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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1440(E)(N15)T

NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

PLUMBING THEORY N2

(11022052)

15 November 2013 (X-Paper)
09:00–12:00

Candidates will require drawing instruments, pens and a ruler.

Calculators may be used.

This question paper consists of 4 pages and 3 diagram sheets.

ENGINEERING

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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 sketches and/or diagrams must be done in pencil.
5. The sketches and/or diagrams must be neat, reasonably large, in proportion and fully labelled.
6. ALL the abbreviations and symbols must comply with the latest National Building Regulations and all relevant SABS-codes.
7. Rule off on completion of each answer.
8. ALL the work, except QUESTION 3.5 must be done in the answer book.
9. Write neatly and legibly.

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QUESTION 1: COLD WATER SUPPLY

1.1 Discuss the flocculation, mixing and sedimentation processes as applicable in a typical public water purification plant. (7)

1.2 Briefly describe the purpose of filtration during public water purification. (2)

1.3 During the distribution of water to the consumer, the water flows to service reservoirs before entering the reticulation networks.

List THREE functions of such service reservoirs. (3)

1.4 Describe what is meant by the term *permanent hard water.* (4)

1.5 Name FOUR impurities that are commonly found in untreated water. (4)
[20]

QUESTION 2: HOT-WATER SUPPLY

2.1 Draw a neat, labelled, single line diagrammatic sketch of a water heating system with a 100 litre vertical geyser with a pressure rating of 100 kPa. Indicate all the required valves, pipes and fittings. Make use of symbols as specified by the relevant SABS codes. (10)

2.2 Describe the working principles of the temperature and pressure safety valve when it is activated by the following processes:

2.2.1 An abnormal increase in temperature. (6)

2.2.3 An abnormal increase in pressure in the hot water. (4)
[20]

QUESTION 3: DRAINAGE

3.1 Any drainage installation must be adequately ventilated as prescribed by the National Building Regulations and other related National Standards.

List TWO functions of ventilation pipes. (2)

3.2 Any drainage installation must be provided with adequate access to the installation, for the purpose of inspection, testing or internal cleaning.

List FOUR instances where access to pipes must be provided. (4)

3.3 Draw a neat single-line longitudinal sectional proportional drawing of a typical septic tank suitable for a domestic dwelling. Clearly indicate and label all the required detail, pipes, fittings and dimensions on the drawing. (10)

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3.4 If a new drainage installation has not passed the air test, the plumber must locate and rectify the defects, and request for another test to be conducted by the local authority.
Discuss TWO methods the plumber could employ to detect (find) the leaks. (4)
[20]

3.5 DIAGRAM SHEET 1 shows the plan detail of a house with an outbuilding. Complete the underground drainage detail to ensure an effective economical sewage disposal system to the septic tank and French drain.
Make use of the one-pipe drain (combined soil and waste water) system, to complete the drainage detail on the plan on DIAGRAM SHEET 2.

Clearly indicate the following detail:

3.5.1 At least one ventilation pipe

3.5.2 One gulley

3.5.3 Sufficient access to facilitate cleaning

3.5.4 One inspection eye

3.5.5 Label all the drainage detail by according to the standard abbreviations (15)
[35]

QUESTION 4: METAL WORK AND FLASHING

The figure on DIAGRAM SHEET 2 shows a pipe with a diameter of 400 mm being intersected at an angle of 45° by a branch pipe with a diameter of 300 mm. Draw the required elevations and develop the full pattern of the branch pipe as well as the pattern of the hole in the main pipe.

Do not show any allowances for seams.
(Use scale 1 : 10) **[15]**

QUESTION 5: CALCULATIONS

Determine all the pipe material, fittings and types of valves required complete the hot and cold water layout as shown on DIAGRAM SHEET 3. Make use of copper pipes with brass compression fittings.

