

Confidential



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**CIVIL TECHNOLOGY: CIVIL SERVICES**

**MAY/JUNE 2025**

**MARKS: 200**

**TIME: 3 hours**

**This question paper consists of 16 pages and 5 answer sheets.**

**REQUIREMENTS:**

1. Drawing instruments
2. A non-programmable calculator
3. ANSWER BOOK

**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of SIX questions.
2. Answer ALL the questions.
3. Read ALL the questions carefully.
4. Answer each question as a whole. Do NOT separate subsections of questions.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Start the answer to EACH question on a NEW page.
7. Do NOT write in the margins of the ANSWER BOOK.
8. You may use sketches to illustrate your answers.
9. Write ALL calculations and answers in the ANSWER BOOK or on the attached ANSWER SHEETS.
10. Use the mark allocation as a guide to the length of your answers.
11. Make drawings and sketches in pencil, fully dimensioned and neatly finished off with descriptive titles and notes to conform to the *SANS/SABS Code of Practice for Building Drawings*.
12. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
13. Use your own discretion where dimensions and/or details have been omitted.
14. Answer QUESTIONS 2, 3.6, 3.7, 5.5 and 6.8 on the attached ANSWER SHEETS using drawing instruments, where necessary.
15. Write your CENTRE NUMBER and EXAMINATION NUMBER on every ANSWER SHEET and hand them in with your ANSWER BOOK, whether you have used them or not.
16. Drawings in the question paper are NOT to scale due to electronic transfer.
17. Google Images was used as the source of all photographs and pictures.
18. Write neatly and legibly. ...

**QUESTION 1: OHSA, MATERIALS, TOOLS, EQUIPMENT AND JOINING (GENERIC)**

Start this question on a NEW page.

1.1 Choose the correct answer(s) from those given in brackets. Write only the word(s) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 Wood.

- 1.1.1 Materials are preserved by (veneering/curing/powder coating) to make them sustainable. (1)
- 1.1.2 This preservation method, (electroplating/annealing/painting), will not protect metal from rust. (1)
- 1.1.3 (Electrolysis/Galvanising/Paint) is available in an oil or water base. (1)
- 1.1.4 Under normal circumstances, scaffold frameworks should be inspected (weekly/bi-weekly/daily). (1)
- 1.1.5 When working on scaffolding (sharp corners may be left uncovered/do not jump from one level to another on the scaffold/throw materials from the scaffold). (1)
- 1.1.6 An employer shall ensure that the outriggers/frames of suspended scaffolds are constructed of (steel/copper/lead). (1)
- 1.1.7 Trestle scaffolds may not consist of more than (2/3/4) tiers. (1)
- 1.1.8 Every employer who uses any hazardous chemical substances at work, should be in possession of (a medical aid/a material safety data sheet/an authorisation letter). (1)
- 1.1.9 Never extend a ladder more than (one quarter/two thirds/one third) of the extension length. (1)
- 1.1.10 The recommended height for the gates of the builder's hoist is at least (1 980 mm/1 250 mm/1 550 mm). (1)

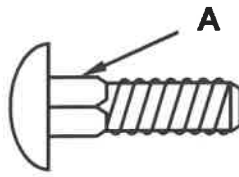
1.2 The nuts below are used to fasten bolts.

1.2.1 Which top view represents a nut with a built-in washer?

**A****B****C****D**

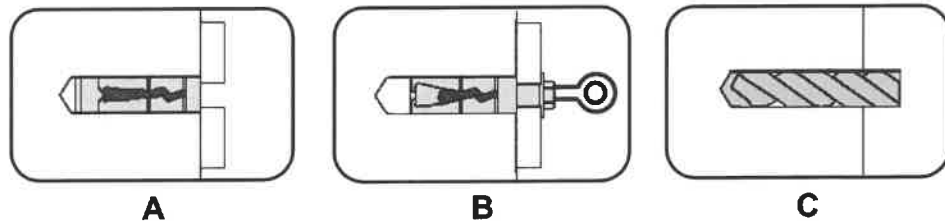
(1)

- 1.2.2 What is the purpose of the square section of the fastener as indicated by **A**?



(1)

- 1.2.3 Rearrange the pictures below in the correct sequence:



(1)

- 1.2.4 The specification for a Rawl bolt is R-RBL-M08/25. What does the number 25 represent?

(1)

