higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1380(**E**)(A6)T

NATIONAL CERTIFICATE

PLUMBING THEORY N2

(11022052)

6 April 2018 (X-Paper)
09:00–12:00

Candidates need drawing instruments.

Calculators may be used.

This question paper consists of 5 pages and 3 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 before answering.
3. Number the answers according to the numbering system used in this question paper.
4. ALL the questions must be done in the ANSWER BOOK, except QUESTION 3.1 and QUESTION 4 which must be answered on DIAGRAM SHEET 1 (attached) and DIAGRAM SHEET 2 (attached) respectively.
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 (SABS) codes.
7. Start each question on a NEW page.
8. Rule off across the page on completion of each question.
9. Write neatly and legibly.

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QUESTION 1 : COLD-WATER SUPPLY

1.1 Air release valves are widely used, in waterworks installations as well as in general purpose installations where there is a possibility of airlocks forming in the pipeline, to automatically extract air from these pipelines.

Give any TWO examples of places where air release valves are usually installed. (2)

1.2 1.2.1 Fire hydrants and other fire-fighting equipment are used to protect lives and properties from damage caused by fire, and are usually connected to water mains to provide access to huge volumes of water.

Consider the above statement and indicate, by means of sketches, the difference between the *pillar-type fire hydrant* and the *underground fire hydrant*. (10)

1.2.2 Give THREE general functions of fire hydrants. (3)

1.3 A pump system is used where the water purification plant is in an area that is lower than the service reservoir and the area to be served by water (consumers); also, where the catchment area is in an area that is lower than the purification plant.

With the installation of a gravity system, the collection dam is in an area that is higher than the water purification plant.

1.3.1 Give THREE advantages of using a gravity system when supplying water to consumers. (3)

1.3.2 In which other cases, not referred to in the above statement, do we use a gravity system? (2)

[20]

QUESTION 2: HOT-WATER SUPPLY

2.1 Make a neat, labelled diagrammatic sketch of an electric hot-water heating installation with a horizontal geyser, with a pressure rating of 400 kPa. Clearly indicate all the required pipes and valves, including the anti-syphon loop.

NOTE: Ignore the safety drip tray. (8)

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2.2 Make a single-line, fully labelled diagrammatic sketch of a boiler and a cylinder hot-water installation and show the following parts:

Cold-water storage tank
Cold-water supply pipe
Fullway valve
Cold-water feed pipe
Primary return pipe
Expansion pipe
Boiler
Drain cock
Primary flow pipe (10)

2.3 The geyser in QUESTION 2.1 is an example of a direct hot-water installation, whereas the one in QUESTION 2.2 is an example of an indirect hot-water installation.

With reference to the above statement, give the difference between the two hot-water installations. (2)
[20]

QUESTION 3: DRAINAGE

3.1 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.

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

3.2 Make 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 details, pipes, fittings and dimensions on the drawing. (8)

3.3 Explain the term *single-stack system* when referring to sanitary pipe arrangements. (4)

3.4 The regulations prescribe that any underground drain should have a backfilling (soil cover) of at least 300 mm. However, if the backfilling (soil cover) is less than 300 mm, special precautions must be applied.

Describe ONE of the methods that can be used to protect the drain against damage. (3)

3.5 The horizontal distance of a section of an underground drain is 18 m and it is laid at a fall of 1 : 30.

Calculate the invert depth at the lower end if the invert depth of the drain at the top end is 620 mm. (5)
[35]

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QUESTION 4: SHEET-METAL WORK AND FLASHING

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

Use scale 1 : 10

NOTE: Write your EXAMINATION NUMBER in the open space given and place the completed DIAGRAM SHEET 2 in the ANSWER BOOK. **[15]**

QUESTION 5: CALCULATIONS

Determine ALL the pipe material, fittings and types of valves required to complete the hot-water and cold-water layout as shown on DIAGRAM SHEET 3 (attached).

Assume that the connection has used 460/2 copper pipes with brass compression fittings.

