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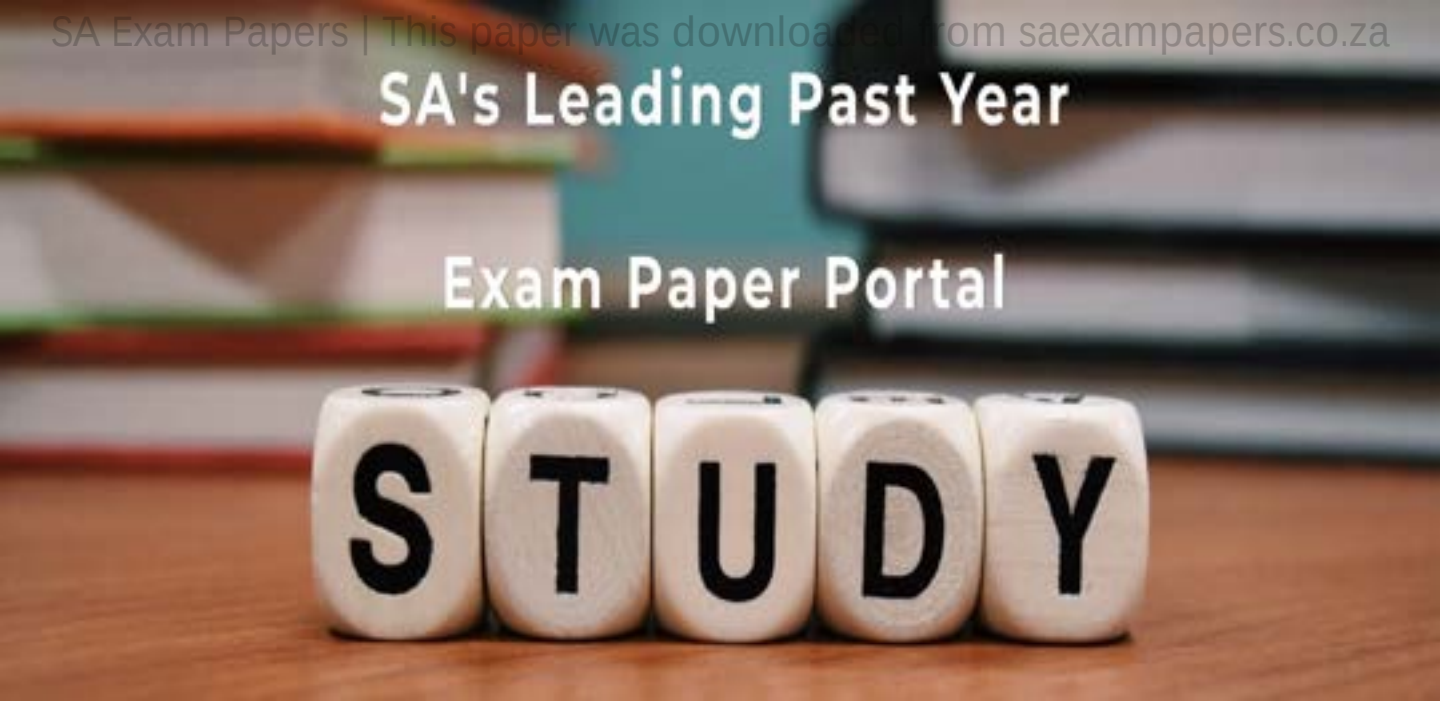

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Province of the
EASTERN CAPE
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GRADE 12

SEPTEMBER 2023

CIVIL TECHNOLOGY: WOODWORKING

MARKS: **200**

TIME: **3 hours**

This question paper consists of 21 pages, including 4 answer sheets.