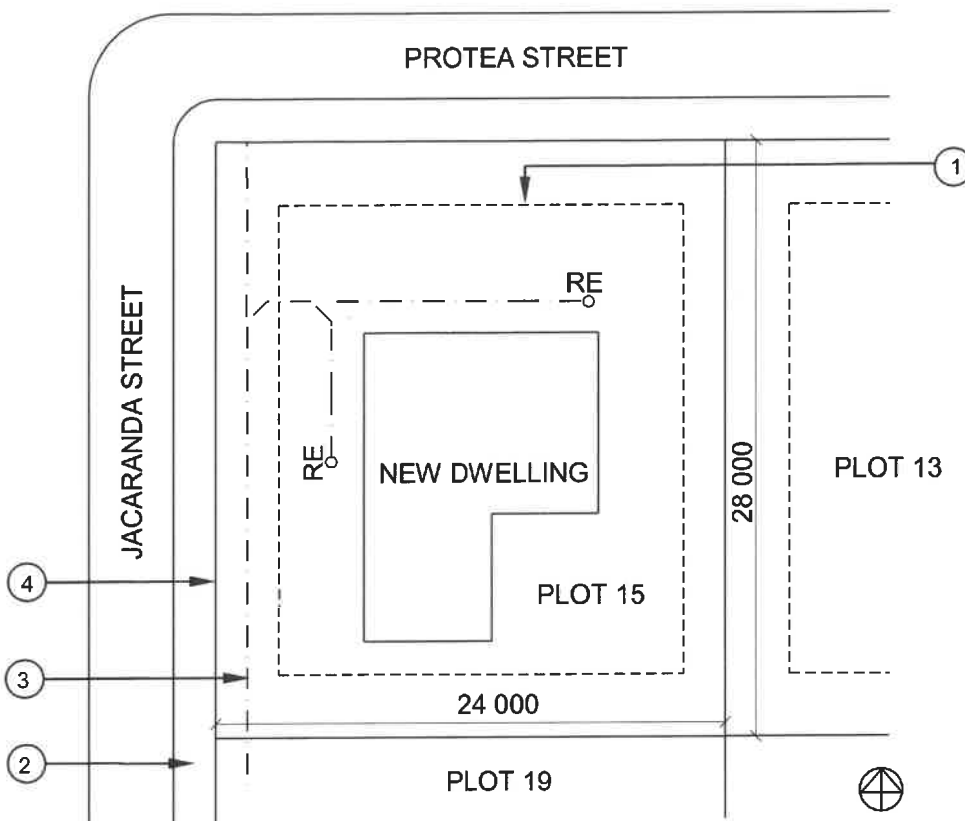
- 1.3 Explain TWO advantages of galvanising. (2)
- 1.4 Name ONE natural element that a multi-detector must be protected against. (1)
- 1.5 Describe why you will use a laser level when installing a shelf against a wall. (1)
- 1.6 Name TWO accessories that must be used with the telescope of the dumpy level to take an accurate reading. (2)

**[20]**

## QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

Start this question on a NEW page.

FIGURE A and FIGURE B on the next page show drawings that appear on a building plan. Analyse the drawings and complete the table on ANSWER SHEET 2.

**FIGURE A****NOTES:**

Contractors must verify all dimensions and levels on site before commencing work.

Architects to be notified of any discrepancies immediately.

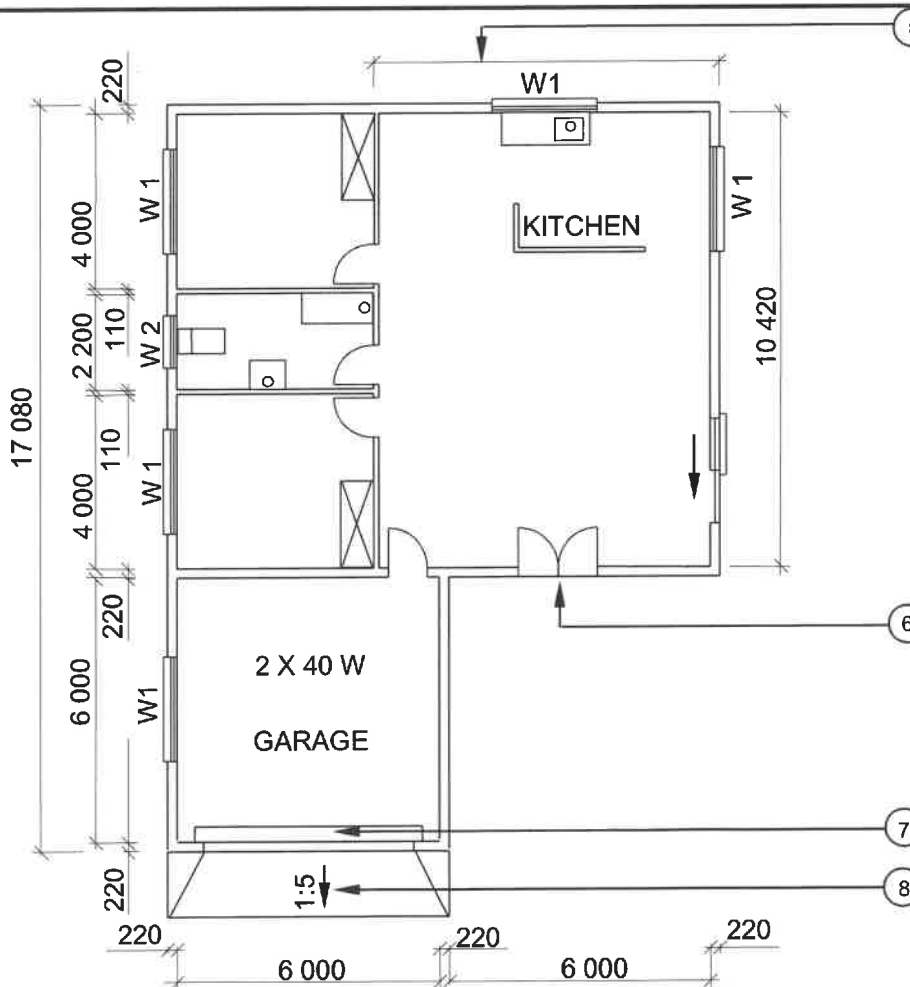
Bedroom lights: 2 x 6 W (LED)

Fencing: Pre-fabricated fencing

Sidewalk next to number 4 = 1 500 mm

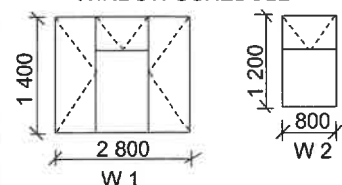
Architect's signature .....