Tabulate the results neatly and clearly in the ANSWER BOOK. **[10]**

TOTAL: 100

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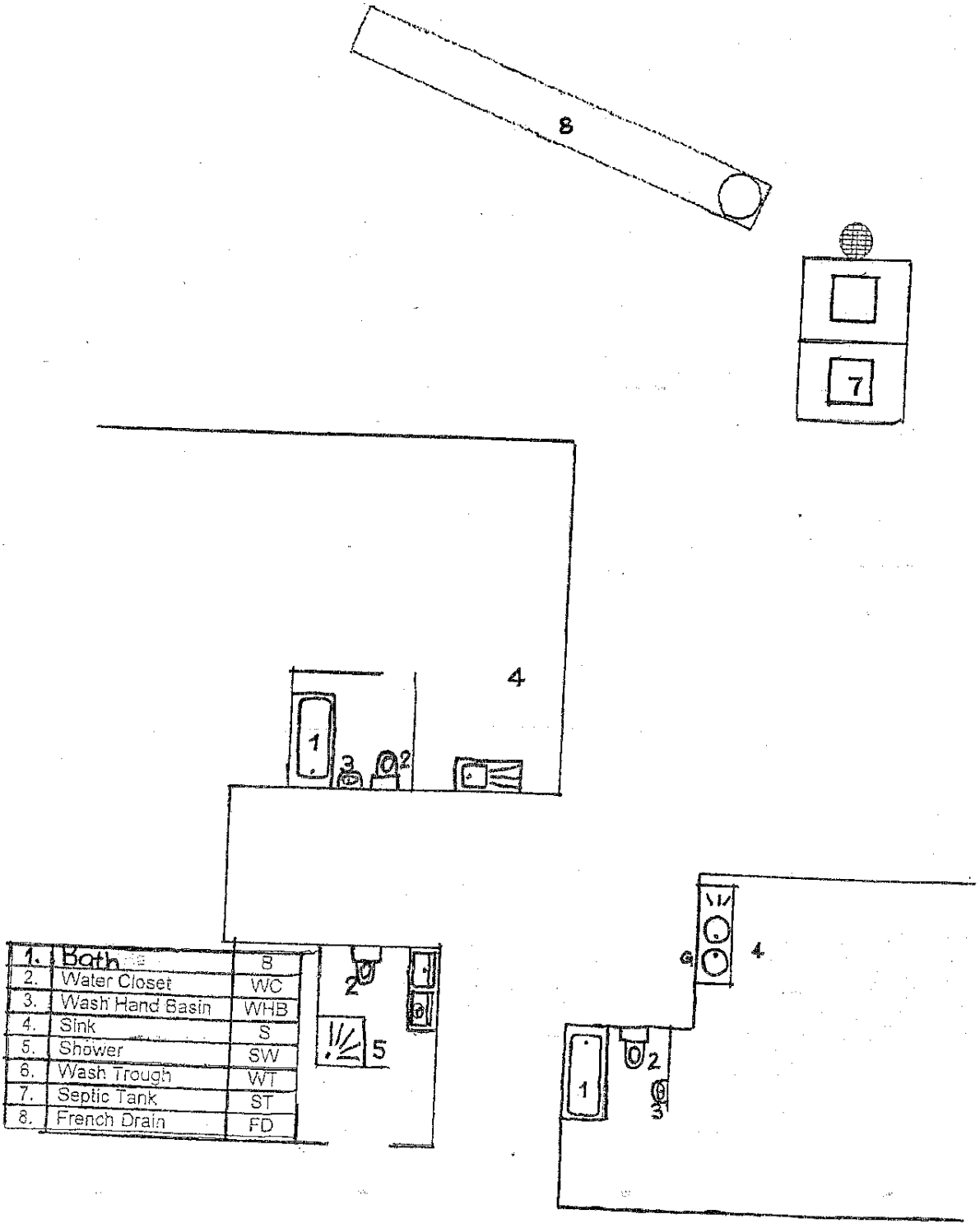
DIAGRAM SHEET 1 **EXAMINATION NUMBER:**

QUESTION 3.1



1.	Bath	B
2.	Water Closet	WC
3.	Wash Hand Basin	WHB
4.	Sink	S
5.	Shower	SW
6.	Wash Trough	WT
7.	Septic Tank	ST
8.	French Drain	FD

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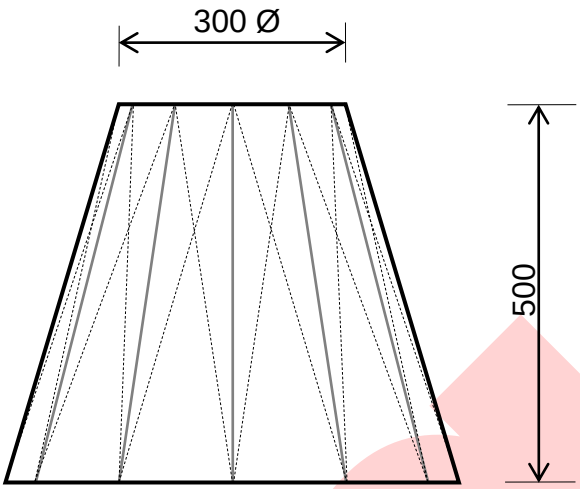
DIAGRAM SHEET 2 **EXAMINATION NUMBER:**