Tabulate the results neatly and clearly in the answer book. **[10]**

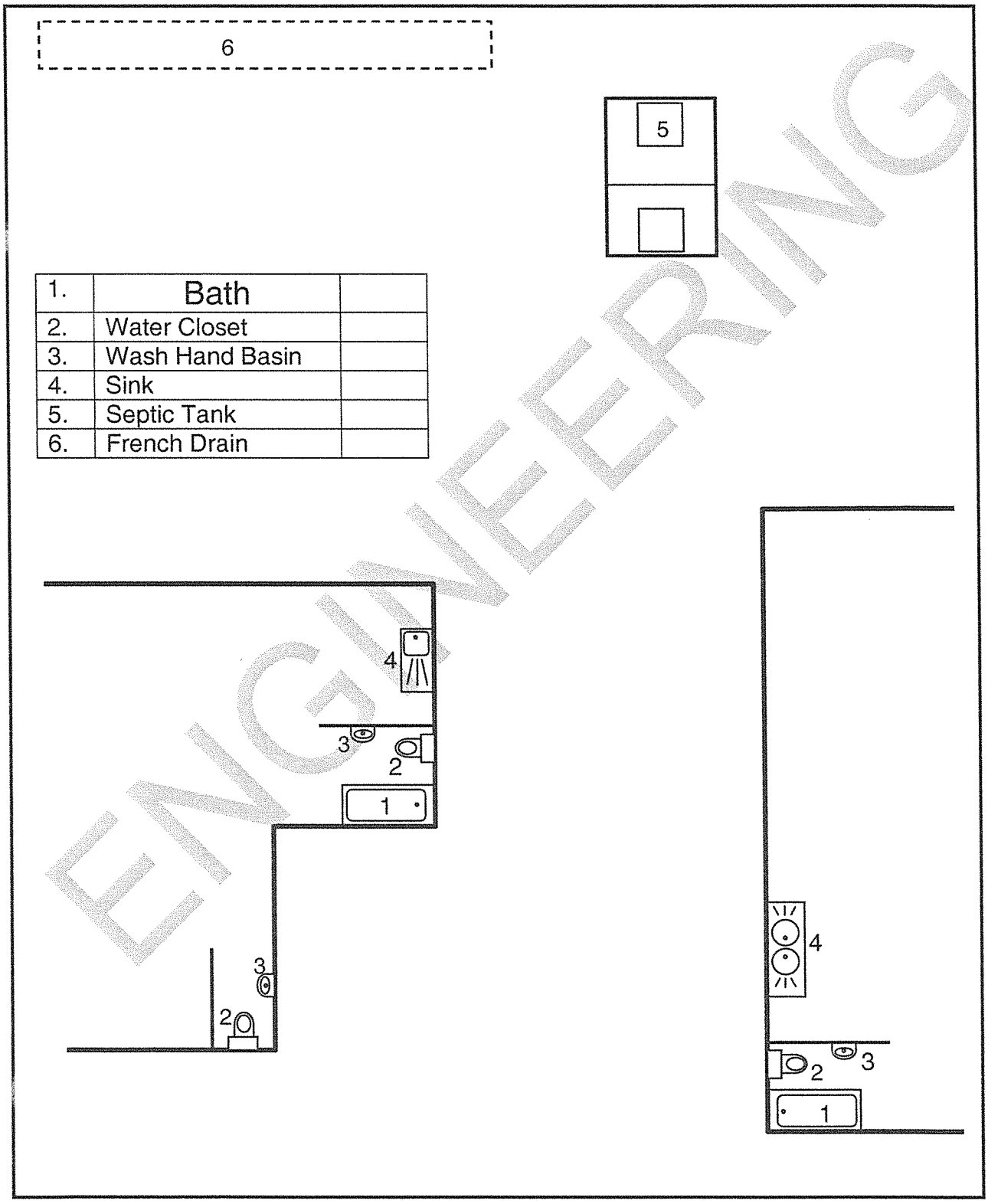
TOTAL: 100

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EXAMINATION NUMBER:

DIAGRAM SHEET 1

QUESTION 3.5



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

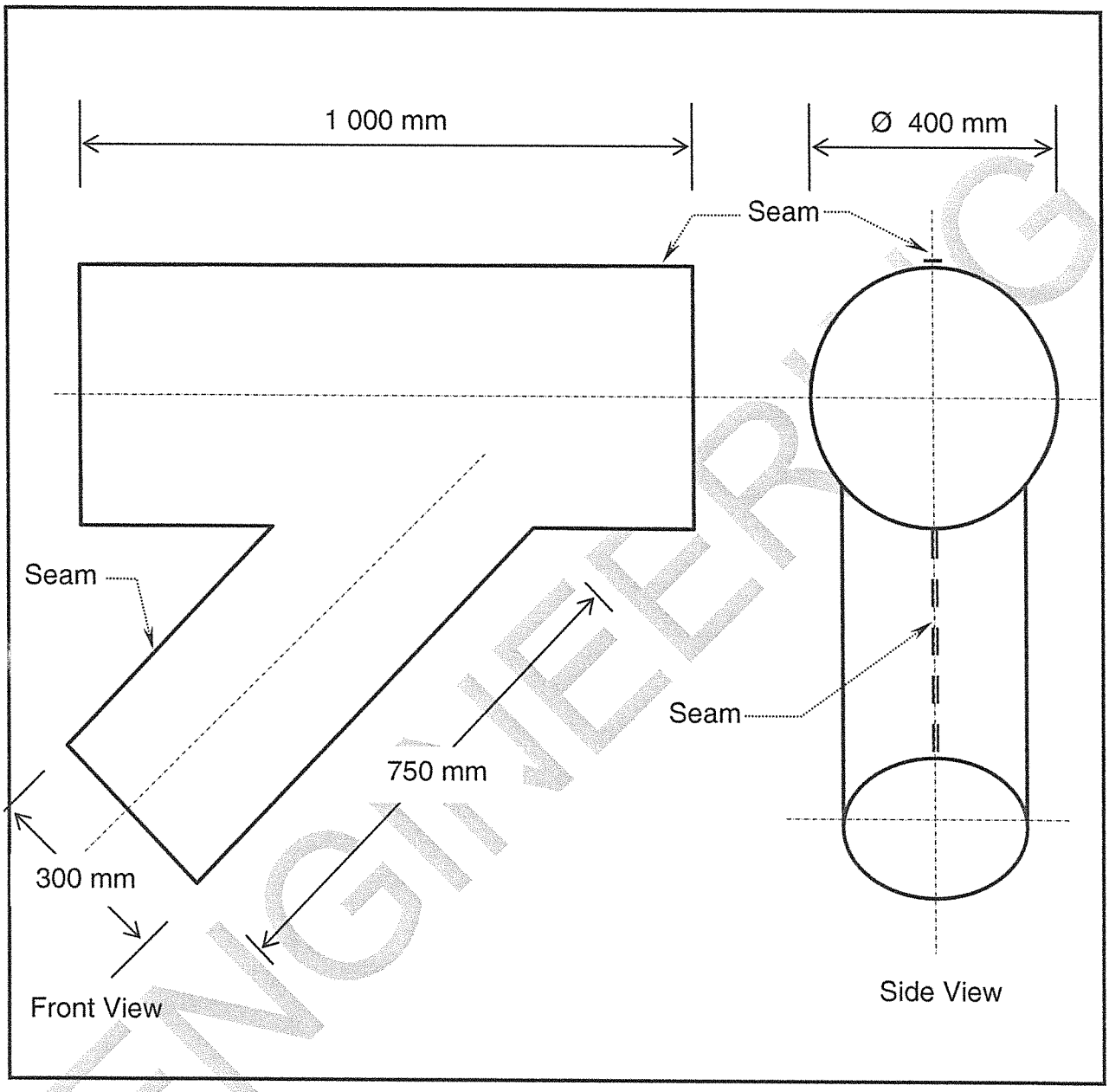
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NB: Place the completed diagram sheet in the answer book.

