higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

PLUMBING THEORY N2

(11022052)

20 November 2020 (X-paper)
09:00–12:00

This question paper consists of 6 pages and 2 diagram sheets.

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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. Write neatly and legibly.

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QUESTION 1: COLD-WATER SUPPLY

1.1 Choose ONE term form the list below for each of the following descriptions and write it next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

pillar-type hydrant; ball valve; wet pipe; sterilisation; water hammer; permanent hard water; consumer reservoir; water reticulation system; pressure filter or mechanical; filtration.

1.1.1 Pressure surge or wave caused when a fluid in motion is forced to stop or change direction suddenly 

1.1.2 Caused by presence of sulphate of calcium and magnesium in water

1.1.3 Holding at least a two days' supply of water and providing sufficient pressure throughout reticulation system so that all consumers receive adequate supply

1.1.4 Cylindrical steel tank with spherical top and bottom and diameter of approximately 1,5 m to 2,7 m

1.1.5 Network of piping buried below street level at depth varying from 2 metres to 1 metre 

1.1.6 Addition of chlorine to water to keep it free from harmful bacteria and suitable for human consumption

1.1.7 Process in water purification that removes bacteria and dividing clay and colloidal matter by filtering it through layers of sand

1.1.8 Regulates water level in flushing cisterns, storage tanks, pressure-reducing tanks and drinking troughs

1.1.9 System in which water is always present in pipes and filled up to sprinkler head 

1.1.10 Gets water directly from water reticulation network in the street

(10 × 1) (10)

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1.2 Rearrange the given water purification stages into the correct sequence in your ANSWER BOOK listing them as stages 1- 8.

- Storage and control
- Sterilisation
- Filtration
- Sedimentation
- Water reticulation
- Screening at source
- Coagulation
- Service reservoir (8)

1.3 Which TWO methods are best suited for an aeration process? (2)
[20]

QUESTION 2: HOT-WATER SUPPLY

2.1 Complete the following sentences by writing only the missing word or words next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

2.1.1 The ... water geyser has a tray attached with water-filled glass tubes along the entire length on one side.

2.1.2 ... is the movement of heat in direct rays from the source without heating the intervening space.

2.1.3 A …. solar water heater simply circulates potable water in the solar HWC through the solar collector.

2.1.4 An ... is an amount of air occurring in the plumbing piping system.

2.1.5 A... reduces the incoming mains pressure to a prescribed pressure rating and controls this pressure when the system is not in use.
(5 × 1) (5)

2.2 List the functions of a pressure relief valve when it is installed with a pressure control valve in a closed (unvented) hot-water installation. (4)

2.3 Sketch a neat, single-line diagram of TWO electric geysers interconnected in a hot-water installation. (8)

2.4 List THREE reasons why back syphonage should be prevented where a vacuum breaker is fitted to the cold-water inlet of a geyser. (3)
[20]

QUESTION 3: DRAINAGE

3.1 Name SIX soil test requirements that must be completed for the ground excavation and preparation readiness, to insert a sceptic tank and accompanying French drain. (6)

3.2 Make a neat, single-line longitudinal sectional diagram of a typical septic tank suitable for a domestic dwelling and label all the required details, pipes, fittings and dimensions on the diagram. (9)

3.3 What are basic requrements of drainage installation? List THREE facts. (3)

3.4 Give TWO instances where it would be specified as a requirement to install a sewage lift pump. (2)

3.5 Use DIAGRAM SHEET 1 to design, an effective and economical sewage drainage system with the aid of a single line diagram. Using the standard SABS symbols and abbreviations, indicate all the sanitary fittings, as well as the following drainage detail:

- Access for cleaning and inspection
- Vent pipes and their sizes
- Gullies

NOTE: Write your EXAMINATION NUMBER in the space provided and place the completed DIAGRAM SHEET in the ANSWER BOOK. (15)

[35]

QUESTION 4: SHEET METAL WORK AND FLASHINGS

DIAGRAM SHEET 2 shows the front view of a branch pipe intersecting a mains at an angle of 45°.
Use the application of the parallel-line method and develop the pattern of the branch pipe and the hole in the main pipe. Do not show any allowances for seams.

- Completed frontview (1)
- Pattern of the hole (4)
- Curve of interpenetration (3)
- Completetd side view (3)
- Pattern of the branch pipe (4)

Use scale 1:10
.
NOTE: Write your EXAMINATION NUMBER in the space provided and place the completed DIAGRAM SHEET in the ANSWER BOOK.

[15]

QUESTION 5: CALCULATIONS

A tank with a rectangle base of 1200 mm × 1600 mm and a height of 1500 mm is used to store water.

Calculate the following:

5.1 Maximum volume of water in cubic metres (m^3) which the tank can store. (3)

5.2 Mass of the water including the tank when the tank is filled with water. The tank has a mass of 130 kg when it is empty. (3)

5.3 Area of material in square metres (m^2) required to manufacture the tank. Do not make any allowances for seams or wire edges.

