higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1300(E)(N12)T

NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

PLUMBING THEORY N2

(11022052)

12 November 2014 (Y-Paper)
13:00–16:00

Candidates will require drawing instruments.
Calculators may be used.

This question paper consists of 5 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. ALL the questions must be answered in the ANSWER BOOK, except QUESTION 3.5 which must be answered on DIAGRAM SHEET 1 (attached).
5. ALL the sketches and/or diagrams must be neat, reasonably large, in good proportion, fully labelled and done in pencil.
6. ALL the abbreviations and symbols MUST comply with the latest National Building Regulations and ALL relevant SANS-codes.
7. Rule off across the page on completion of EACH answer.
8. Write neatly and legibly.

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QUESTION 1: COLD-WATER SUPPLY

1.1 Name ONE type of gas that can be used to sterilise water during the public water purification process. (1)

1.2 What effect does acidic soft water have on:

1.2.1 Copper pipes

1.2.2 Galvanized pipes

(2 × 2) (4)

1.3 List FOUR common causes that could lead to vibrations and 'water hammer' in the pipework. (2 x 2) (4)

1.4 Water mains are usually arranged in a reticulation network from the service reservoirs to the consumers.

Make a neat diagrammatic sketch of a typical 'ring water reticulation' layout. (5)

1.5 Can permanent hard water be softened by means of boiling? Motivate your answer. (2)

1.6 Thermostatic valves are sometimes installed in public places such as hospitals, clinics and old-age homes.

What is the purpose of installing these valves? (1)

1.7 What is meant by the term *pressure zone* in the distribution and reticulation of water to the consumer? (3)

[20]

QUESTION 2: HOT-WATER SUPPLY

2.1 List the working principles of the temperature and pressure safety valve when it is activated by:

2.1.1 An abnormal increase in <u>temperature</u> in hot water

2.1.2 An abnormal increase in <u>pressure</u> in the hot water

(2 × 5) (10)

2.2 Give ONE advantage and ONE disadvantage of a water solar heating system when compared to an electric hot-water heating system. (2)

2.3 When hot-and cold-water installation takes place what is meant when it is said to have a balanced pressure? (2)

2.4 Name any TWO functions of a vacuum breaker when it is installed in a hot-water installation. (2 × 2) (4)

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2.5 Pressure control (reducing) valves are colour-coded to identify their various nominal working pressures.

Name the correct colour coding to identify the following pressure ratings:

2.5.1 400 kPa

2.5.2 600 kPa

(2 × 1) (2)
[20]

QUESTION 3: DRAINAGE

3.1 Name TWO factors that need to be considered when determining where to place a conservancy or vacuum tank, intended for the disposal of sewage. (2)

3.2 In the process of conveying potable drinking water state the minimum distance at which supply pipes should be away from an underground drain when they:

3.2.1 Are laid horizontally next to each other

3.2.2 Cross each other

(2 × 1) (2)

3.3 List FOUR facts that describe the *one-pipe system* with particular reference to the arrangement of sanitary pipework on walls. (4)

3.4 Name the TWO requirements recommended by the National Building Regulations with regard to the minimum capacity (volume) of a septic tank for a single dwelling. (4)

3.5 Design an effective drain layout for the plan view of the domestic dwelling shown on DIAGRAM SHEET 1 (attached). Label and describe all the pipes and fittings required to complete the installation. Make use of the SABS symbols and abbreviations.

NOTE: Write your EXAMINATION NUMBER in the space provided and place the completed DIAGRAM SHEET 1 in your ANSWER BOOK. (15)

3.6 With the aid of a simple, labelled sketch and word description, show the control mechanism of a submersible pump in a subsoil water sump. (8)
[35]

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QUESTION 4: SHEET-METAL WORK AND FLASHING

Apply the triangulation method of pattern development and develop the pattern of the transition piece shown on DIAGRAM SHEET 2 (attached). Do NOT show any allowance for seams.

Use scale 1: 10. **[15]**

QUESTION 5: CALCULATIONS

5.1 A tank with a base of 1 200 mm x 1 600 mm and height of 1 500 mm is used as a water storage tank.

Calculate:

5.1.1 The maximum volume of water (in m^3) that the tank can hold (3)

5.1.2 The mass of the water and the tank when the tank is full of water (4)

(The tank has a mass of 210 kg when it is empty.)