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REQUIREMENTS:

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

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX questions: TWO questions are generic and FOUR questions are subject specific.
2. Answer ALL the questions.
3. Answer each question as a whole. Do NOT separate subsections of questions.
4. Start the answer to EACH question on a NEW page.
5. Do NOT write in the margins of the ANSWER BOOK.
6. You may use sketches to illustrate your answers.
7. Write ALL calculations and answers in the ANSWER BOOK or on the attached ANSWER SHEETS.
8. Use the mark allocation as a guide to the length of your answers.
9. 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.*
10. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
11. Use your own discretion where dimensions and/or details have been omitted.
12. Answer QUESTIONS 2.2, 3.4, 3.5 and 5.9 on the attached ANSWER SHEETS using drawing instruments where necessary.
13. Write your FULL NAME on every ANSWER SHEET and hand them in with your ANSWER BOOK, whether you have answered the question or not.
14. Due to electronic transfer, drawings in the question paper are NOT to scale.

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QUESTION 1: SAFETY AND MATERIALS (GENERIC)

Start this question on a NEW page.

1.1 What is the aim of the Occupational Health and Safety Act (Act 85 of 1993) (OHS Act)? (1)

1.2 Name the TWO main causes of accidents. (2 x 1) (2)

1.3 Name ONE reason why scaffolding should be inspected, before it can be used. (1 x 1) (1)

1.4 Answer the following questions with regard to the scaffolding in FIGURE 1.4.

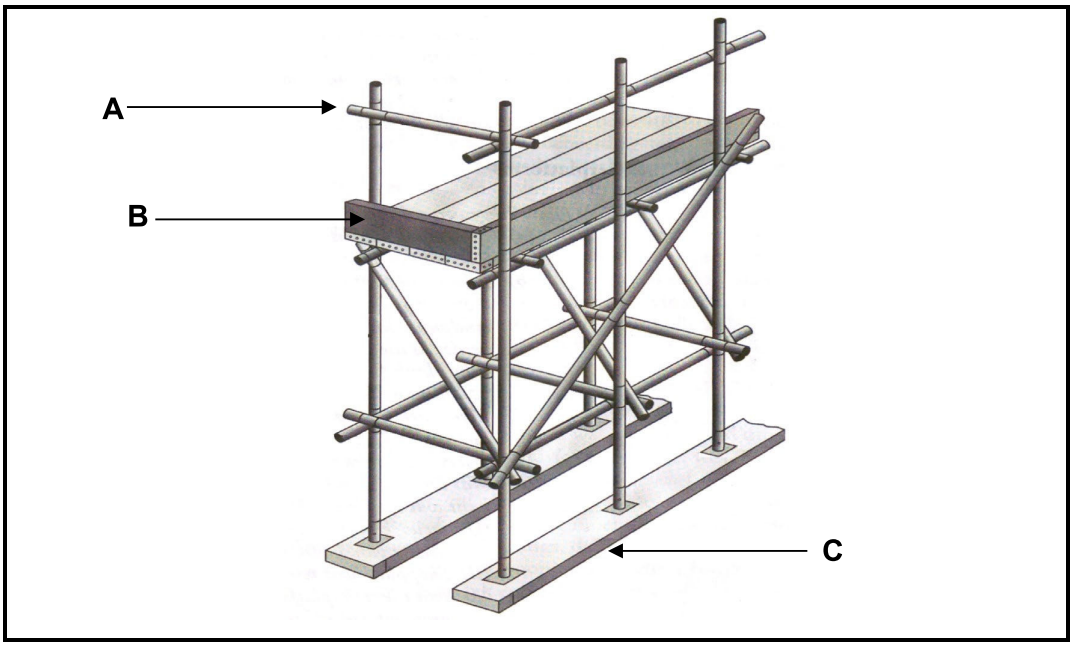

FIGURE 1.4

1.4.1 Name parts **A** to **C**. (3 x 1) (3)

1.4.2 Is this a dependant **or** an undependant scaffolding? (1)

1.4.3 What is the maximum height that part **A** must be from the platform? (1)

1.5 Answer the following questions regarding the regulations on a construction site.

1.5.1 Name ONE way to transport waste material from higher levels in a building to the ground level. (1 x 1) (1)

1.5.2 If work is done above an entrance, what will prevent materials from falling on workers below? (1)

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1.6 Indicate whether the following statements are TRUE or FALSE.

