higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1260(E)(M25)T
APRIL EXAMINATION

NATIONAL CERTIFICATE

PLUMBING THEORY N2

(11022052)

25 March 2014 (Y-Paper)
13:00–16:00

Candidates will require drawing instruments.

Calculators may be used.

This question paper consists of 6 pages of which 4 are 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 through ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. ALL questions, except for QUESTION 3.6 which must be answered on DIAGRAM SHEET 2 (attached), must be done in the ANSWER BOOK.
5. All the sketches and/or diagrams must be done in pencil, 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 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 FOUR types of impurities commonly found in water. (4)

1.2 During water purification processes, air is mixed with water, which is known as aeration.

1.2.1 Name TWO methods that can be used for the aeration process to take place. (2)

1.2.2 Give TWO reasons why the aeration process is necessary. (2)

1.3 The pillar type fire hydrant has some advantages when compared to the underground type.

Name TWO of these advantages. (2)

1.4 State TWO advantages of the gravity system in relation to the pumped system. (4)

1.5 When water is processed and made suitable for human consumption, it undergoes a filtration process through a rapid sand filter. Based on this statement, please answer the following questions:

1.5.1 What causes the water level in this filter to rise and the filtration rate to drop? (2)

1.5.2 The filtering system needs periodic cleaning by means of a backwashing process.

Explain how this backwashing process will take place. (4)

[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 codes. (8)

2.2 Name ONE disadvantage to the user if the fixed geyser is not at balanced pressure at the various draw-off points. (2)

2.3 The sketches on DIAGRAM SHEET 1 (attached) depict the SANS (SABS) symbols for various valves used in hot-water systems. Write the name of each valve next to the question number (2.3.1–2.3.4) in your ANSWER BOOK. (4)

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2.4 The attached DIAGRAM SHEET 1 shows a single-line diagram of a boiler and cylinder hot-water system with a secondary return.

Name at least SIX of the components indicated in the sketch and write only the name of the component in no sequential order, in the ANSWER BOOK. (6)

[20]

QUESTION 3: DRAINAGE

3.1 Describe the following drainage terms:

3.1.1 Inspection chamber (2)

3.1.2 Conservancy tank (vacuum tank) (3)

3.2 Name THREE instances where a ventilation pipe will be required in a stub stack drainage system. (3)

3.3 The prime function of a septic tank is to treat the incoming raw sewage so that the solids are largely separated from the water.

List the functions of the septic tank with special reference to the bacteriological processes that occur in the tank. (6)

3.4 Give TWO reasons why a French drain may not be covered with waterproofing material. (2)

3.5 When planning the layout of a drain, certain design considerations must be borne in mind.

Name FOUR of these considerations. (4)

3.6 DIAGRAM SHEET 2 (attached) shows the plan view of a house with an outbuilding. Make use of a single-line diagram to indicate the underground drainage detail which will ensure an effective economical sewage disposal system.

The following must be clearly indicated:

3.6.1 Adequate provision for ventilation (2)

3.6.2 Two gullies (2)

3.6.3 Sufficient access to facilitate cleaning (2)

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3.6.4 One inspection eye (2)

3.6.5 Label all the drainage detail in accordance with the standard abbreviations. (7)

[35]

IMPORTANT NOTE:

Write your examination number in the space provided and place the completed diagram sheet in the ANSWER BOOK.

QUESTION 4: SHEET METAL WORK AND FLASHING

4.1 The drawing on DIAGRAM SHEET 3 (attached) shows a front view of two pipes with different diameters intersecting each other at an angle. The 300 mm Ø branch pipe is intersecting the 400 mm Ø main pipe at an angle of 45°.

4.1.1 Draw the given view and project the side view. (2)

4.1.2 Plot the curve of interpenetration. (2)

4.1.3 Develop the full pattern of the branch pipe. (5)

4.1.4 Use scale 1 : 10. (1)

4.1.5 Develop the true shape of the hole in the main pipe. (5)

[15]

IMPORTANT NOTE: Ignore the allowance for the seam.

QUESTION 5: CALCULATIONS

5.1 The sketch on DIAGRAM SHEET 4 (attached) shows a PVC water supply tank with a total depth of 800 mm supplying water to a garden bib tap. The outlet from the tank is a female iron connector and the bib tap is connected to a wall plate elbow.