NOTE: The tank is open at the top and the density of water is 1000 kilogram per cubic metre. (4)

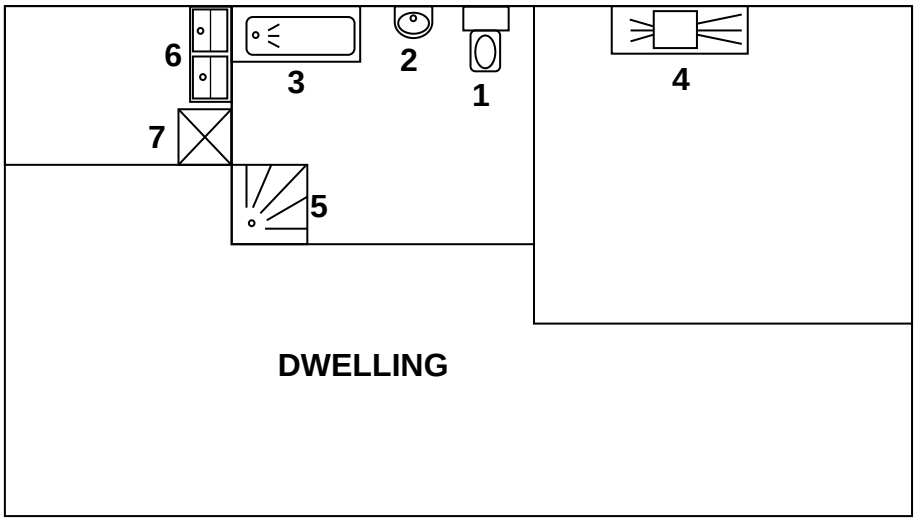
[10]

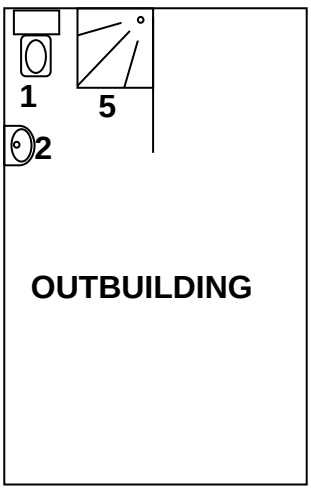
TOTAL: 100

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EXAMINATION NUMBER:

DIAGRAM SHEET 1





1.	Water Closet	
2.	Wash Hand Basin	
3.	Bath	
4.	Sink	
5.	Shower	
6.	Washing Trough	
7.	Washing Machine	
8.	Septic Tank	
9.	French Drain	

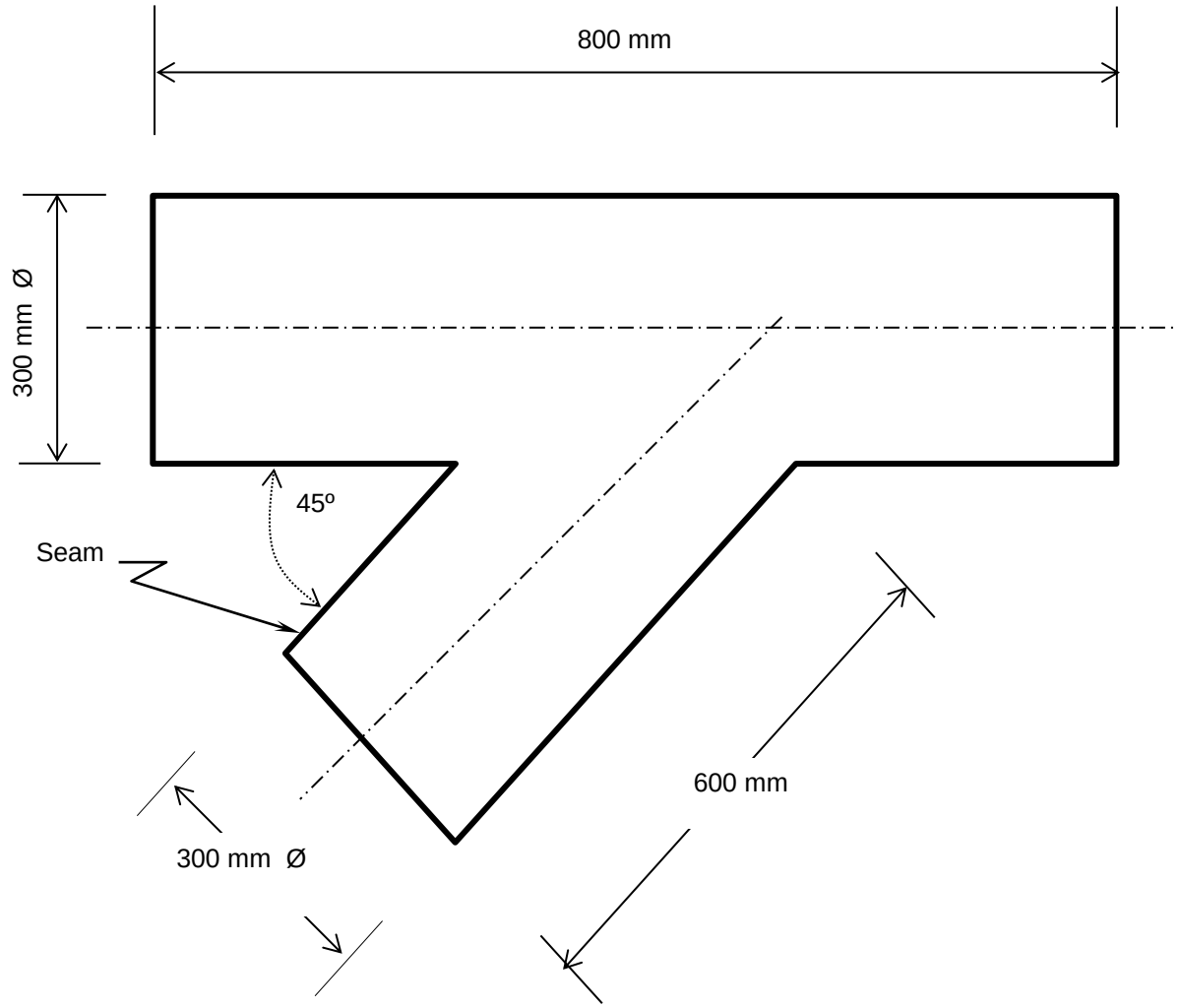
8

9

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EXAMINATION NUMBER:

DIAGRAM SHEET 2



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