1.6.1 Trestle scaffold is used on heights greater than 3 m. (1)

1.6.2 No stack height should exceed three times the width of the material. (1)

1.6.3 Aluminium ladders can be used in the proximity of electrical wires. (1)

1.6.4 The horizontal part of a ladder is called a stile. (1)

1.7 Name the TWO main groups into which paint can be divided. (2 x 1) (2)

1.8 What is the purpose of galvanising? (1)

1.9 Name TWO advantages of curing (concrete). (2 x 1) (2)

[20]

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QUESTION 2: GRAPHICS, JOINING AND EQUIPMENT (GENERIC)

Start this question on a NEW page.

2.1 Identify SIX of the descriptions below which are applicable to the checklist of a floor plan.

- Window numbers
- Building lines
- Plot number
- Door swings
- Names of rooms
- Ground contours
- Stair directions
- Sliding doors
- Street number
- Water connection point
- Position of proposed building
- Floor covering (6 x 1) (6)

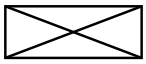
2.2 FIGURE 2.2 on ANSWER SHEET A shows the incomplete elevation of a building. Complete the elevation by drawing in the following parts on scale 1 : 50.

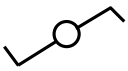
2.2.1 A window with a length of 1 800 mm and a height of 900 mm. The window is built in 700 mm from the right-hand side and one-third of the right side of the window can open. (7)

2.2.2 A door according to standard measurements, 900 mm from the left side of the building. The door opens to the left. There is one step to the ground level. (5)

2.2.3 The barge board against the gable end. (2)

2.3 Identify the appliances which are illustrated by the following drawing symbols.

2.3.1  (1)

2.3.2  (1)

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2.4 Make neat sketches according to standard building drawing practice to illustrate the following symbols.

2.4.1 Water meter (2)

2.4.2 Plaster (2)

2.4.3 Invert level (2)

2.5 Briefly explain the advantages of the square shoulder screw. (2)

2.6 Explain the meaning of the following code on rawl bolts: **R-RBL M06/18**. (3)

2.7 What is the purpose of the foot screws of the dumpy level? (1)

2.8 Identify the cross hairs **A** to **C** in the telescope of the dumpy level in FIGURE 2.8.

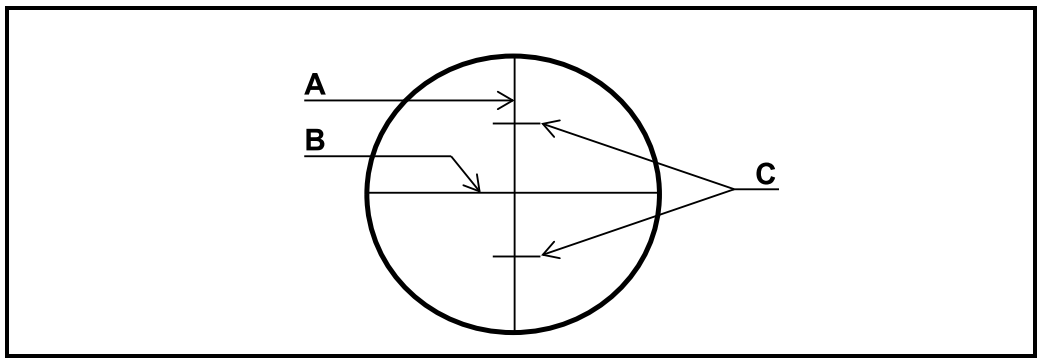

FIGURE 2.8

(3 x 1) (3)

2.9 Name TWO uses of the dumpy level. (2 x 1) (2)

2.10 Motivate briefly why labels and metal plates should be removed from the multi-detector before using the instrument. (1)

[40]

TOTAL SECTION A: 60

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QUESTION 3: CASEMENTS, CUPBOARDS, WALL-PANELLING 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, for example 3.1.6 Casement.