Calculate the water pressure at the bib tap whilst the tank is filled with water and your answer must be presented in kPa.

NB: Density of water = 1 000 kg/m^3
Gravitation acceleration = 9,81 m/s^2 (5)

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5.2 Draw up a list of pipe fittings that will be required from the water supply outlet to the garden bib tap shown in the same sketch on DIAGRAM SHEET 4 (attached).

All the pipework is made from 22 mm Ø Class 460/1 copper tubing. Make use of compression type fittings. (5)

[10]

TOTAL: 100

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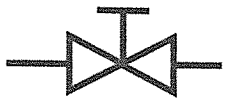
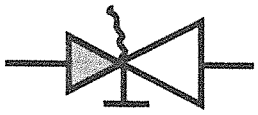
DIAGRAM SHEET 1

QUESTION 2.3

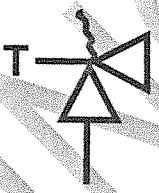


2.3.1



2.3.2

2.3.3



2.3.4

QUESTION 2.4

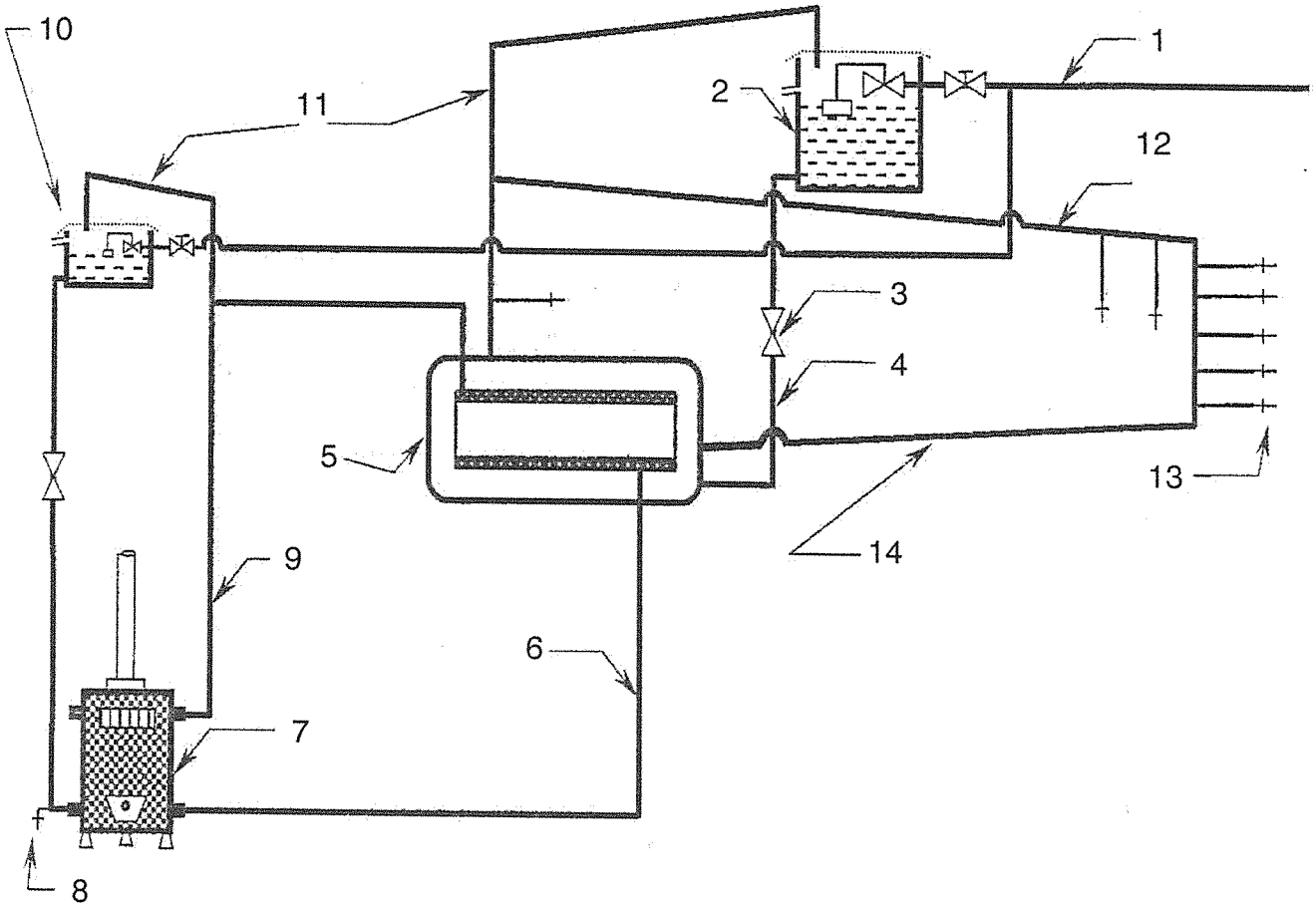


DIAGRAM LAYOUT OF A BOILER AND CYLINDER HOT WATER SYSTEM WITH SECONDARY RETURN

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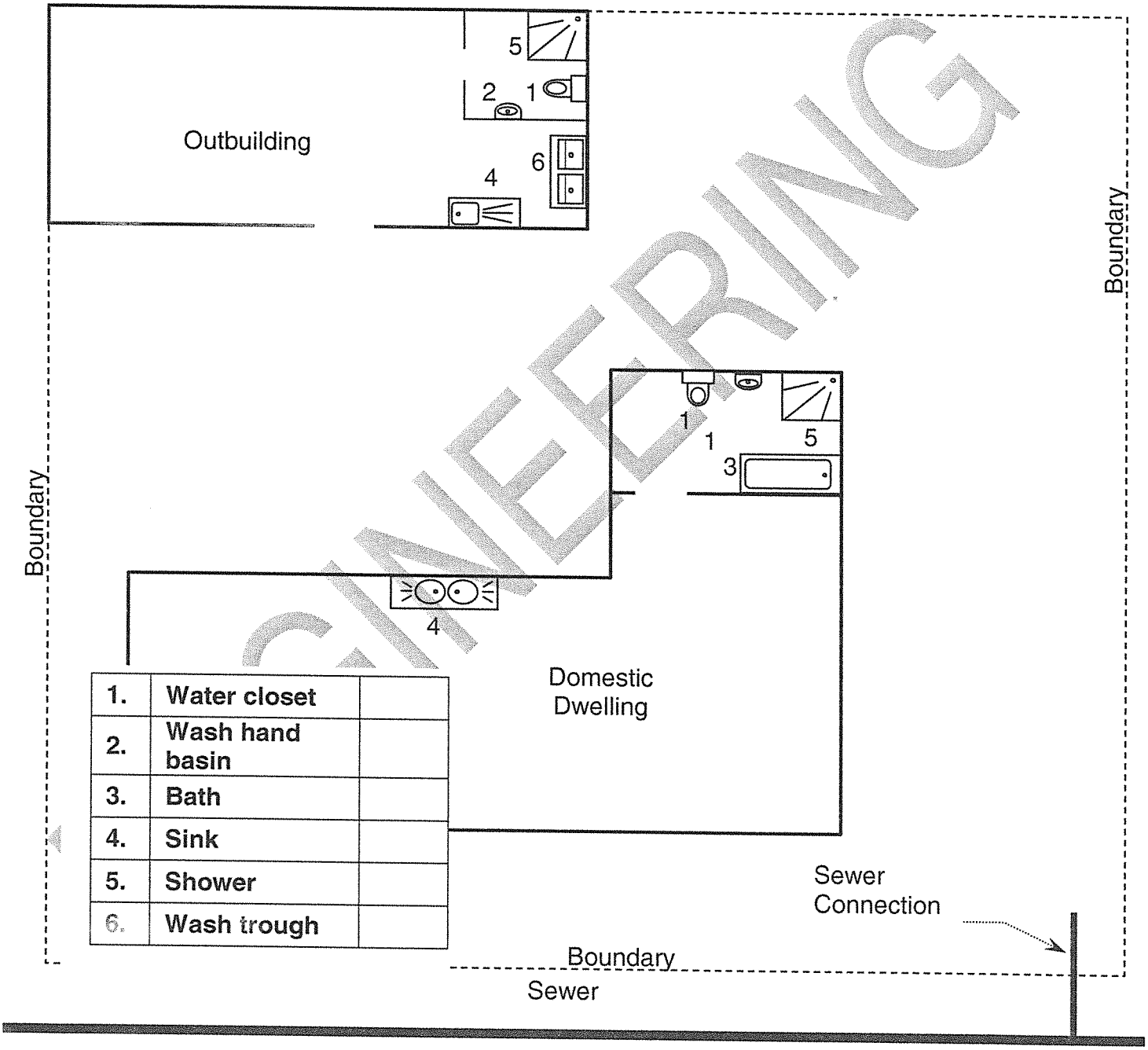
DIAGRAM SHEET 2