5.1.3 The area of the material (in m^2) required to manufacture the tank (3)

(Do NOT make any allowances for seams or wire edges.
NOTE: The tank is open at the top.
Density of water = 1 000 kg/m^3) **[10]**

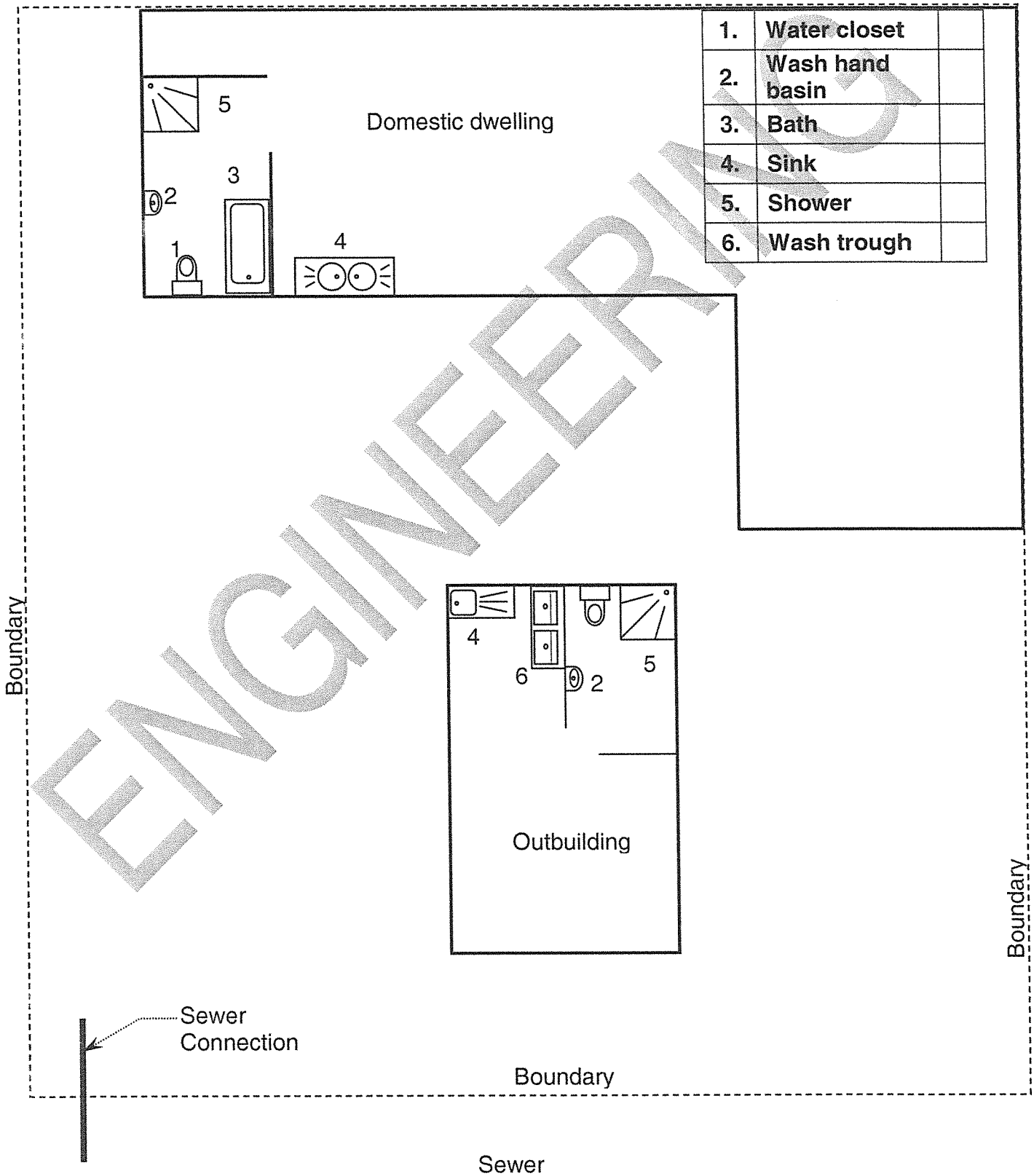