Mullion; Fanlight; Tongue and groove; Transom; Skirting; Drip groove; Melamine; Bottom rail

3.1.1 Intermediate member between the jambs. (1)

3.1.2 The small window above the opening of a door or window. (1)

3.1.3 Prevents rain water from being blown into the casement and penetrating the room. (1)

3.1.4 Horizontal member that separates the casement and fanlight. (1)

3.1.5 Boards that are usually made of knotty pine and easily fits into one another by means of specific feature on each side of the board. (1)

3.2 FIGURE 3.2 shows an external elevation of a double casement with fanlights. Study the figure and answer the questions that follow.

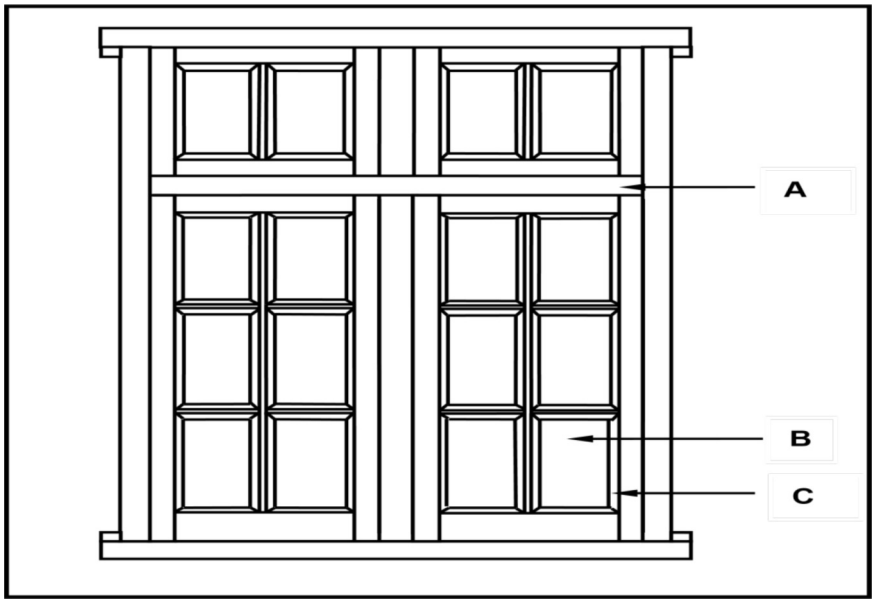

FIGURE 3.2

3.2.1 What type of materials can be used for **A** and **B** respectively? (2 x 1) (2)

3.2.2 Explain the purpose of part **C**. (1)

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3.3 FIGURE 3.3 shows the built in cupboard without the doors. Study the figure and answer the questions that follow.