Client's signature .....

**FIGURE B**

|                                                                               |                              |                                    |
|-------------------------------------------------------------------------------|------------------------------|------------------------------------|
| REVISION<br>1                                                                 | DATE:<br>16/02/2025          | DRAWING OF<br>BATHROOM<br>FIXTURES |
| PRINTED BY:<br>DOCK PRINTERS                                                  | DATE OF PRINT:<br>18/04/2025 |                                    |
| DRAWING TITLE:<br>SITE PLAN AND FLOOR PLAN                                    |                              |                                    |
| PROJECT:<br>PROPOSED DWELLING OF MS TOMEY<br>ON PLOT 15, PALM STREET, PHOENIX |                              |                                    |
| PROJECT NO.:<br>GR 288-229                                                    | DRAWING NO.:<br>668P8        |                                    |
| DATE:<br>08/04/2025                                                           | DRAWN:<br>P COX              | CHECKED:<br>D FOX                  |
| SITE PLAN                                                                     | SCALE: 1 : 500               |                                    |
| FLOOR PLAN                                                                    | SCALE 1 : 100                |                                    |

REFERENCE CODE  
QP 8 – 2025

**WINDOW SCHEDULE****[40]**

**QUESTION 3: CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES, OHSA AND QUANTITIES (SPECIFIC)**

Start this question on a NEW page.

- 3.1 Give ONE word/term for EACH of the following descriptions by choosing a word/term from the list below. Write only the word/term next to the question numbers (3.1.1. to 3.1.5) in the ANSWER BOOK, e.g. 3.1.6 Wedge.

tape measure; 1 : 60; transparent pipe level; back filling; stretcher bond; strut; jetting; English bond; 1 : 40; poling board; spirit level

- 3.1.1 The gradient for a 110 mm diameter drain pipe (1)
- 3.1.2 Can be used in conjunction with the gradient template when setting out the fall for a short distance (1)
- 3.1.3 Compaction method for sandy soil (1)
- 3.1.4 A closer is a necessity at the header course of this one-brick wall (1)
- 3.1.5 Vertical upright support used for shoring in trenches (1)
- 3.2 FIGURE 3.2 below shows a picture of a warning light used on a construction site. Name ONE colour that the warning lights use to indicate danger on a site.



**FIGURE 3.2**

- 3.3 Explain the reason for testing the air quality before entering the confined space of a manhole. (1)

3.4      FIGURE 3.4 below is a picture of a manhole being installed.



FIGURE 3.4

- 3.4.1      Identify the type of manhole. (1)
- 3.4.2      Name ONE place where a manhole must be placed. (1)
- 3.4.3      Name ONE accessory for this manhole. (1)

3.5      Use the information in FIGURE 3.5 below and take off the details of materials needed, as indicated in the table below. Write only the answer next to the question numbers (3.5.1 to 3.5.7) in the ANSWER BOOK, e.g. 3.5.8 Shower.

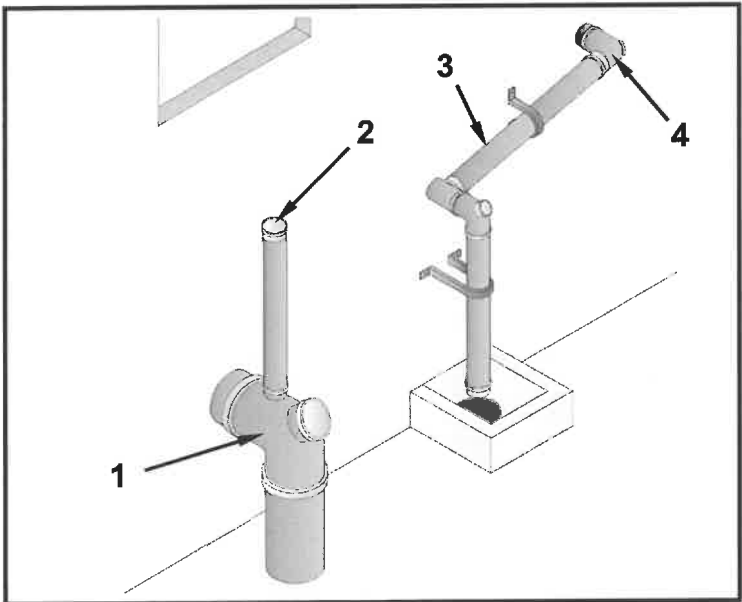


FIGURE 3.5

| ITEM | NAMES OF PIPES/<br>SANITARY<br>FITTINGS | MATERIAL | DIAMETER | QUANTITY |
|------|-----------------------------------------|----------|----------|----------|
| 1    | 3.5.1                                   | ...      | 3.5.2    | 1        |
| 2    | 3.5.3                                   | 3.5.4    | ...      | 1        |
| 3    | Waste-water pipe                        | ...      | 3.5.5    | ...      |
| 4    | 3.5.6                                   | ...      | ...      | 3.5.7    |

(7)

- 3.6 Draw on ANSWER SHEET 3.6 a vertical sectional view of a manhole without the manhole frame and cover. (7)
- 3.7 ANSWER SHEET 3.7 shows the top view of a corner (quoin) half-brick wall. Project and draw the consecutive layer to fit exactly on the top view. Print the title of the drawing. (6)  
**[30]**

**QUESTION 4: COLD- AND HOT-WATER SUPPLY, TOOLS, EQUIPMENT AND MATERIALS (SPECIFIC)**

Start this question on a NEW page.