TOTAL: 100

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DIAGRAM SHEET 1

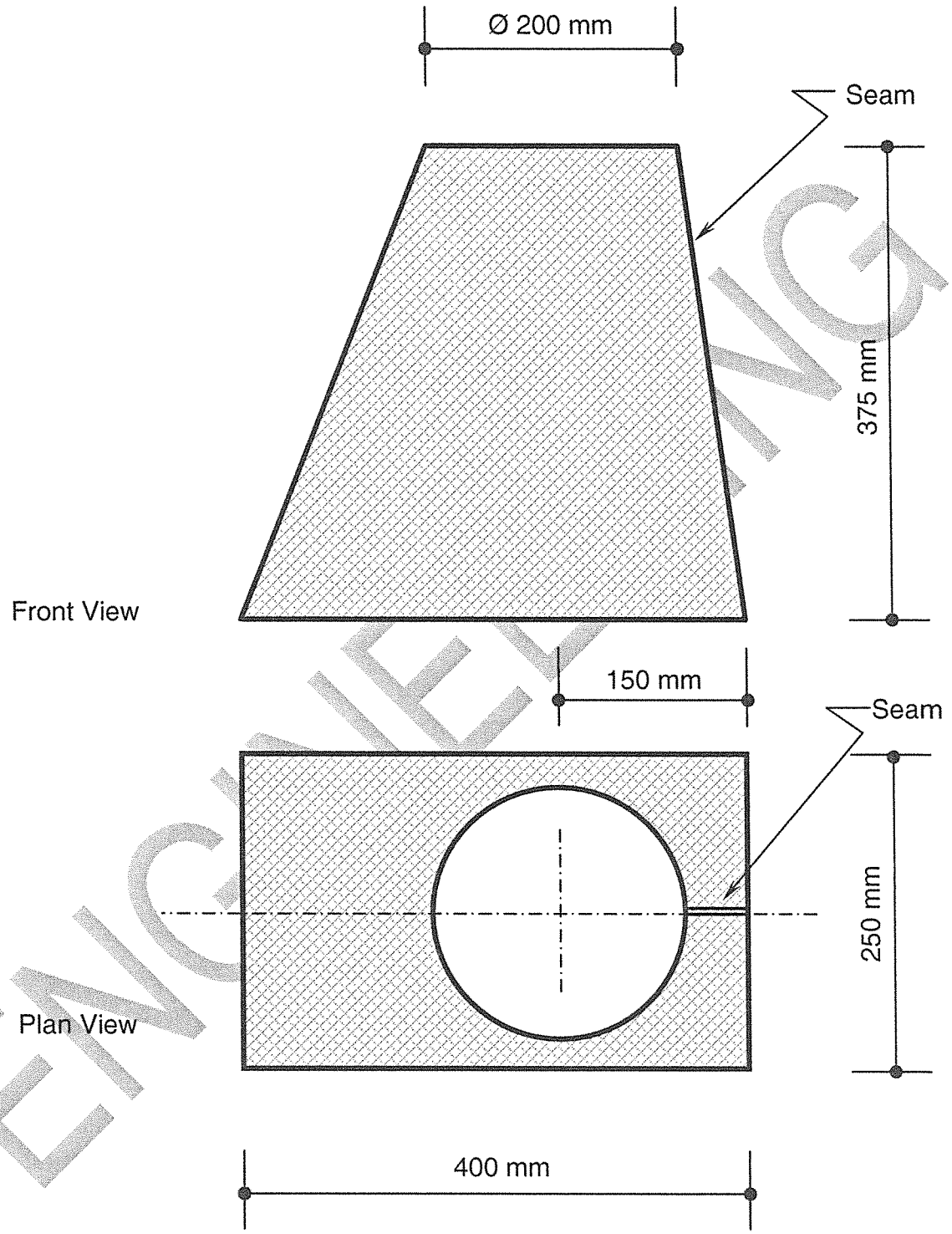
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DIAGRAM SHEET 2



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