QUESTION 4

SIDE VIEW



PLAN VIEW

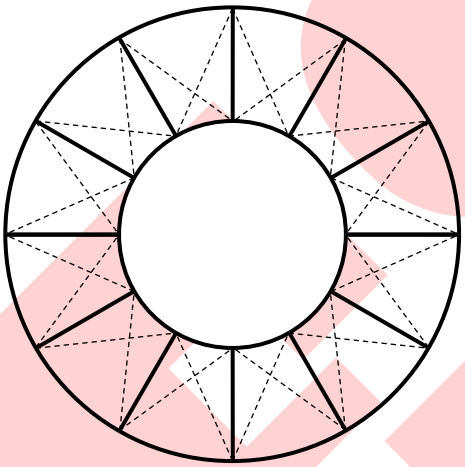


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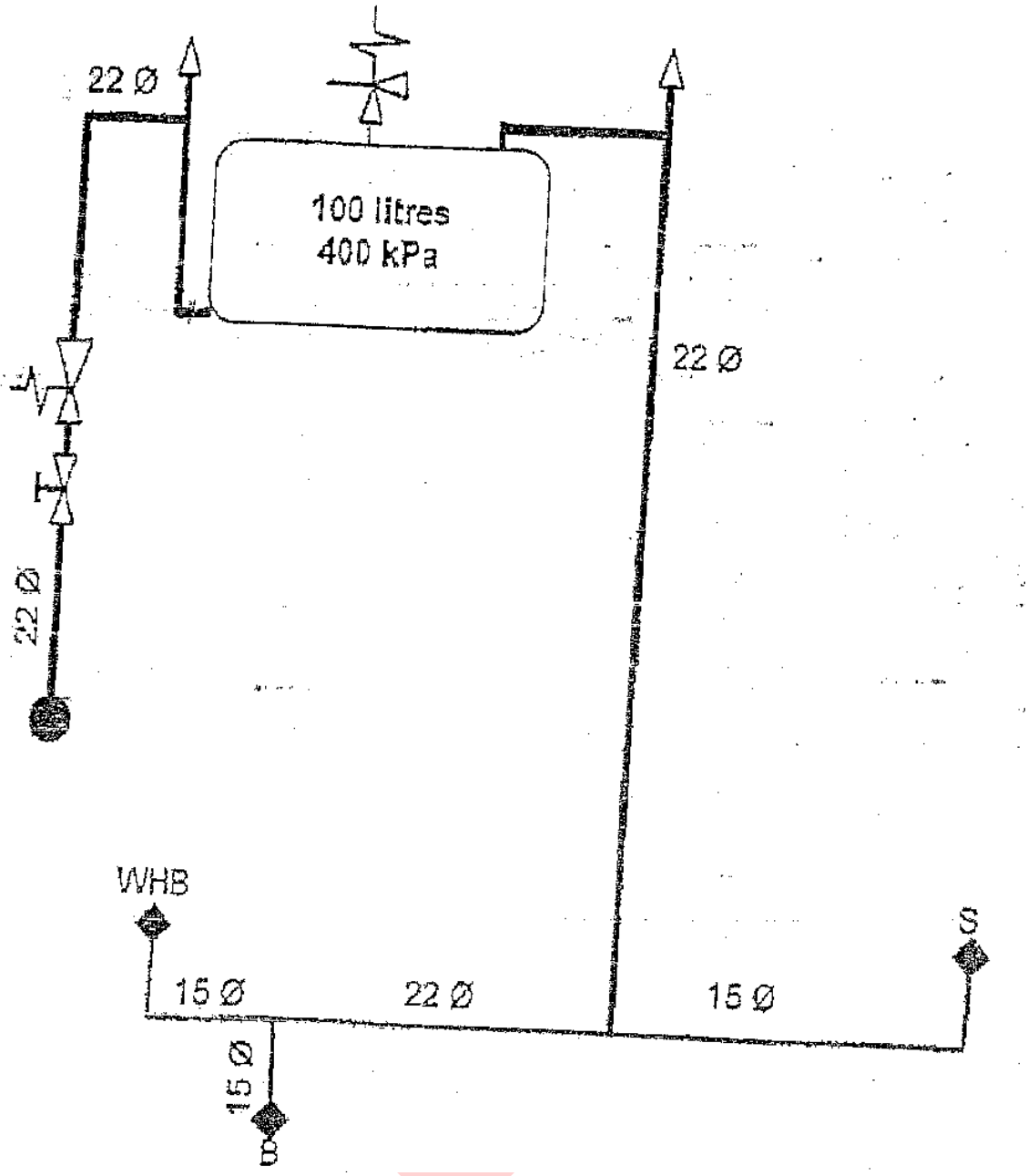
DIAGRAM SHEET 3



(10)

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