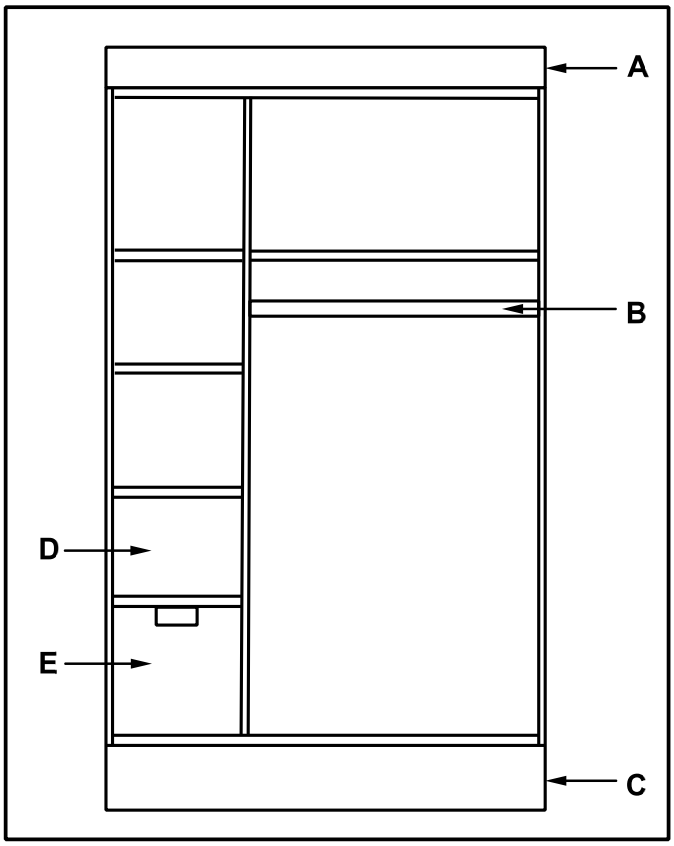

FIGURE 3.3

3.3.1 Identify parts **D** and **E**. (2 x 1) (2)

3.3.2 Describe the difference between a *free-standing cupboard* and a *built-in-cupboard*. (2)

3.3.3 What is the depth of a free-standing cupboard? (1)

3.3.4 Describe the advantage of a built-in-cupboard up to ceiling height. (1)

3.3.5 Explain in your own words why you will use melamine rather than plain chipboard for the inside of a built-in-cupboard. (2 x 1) (2)

3.4 Use ANSWER SHEET B and draw in good proportion a neat sketch of a vertical section through the finishing of the top wall panelling below the ceiling and the cornice. Show labels for any TWO parts. (5)

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3.5 FIGURE 3.5 shows the floor plan of a building with a gable roof.
The external measurements are 9 000 mm x 5 000 mm.

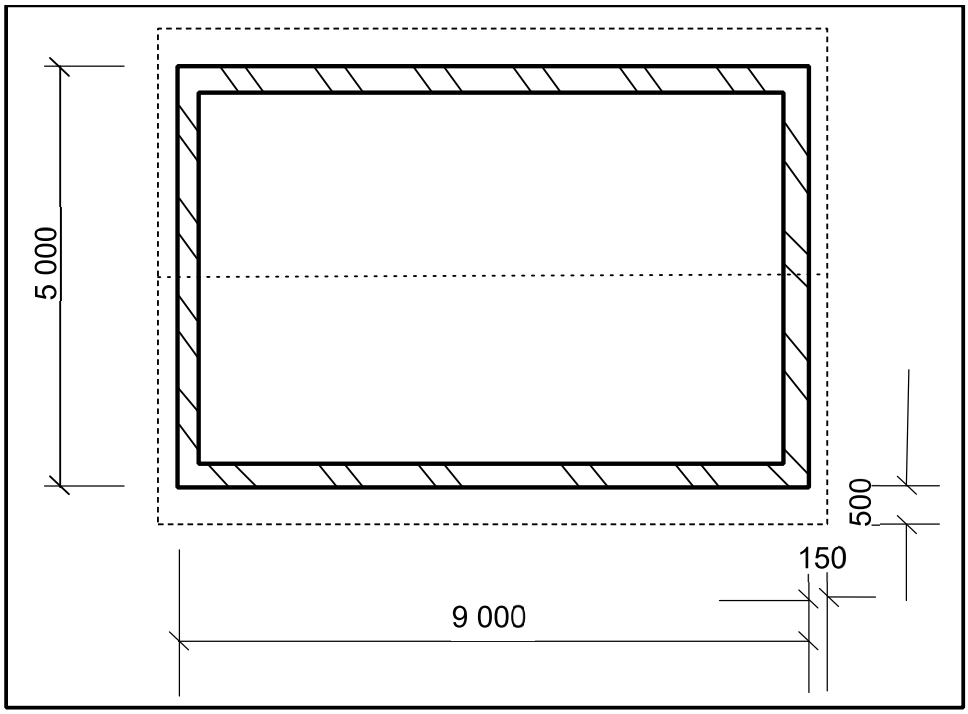

FIGURE 3.5

Use the following specifications:

- Walls are 220 mm thick
- South African roof truss
- Length of ONE ridge capping is 2 350 mm
- True length of a rafter is 2 900 mm
- Corrugated roof sheet projects 50 mm past the rafter

Use the dimension sheet on ANSWER SHEET C and calculate the following:

3.5.1 The total length of the fascia board needed for the building in metres (4)

3.5.2 The length of ONE corrugated roof sheet (2)

3.5.3 The number of ridge capping needed (3)
[30]

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QUESTION 4: ROOFS, CEILINGS, TOOLS AND EQUIPMENT AND MATERIALS (SPECIFIC)

Start this question on a NEW page.