4.1 FIGURE 4.1 below shows part of a sewerage system.

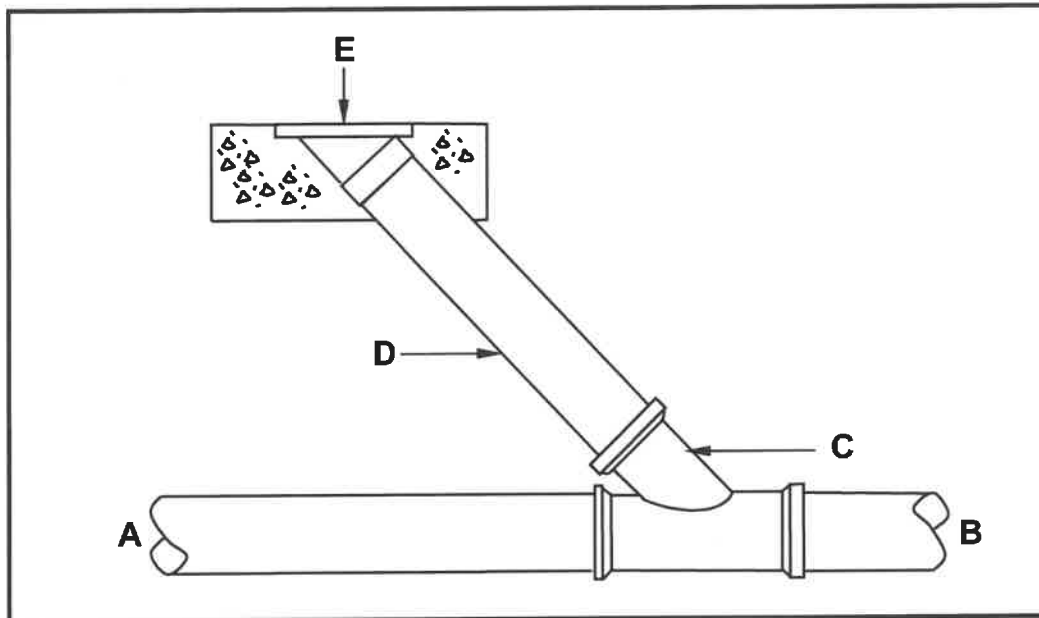


**FIGURE 4.1**

- 4.1.1 Identify components **C**, **D** and **E**. (3)
- 4.1.2 In which direction will the sewage in the main sewage pipe flow in terms of **A** and **B**? (1)
- 4.1.3 Explain why **C** is at an angle with the main sewage pipe. (1)
- 4.1.4 Explain the purpose of component **E**. (2)
- 4.1.5 Discuss TWO advantages of installing component **E** in a sewerage system instead of installing a manhole. (2)

- 4.2 FIGURE 4.2 below shows galvanised pipes with fittings used in water systems.

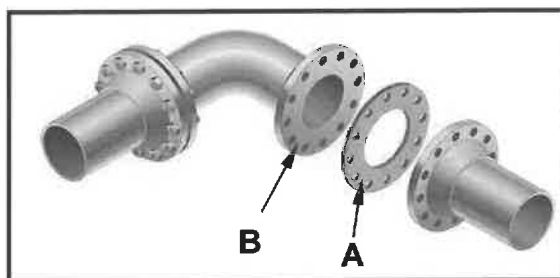


**FIGURE 4.2**

- 4.2.1 Identify **A** and **B**. (2)

- 4.2.2 Explain the purpose of **A**. (2)

- 4.3 FIGURE 4.3 below shows plumbing tools.

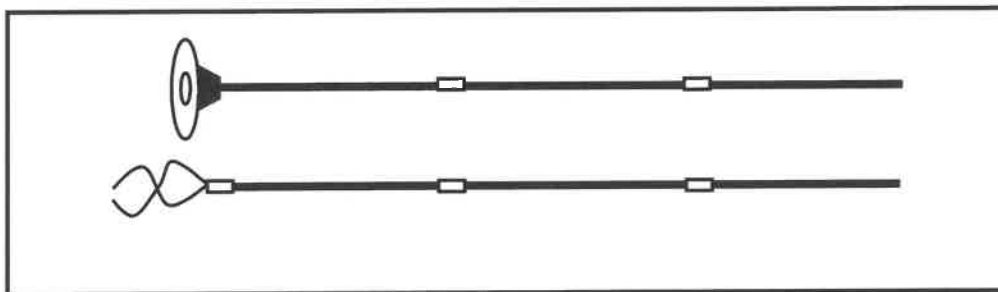


**FIGURE 4.3**

- 4.3.1 Identify the tool. (1)

