue pen. A pencil may be used for sketches.
7. Write neatly and legibly.

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QUESTION 1: COLD-WATER SUPPLY

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

1.1.1 … may be found in high-pressure water systems when a tap is turned off quickly.

A Water hammer
B Hard water
C Soft water
D A flush valve

1.1.2 It should hold at least a two-day supply of water and provide sufficient pressure throughout the reticulation system so that all the consumers receive an adequate supply:

A Supply tanks
B Supply towers
C Consumer reservoir
D Water reticulation

1.1.3 A cylindrical steel tank with a diameter of approximately 1,5 m to 2,7 m with a spherical top and bottom, uses a …

A thermostatic valve.
B air-reducing valve.
C fire hydrant.
D mechanical pressure filter.

1.1.4 A network of piping varying in depth from 2 metres to 1 metre under street level:

A Dry-pipe system
B Garden tap
C Water reticulation system
D Stopcock

1.1.5 Addition of chlorine to water to make the water free from harmful bacteria so that it can be used for human consumption:

A Sterilisation
B Hydration
C Filtration
D Sedimentation

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1.1.6 A process in water purification that removes bacteria and finely dividing clay and colloidal matter from liquid by passing it through the openings between the sand grains, through layers of sand.

A Sedimentation
B Filtration
C Ball valve
D Water hammer

1.1.7 … regulates the water level in flushing cisterns, storage tanks, pressure-reducing tanks and drinking troughs.

A A stopcock
B A drain plug
C A ball valve
D Coagulation

1.1.8 A system where water is always present in the pipes and filled up to the sprinkler head:

A Range pipe
B Water meter
C Cold feed
D Wet pipe

1.1.9 A/an … hydrant gets water directly from a water reticulation network in the street.

A underground
B pillar-type
C indoor
D street

1.1.10 … water is caused by the presence of calcium and magnesium sulphates in the water.

A Soft
B Permanent hard
C Acidic
D Aerobic

(10 × 1) (10)

1.2 Give a brief description of each of the following fire hydrants:

1.2.1 Wet barrel (2)

1.2.2 Dry barrel (2)

1.3 What is the cause of permanent hard water? (4)

1.4 Name TWO valves or pipe fittings that is used to prevent the backflow of water. (2)

[20]

QUESTION 2 : HOT-WATER SUPPLY

2.1 Make a neat, labelled, single-line diagram of a balanced pressure, hot-water heating supply system with a 100 litre vertical geyser. The pressure rating of the geyser is 100 KPa. In your diagram, indicate the following: All the required valves and the pipe installation to and from the geyser and make use of symbols as specified by the relevant SABS code in the ANSWER BOOK. (10)

2.2 Name TWO disadvantages if a fixed geyser is not at balanced pressure at the various draw-off points. (2)

2.3 What are the functions of a pressure-relief valve when it is installed with a pressure-control valve in a closed (unvented) hot-water installation? (3)

2.4 How would you best describe the difference between a:

2.4.1 Vacuum breaker (2)

2.4.2 Pressure vacuum breaker (2)

2.5 To identify a valve with a pressure of 200 kPa, which colour code would be used? (1)

[20]

QUESTION 3: DRAINAGE

3.1 Name THREE advantages and THREE disadvantages of a one-pipe system with an anti-syphon pipe. (6)

3.2 Give brief descriptions of the following drainage terms:

3.2.1 Inspection chamber (2)

3.2.2 Conservancy tank (vacuum tank) (3)

3.3 The invert level of a drain is 400 mm at the head of the drain.

Calculate the invert depth at the first change of direction if the length of the first section of pipe is 12 m and the fall is 1:35 (1 636 degrees). (5)

3.4 Name THREE advantages of a septic tank (3)

3.5 Why are French drains not covered with waterproofing material? (1)

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3.6 DIAGRAM SHEET 1 (attached) shows the plan detail of a house with an outbuilding.

Complete the underground drainage details to ensure an effective economical sewage disposal system to the septic tank and French drain. Make use of the one-pipe drain (combined and waste water) system.