4.1 Choose a description from COLUMN B that matches best with an item in COLUMN A. Write only the letter (A–F) next to the question numbers (4.1.1–4.1.5) in the ANSWER BOOK, for example 4.1.6 G.

COLUMN A		COLUMN B	
4.1.1	Batten	A	Type of roof covering
4.1.2	Galvanised nail plate	B	Internal angle formed where two parts of a pitched roof meet
4.1.3	Hurricane clip	C	38 mm x 38 mm
4.1.4	Valley	D	Join purlins to rafters
4.1.5	Purlin size	E	Right angular galvanised punched steel plate to join roof truss parts
		F	76 mm x 50 mm

(5 x 1) (5)

4.2 FIGURE 4.2 shows a pictorial view of a roof with a hipped end, a gable end and a valley. The roof will be covered with corrugated iron sheeting.
Study the figure below and answer the questions that follow.

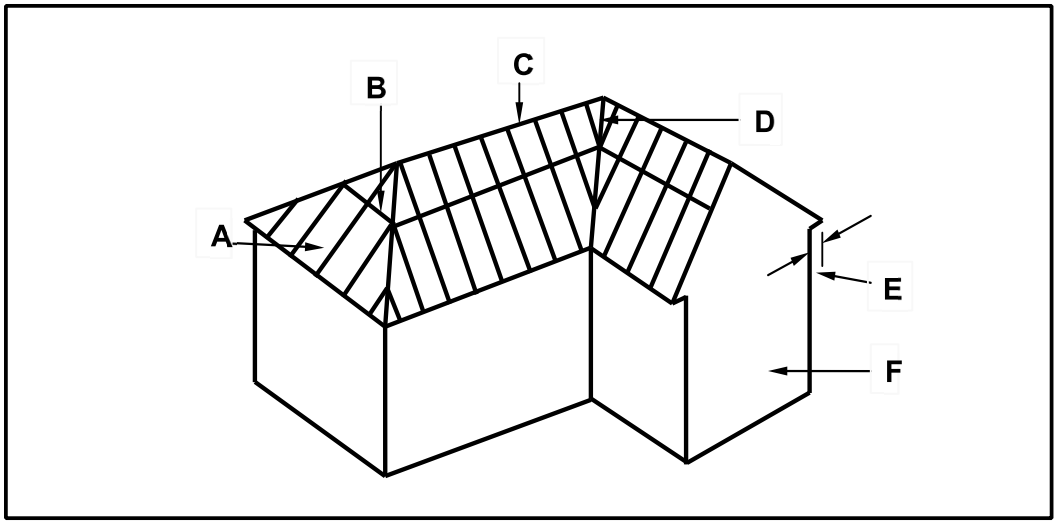

FIGURE 4.2

4.2.1 Identify parts **B** and **D**. (2 x 1) (2)

4.2.2 Explain what a *hipped end* is. (1)

4.2.3 Describe the purpose of part **C**. (2)

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4.2.4 Explain why the corrugated iron sheets are protruding 50 mm over the ends of the rafters. (1)

4.2.5 Describe the difference between a *hipped end roof* and a *gable roof* in terms of the material to be used and the construction method. Describe your answer in table form. (4)

4.3 Explain TWO purposes of roof underlay for a tiled roof. (2 x 1) (2)

4.4 Explain the first THREE steps that you must consider when preparing wood for preservation. (3 x 1) (3)

4.5 Explain TWO characteristics of a good roof covering. (2 x 1) (2)

4.6 Name the THREE main parts of a conventional trap door. (3 x 1) (3)

4.7 Differentiate between a *hurricane clip* and a *storm clip*. (2)

4.8 FIGURE 4.8 shows a portable electrical machine. Study the picture and answer the questions that follow.

FIGURE 4.8

4.8.1 Identify the machine in FIGURE 4.8. (1)

4.8.2 Name TWO personal safety equipment that you must wear when operating the machine. (2 x 1) (2)

4.8.3 Recommend TWO ways of storing the machine. (2 x 1) (2)

4.8.4 Describe TWO safety precautions that should be applied to a piece of timber to prevent damages to the machine in FIGURE 4.8. (2 x 1) (2)

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4.9 FIGURE 4.9 shows a radial arm saw. Study the picture and answer the questions that follow.