QUESTION 3.6

EXAMINATION NUMBER



1.	Water closet	
2.	Wash hand basin	
3.	Bath	
4.	Sink	
5.	Shower	
6.	Wash trough	

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DIAGRAM SHEET 3

QUESTION 4

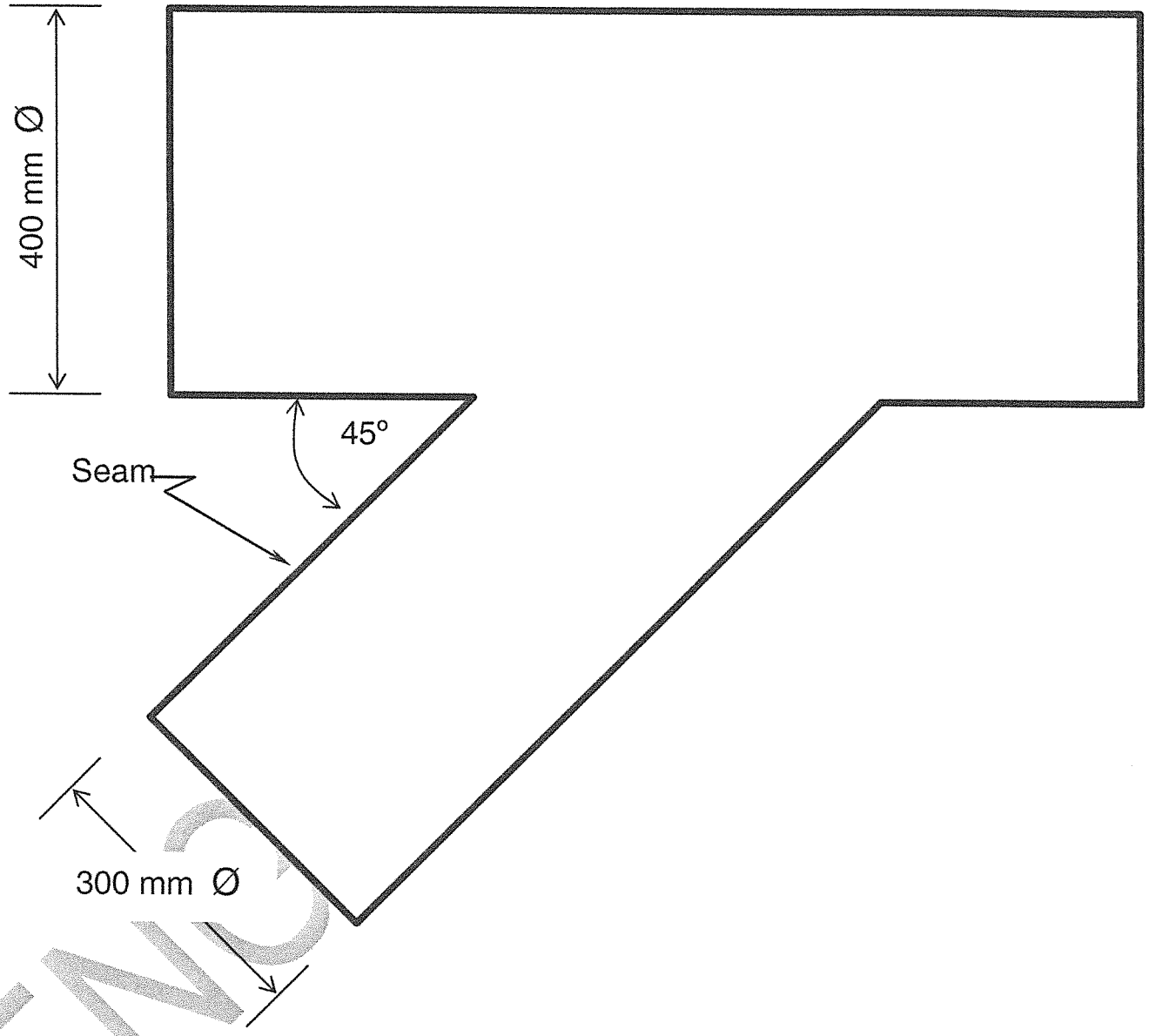

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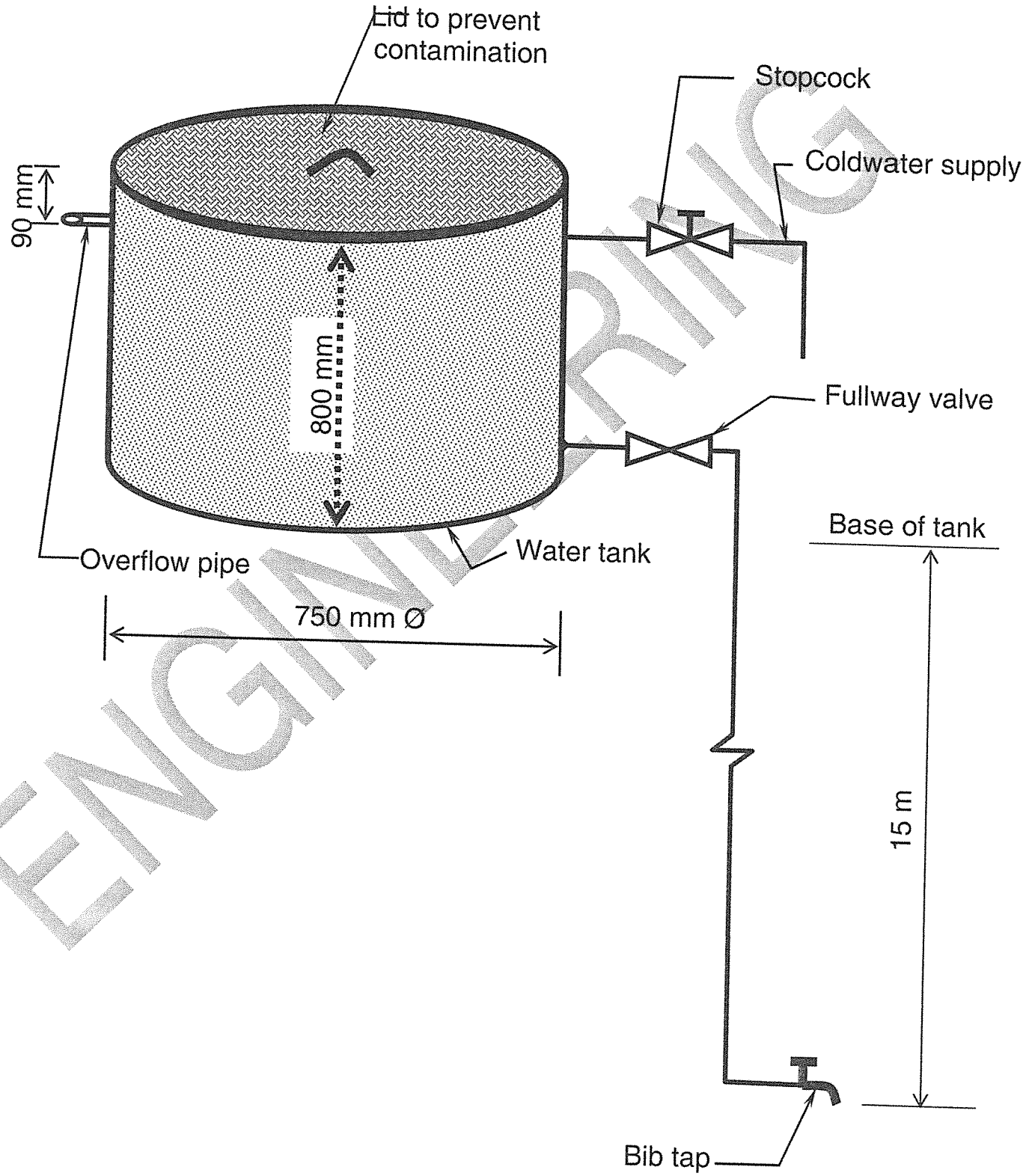
DIAGRAM SHEET 4

QUESTION 5



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