- 4.3.2 State the use of the tool. (1)

- 4.3.3 Explain how to take care of the tool. (2)

4.4 FIGURE 4.4 below shows a type of geyser.

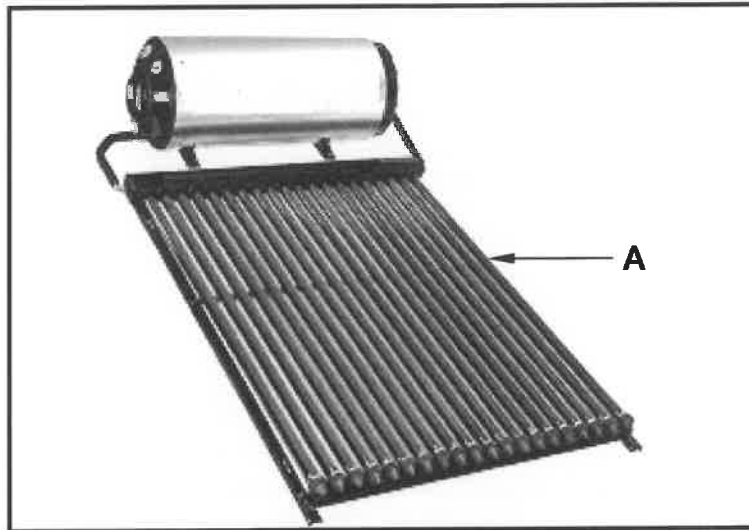


**FIGURE 4.4**

4.4.1 Identify the type of geyser. (1)

4.4.2 Identify **A**. (1)

4.4.3 Explain how **A** works. (2)

4.5 FIGURE 4.5 below shows an incomplete geyser.

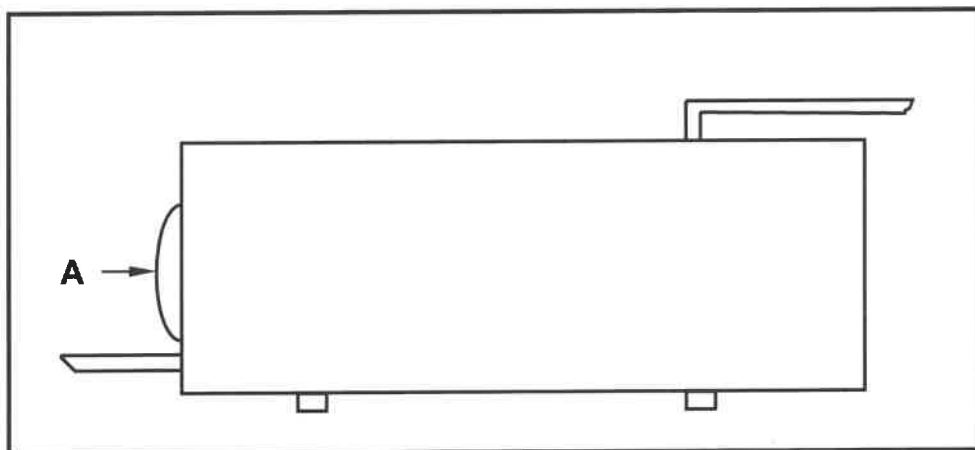


**FIGURE 4.5**

4.5.1 Name the device that will heat the water inside the cylinder. (1)

4.5.2 Identify **A**. (1)

4.5.3 Name the part that needs to be placed under the geyser in case it starts to leak. (1)

4.5.4 Explain how the water temperature inside the geyser will be regulated. (2)

4.6 Draw the following symbols that are used in hot-water systems:

4.6.1 Stopcock (2)

4.6.2 Balancing device (hot-water control) (2)

4.7 Choose a description from COLUMN B that matches the item in COLUMN A. Write only the letter (A–H) next to the question numbers (4.7.1 to 4.7.5) in the ANSWER BOOK, e.g. 4.7.6 J.

| COLUMN A |                           | COLUMN B |                                                                   |
|----------|---------------------------|----------|-------------------------------------------------------------------|
| 4.7.1    | Diluted hydrochloric acid | A        | to prepare galvanised metals for solder work                      |
| 4.7.2    | Dezincification           | B        | process to remove scale or corrosion from metal surfaces          |
| 4.7.3    | Electrolytic cleaning     | C        | is a ferrous metal                                                |
| 4.7.4    | Electrolytic reaction     | D        | added to soap solution to remove an oil layer on galvanised metal |
| 4.7.5    | Galvanic corrosion        | E        | has a very weak atomic bond                                       |
|          |                           | F        | process to remove scale or corrosion from an alloy-like brass     |
|          |                           | G        | acid corrosion that occurs where mixed metals are used            |
|          |                           | H        | electrochemical process between two dissimilar metals or alloys   |

(5 x 1) (5)

4.8 Show, by means of a sketch, a 90° double-reducing cross-junction with an inspection eye.

(5)  
[40]

**QUESTION 5: GRAPHICS AS MEANS OF COMMUNICATION, ROOF WORK AND STORM WATER (SPECIFIC)**

Start this question on a NEW page.