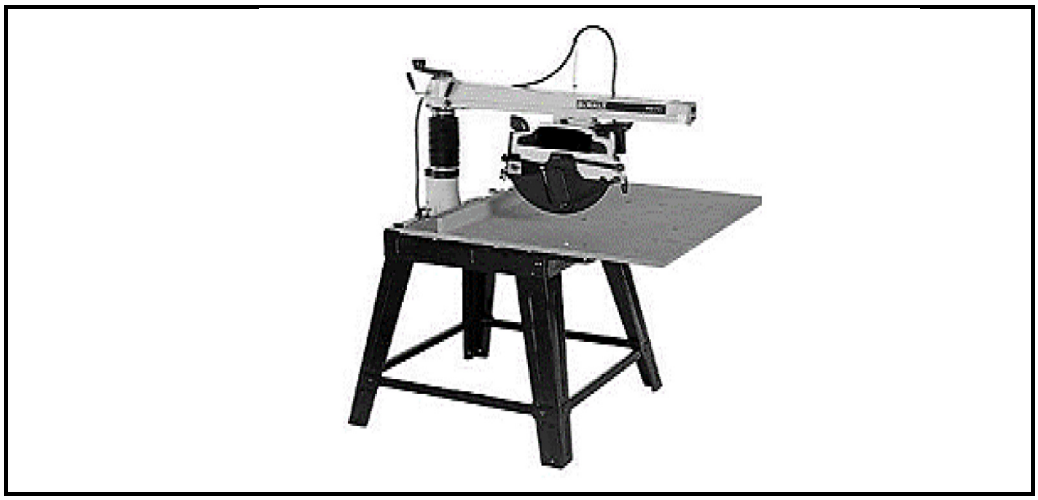

FIGURE 4.9

4.9.1 Describe THREE precautions that should be taken to ensure safe handling of the machine. (3 x 1) (3)

4.9.2 Explain how the blade of the machine must be cared for, to prevent it from being damaged. (1)

4.10 The heads of graded timber boards are marked with a letter, a symbol and a number. Explain what the letter and number represent. (2)

[40]

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QUESTION 5: CENTERING, FORMWORK, SHORING AND GRAPHICS AS MEANS OF COMMUNICATION (SPECIFIC)

Start this question on a NEW page.