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DIAGRAM SHEET 2

QUESTION 3.5



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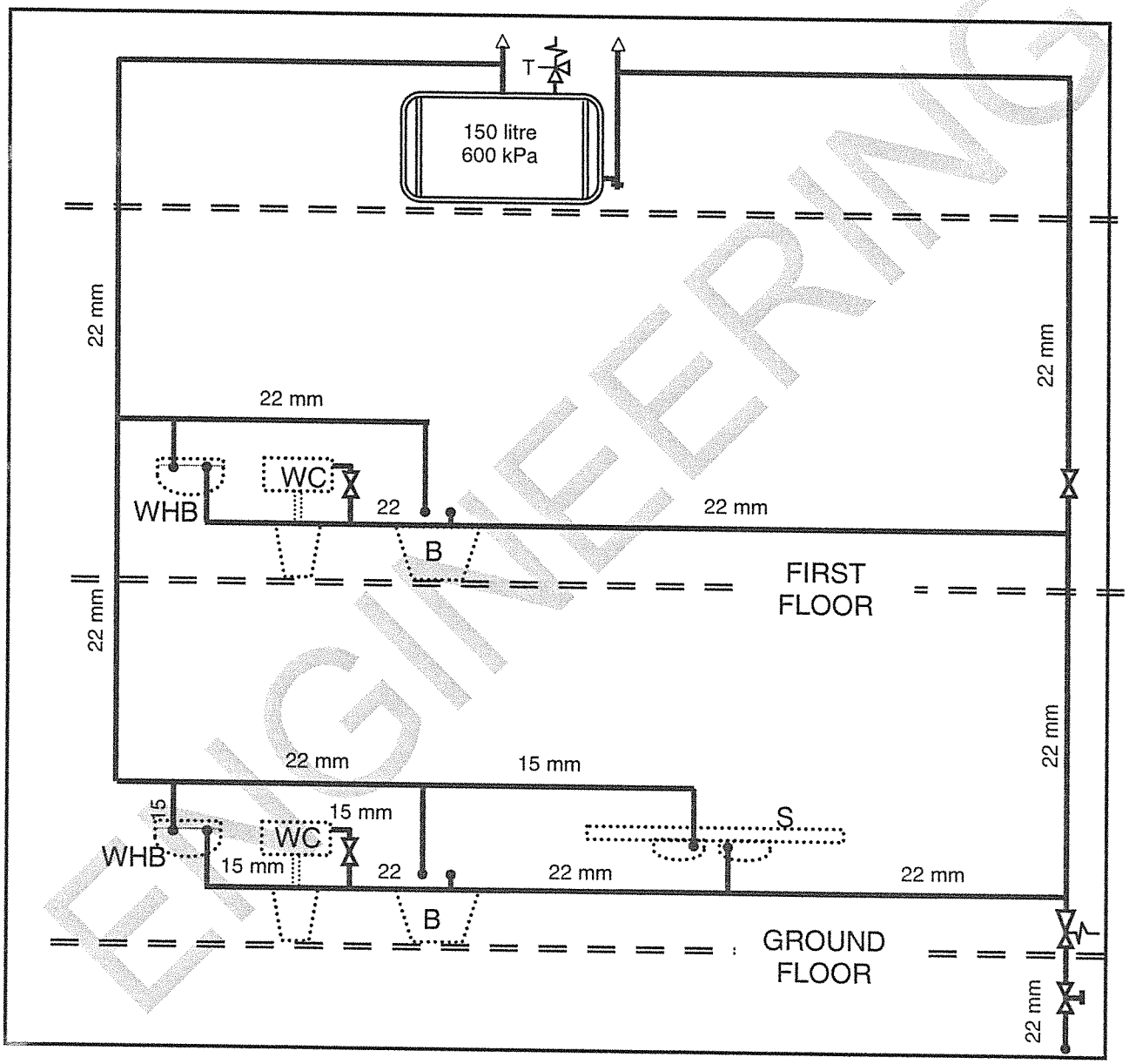
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DIAGRAM SHEET 1

QUESTION 3.5

NOTE:

- All branch pipes to terminal points are 15 mm except to the baths that are fed from 22 mm pipes.
- Use copper pipes with brass compression fittings.



DIAGRAMMATIC LAYOUT OF A TYPICAL
WATER INSTALLATION OF A TWO STOREY DWELLING

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