5.1 FIGURE 5.1 below shows a roof attached to a wall.

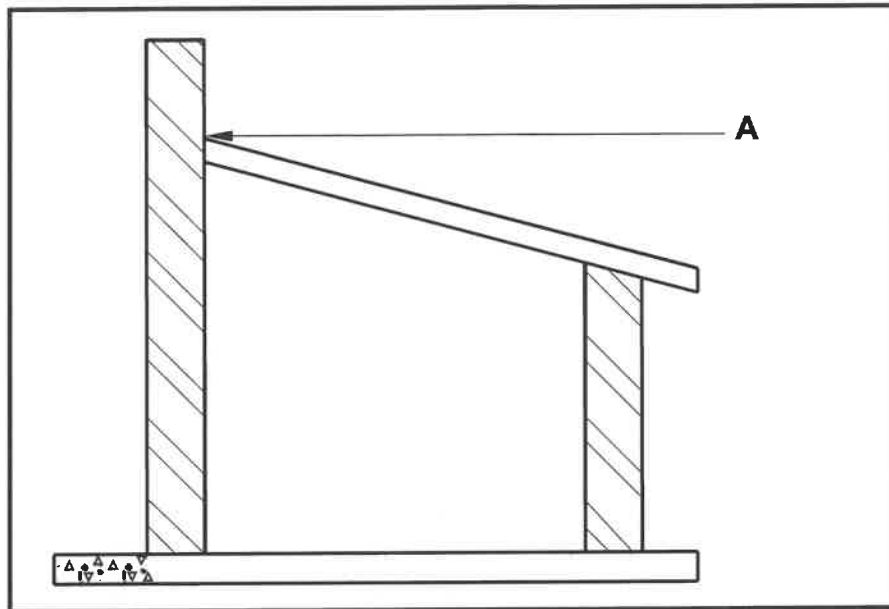


**FIGURE 5.1**

- 5.1.1 Name the component that must be installed at **A** to prevent leaks. (1)
- 5.1.2 Name ONE material that the component at **A** can be made of. (1)
- 5.2 Draw a neat sketch to show the shape of the development for a round pipe with seams for a chimney that must be attached to a sloping roof. (6)
- 5.3 The disposal of storm water from a building is regulated.
- 5.3.1 Name ONE waste product that must NOT be directed into a storm-water system. (1)
- 5.3.2 Explain why rain water around buildings must be channelled away. (1)
- 5.4 Name ONE hand tool that can be used to cut PVC gutters. (1)
- 5.5 ANSWER SHEET 5.5 shows the front view and top view of a square truncated pyramid made of sheet metal, to be used as part of the development of a hopper.
- Use the views and information given and draw the development of the truncated pyramid. Start the development at **A**.
- The pyramid has a 3 mm seam on both sides.
- Show ALL construction and projection lines. (19)
- [30]

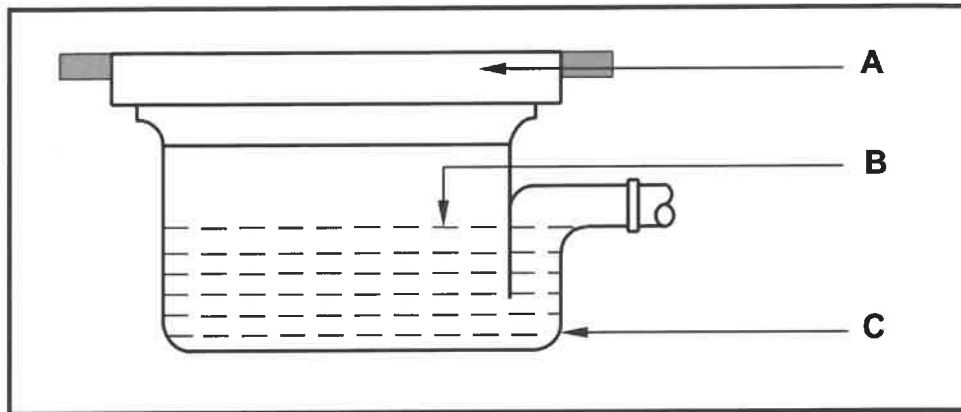
**QUESTION 6: SEWERAGE, SANITARY FITTINGS AND JOINING (SPECIFIC)**

Start this question on a NEW page.

6.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (6.1.1 to 6.1.5) in the ANSWER BOOK, e.g. 6.1.6 D.

- 6.1.1 The inspection pipe, distribution pipe and inspection eye cover are some parts of a ...  
A vacuum tank.  
B ramp.  
C French drain.  
D backfill trench. (1)
- 6.1.2 A ... is used to join soil water pipes in straight lengths.  
A straight pan collar  
B straight coupling double socket  
C plain T-waste junction  
D straight coupling (1)
- 6.1.3 The colour of storm-water drains should be ..., as required by the municipality and according to SANS-0040-1990.  
A black  
B blue  
C brown  
D None of the above-mentioned (1)
- 6.1.4 Cold- and hot-water taps are respectively marked in ...  
A red and orange.  
B black and orange.  
C blue and red.  
D blue and black. (1)
- 6.1.5 P-traps must be installed at ...  
A sinks.  
B showers.  
C baths.  
D All the above-mentioned (1)

- 6.2 Name TWO methods of securing galvanised pipes to a wall. (2)
- 6.3 Show, by means of a neat sketch, a sectional view of 3 mm plastic strips joined together with a rivet. (6)
- 6.4 FIGURE 6.4 below shows the sectional view of a drainage fixture. (2)