Clearly indicate the following details:

3.6.1 At least ONE ventilation pipe

3.6.2 ONE gulley

3.6.3 Sufficient access to facilitate cleaning

3.6.4 ONE inspection eye

Write your EXAMINATION NUMBER in the space provided on DIAGRAM SHEET 1, detach it from the question paper and hand it in with the ANSWER BOOK. (15)
[35]

QUESTION 4: SHEET METAL WORK AND FLASHINGS

DIAGRAM SHEET 2 shows two views of a square-to-round transition piece. The position of the seam is indicated on the two views.

Draw, by means of the triangulation method, the full pattern of the transition piece. Do not show any allowances for seams.

Use scale 1:10.

Write your EXAMINATION NUMBER in the space provided on DIAGRAM SHEET 2, detach it from the question paper and hand it in with the ANSWER BOOK. **[15]**

QUESTION 5: CALCULATIONS

On DIAGRAM SHEET 3 a hot-water and cold-water layout is shown.

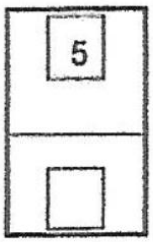
Determine all the pipe material, fittings and types of valves required to complete the layout. Use the extracted information and draw up a materials list and write the results neatly and clearly in the ANSWER BOOK. **[10]**

TOTAL: 100

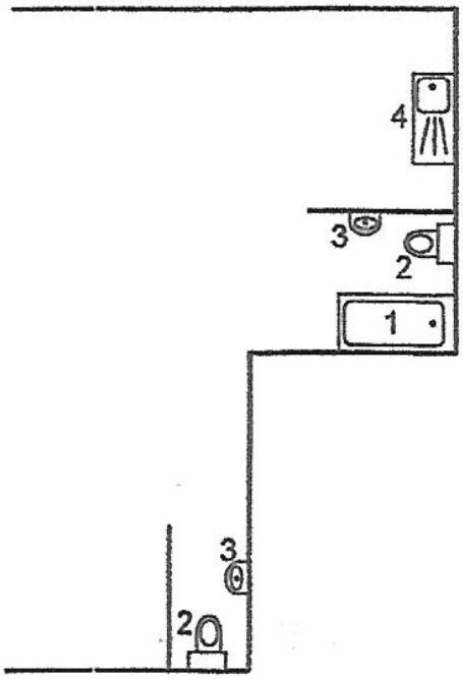
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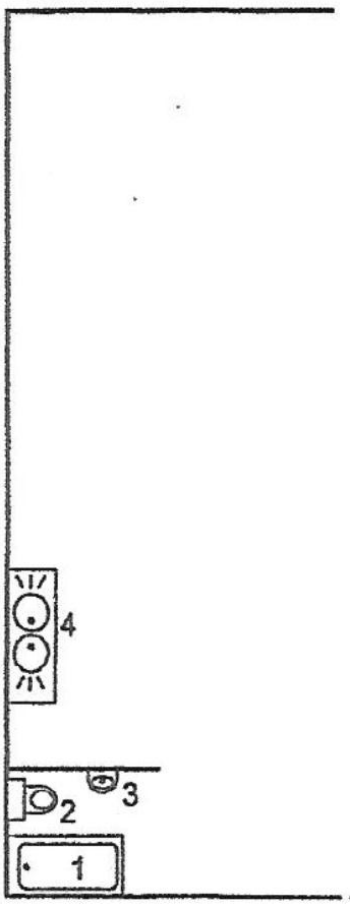
QUESTION 3.6 EXAMINATION NUMBER:

DIAGRAM SHEET 1



1.	Bath	
2.	Water Closet	
3.	Wash Hand Basin	
4.	Sink	
5.	Septic Tank	
6.	French Drain	



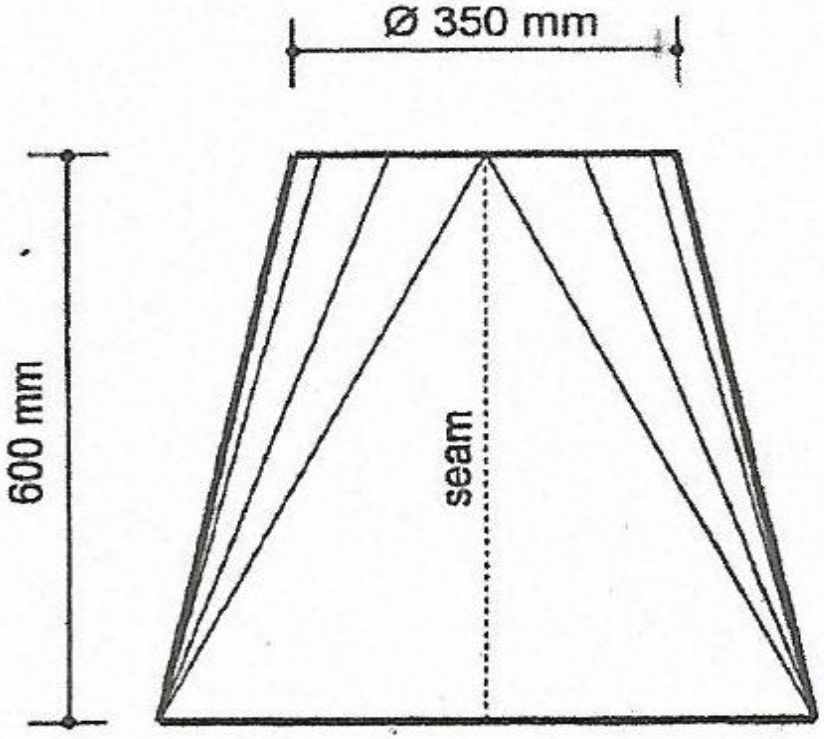


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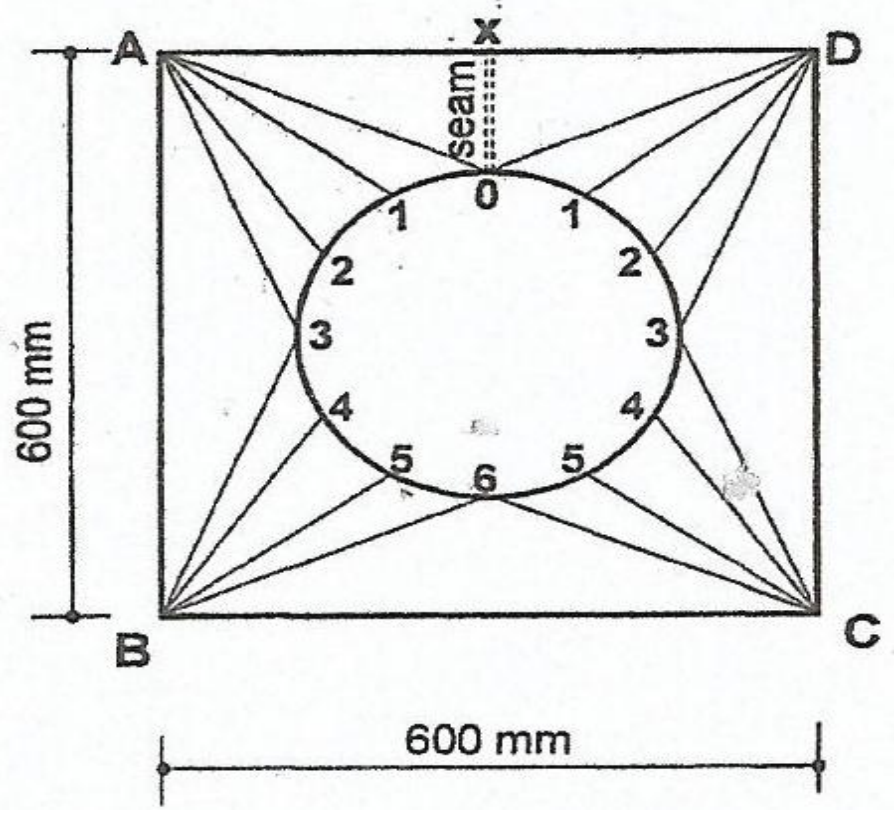
QUESTION 4 EXAMINATION NUMBER:

DIAGRAM SHEET 2

Side View

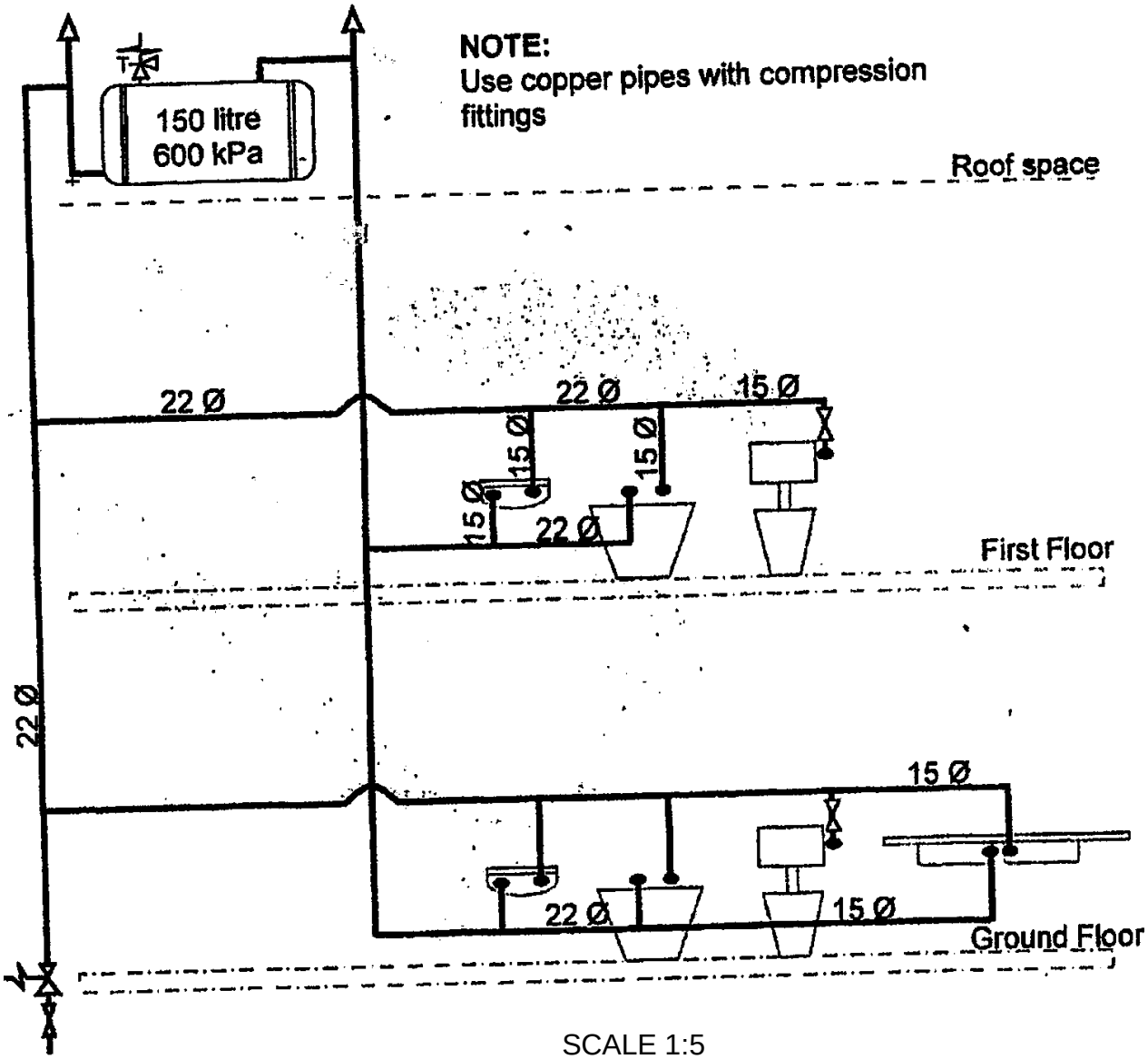


Top View



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DIAGRAM SHEET 3



SCALE 1:5

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