**FIGURE 6.4**

- 6.4.1 Identify **A** and **C**. (2)
- 6.4.2 Explain where the fixture will be positioned in a drainage pipeline. (1)
- 6.4.3 What is indicated by **B**? (1)
- 6.5 Name TWO materials that are used in the construction of an inspection chamber for a drainage system. (2)
- 6.6 What is the maximum depth of an inspection chamber used in a drainage system? (1)

6.7 FIGURE 6.7 below shows a sectional view of a septic tank.

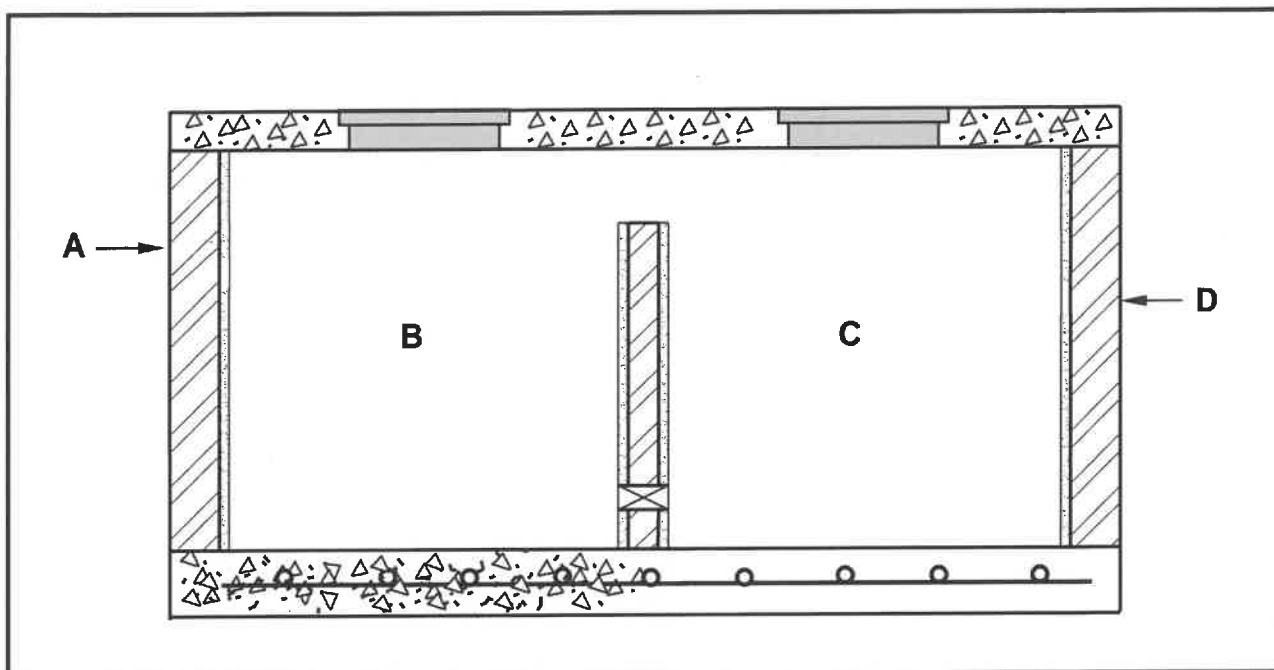


FIGURE 6.7

6.7.1 Identify compartments **B** and **C**. (2)

6.7.2 Show, by means of neat sketches in the ANSWER BOOK, the components that are missing at **A** and **D**. Show the positions as they should be in the septic tank.

Indicate the directions of flow in both drawings. (7)

6.8 FIGURE 6.8, on ANSWER SHEET 6.8, shows the floor plan of a building and part of the sewerage layout. Use ANSWER SHEET 6.8 to design and draw a suitable sewerage layout for the building. Print TWO different abbreviations on the main sewer lines. (11)  
[40]

**TOTAL: 200**

CENTRE NUMBER: 

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**ANSWER SHEET 2**

| NO. | QUESTIONS                                                                        | ANSWERS | MARKS |
|-----|----------------------------------------------------------------------------------|---------|-------|
| 1.  | What is the measurement of the dwelling facing Jacaranda Street?                 |         | 1     |
| 2.  | Identify number 1.                                                               |         | 1     |
| 3.  | Identify number 2.                                                               |         | 1     |
| 4.  | Identify number 3.                                                               |         | 1     |
| 5.  | Identify the number indicating the boundary line.                                |         | 1     |
| 6.  | Name the colour that must be used to indicate the new dwelling on the site plan. |         | 1     |
| 7.  | What is omitted at number 6 if the NGL is 300 mm lower than the FFL?             |         | 1     |
| 8.  | What type of fencing is used for the boundary wall for plot number 15?           |         | 1     |
| 9.  | Name TWO materials that can be used for number 7.                                |         | 2     |
| 10. | What is wrong with number 8?                                                     |         | 1     |
| 11. | Name THREE electrical installations omitted in the house.                        |         | 3     |
| 12. | Which plot is on the eastern side of the new dwelling?                           |         | 1     |

|     |                                                                                   |  |   |
|-----|-----------------------------------------------------------------------------------|--|---|
| 13. | Identify the elevation with no windows.                                           |  | 1 |
| 14. | How many rodding eyes are shown on the site plan?                                 |  | 1 |
| 15. | How many external doors are there on the plan for the house?                      |  | 1 |
| 16. | Which street is on the western side of the new dwelling?                          |  | 1 |
| 17. | How many 1 200 mm x 800 mm windows are in the building?                           |  | 1 |
| 18. | On what date was revision 1 completed?                                            |  | 1 |
| 19. | Draw the symbol for a wall-mounted urinal.                                        |  | 2 |
| 20. | Draw the symbol for a double-pole one-way switch.                                 |  | 3 |
| 21. | Draw the symbol for a staircase.                                                  |  | 3 |
| 22. | Deduce from the notes column the type of globes that will be used in the bedroom. |  | 1 |
| 23. | In which town will the new dwelling be erected?                                   |  | 1 |

|     |                                                                                                                                                           |               |           |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|
| 24. | Calculate the total length of fencing that would be needed to fence plot number <b>15</b> .<br>Give your answer in metres and show ALL your calculations. |               | 6         |
| 25. | The internal area of the open plan kitchen is 72,94 m <sup>2</sup> . Calculate the length of number <b>5</b> . Give your answer in mm.                    |               | 3         |
|     |                                                                                                                                                           | <b>TOTAL:</b> | <b>40</b> |

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**ANSWER SHEET 3.6**

| ASSESSMENT CRITERIA |          |                  |
|---------------------|----------|------------------|
| NO.                 | MARK     | CANDIDATE'S MARK |
| 1                   | 2        |                  |
| 2                   | 1        |                  |
| 3                   | 2        |                  |
| 4                   | 1        |                  |
| 5                   | 1        |                  |
| <b>TOTAL:</b>       | <b>7</b> |                  |

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**ANSWER SHEET 3.7**

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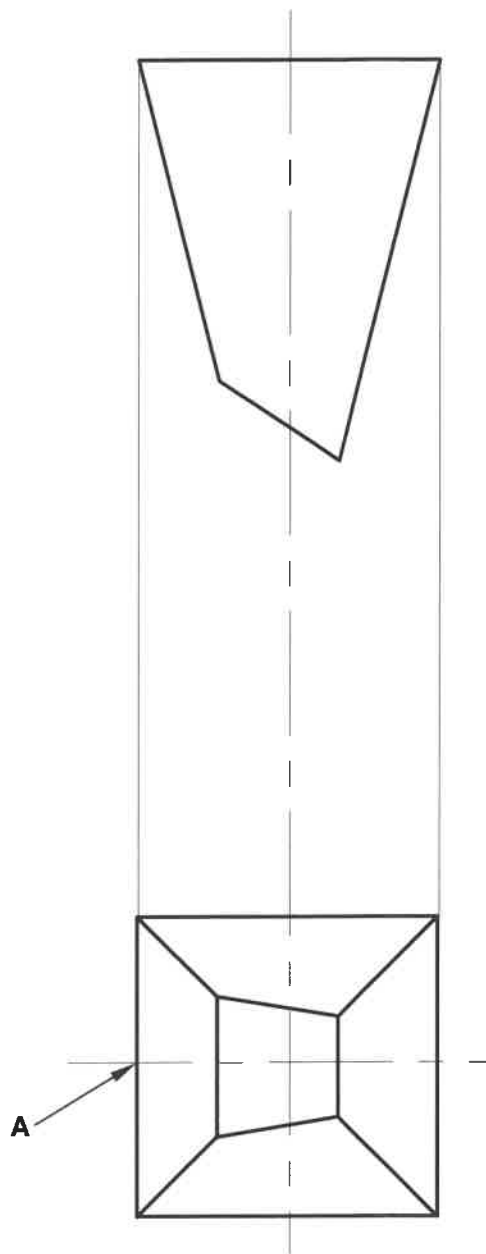
| ASSESSMENT CRITERIA |          |                  |
|---------------------|----------|------------------|
| NO.                 | MARK     | CANDIDATE'S MARK |
| 1                   | 3        |                  |
| 2                   | 2        |                  |
| 3                   | 1        |                  |
| <b>TOTAL:</b>       | <b>6</b> |                  |

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**ANSWER SHEET 5.5**

| ASSESSMENT CRITERIA |           |                  |
|---------------------|-----------|------------------|
| NO.                 | MARK      | CANDIDATE'S MARK |
| 1                   | 1         |                  |
| 2                   | 2         |                  |
| 3                   | 3         |                  |
| 4                   | 5         |                  |
| 5                   | 5         |                  |
| 6                   | 2         |                  |
| 7                   | 1         |                  |
| <b>TOTAL:</b>       | <b>19</b> |                  |

CENTRE NUMBER:

EXAMINATION NUMBER:

## ANSWER SHEET 6.8

| ASSESSMENT CRITERIA |           |                  |
|---------------------|-----------|------------------|
| NO.                 | MARK      | CANDIDATE'S MARK |
| 1                   | 1         |                  |
| 2                   | 1         |                  |
| 3                   | 3         |                  |
| 4                   | 1         |                  |
| 5                   | 1         |                  |
| 6                   | 2         |                  |
| 7                   | 2         |                  |
| <b>TOTAL:</b>       | <b>11</b> |                  |

MUNICIPAL CONNECTION