5.1 FIGURE 5.1 below shows a vertical section through formwork for two concrete beams.

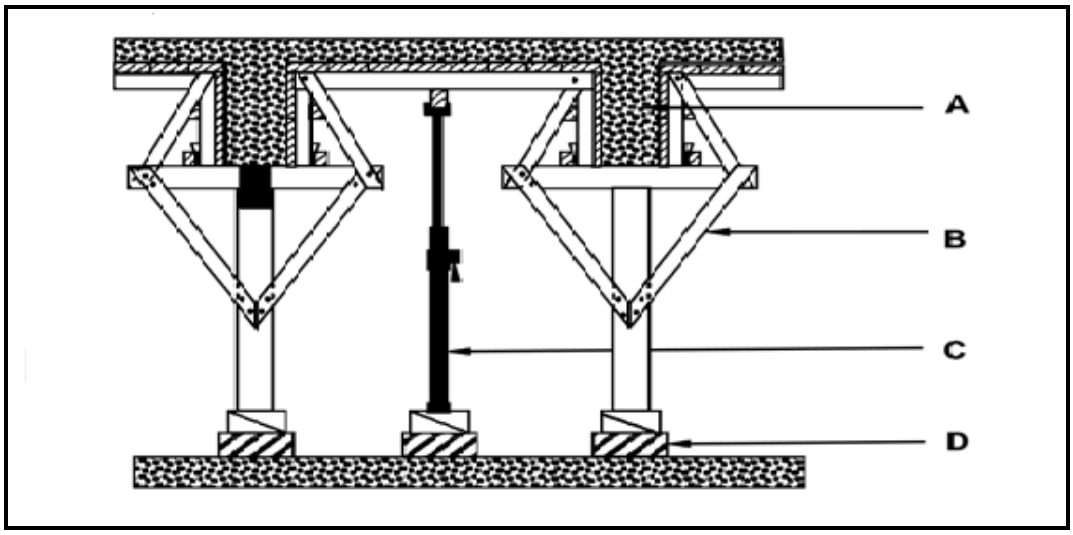

FIGURE 5.1

Identify parts **A** to **D**. (4 x 1) (4)

5.2 Recommend TWO wooden products that can be used as sides of the formwork. (2 x 1) (2)

5.3 Describe the purpose of the following members in formwork.

5.3.1 Ties (1)

5.3.2 Fish plate (1)

5.4 Explain why the soffit board in the construction of formwork, is thicker than the sides. (1)

5.5 Describe the difference between the following shores regarding their uses.

5.5.1 Double flying shore (1)

5.5.2 Dead shore (1)

5.6 Describe the function of the following components of the dead shore.

5.6.1 Sole plate (1)

5.6.2 Prop / Strut (1)

5.6.3 Steel dog (1)

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5.7 At what angle must the braces above and beneath the horizontal shores be placed on a flying shore? (1)

5.8 FIGURE 5.8 shows a pictorial view of the construction details underneath a centre of an arch. Study the figure and answer the questions that follow.

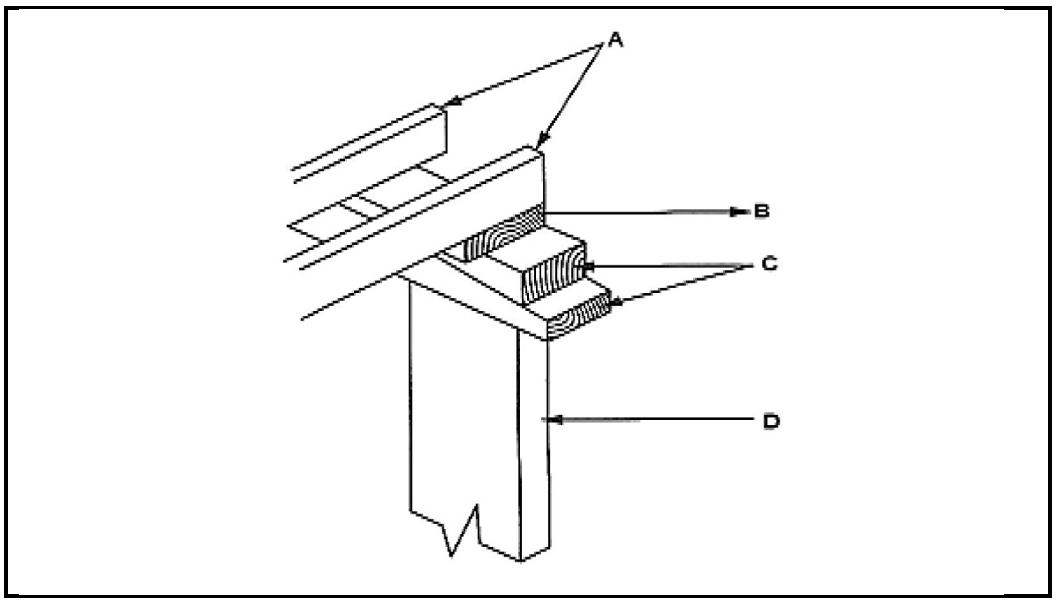

FIGURE 5.8

5.8.1 Identify parts **A** to **D**. (4 x 1) (4)

5.8.2 Explain ONE use of part **A.** (1 x 1) (1)

5.8.3 Describe TWO purposes of part **C**. (2 x 1) (2)

5.8.4 Describe the function of part **D** in the construction of a centre. (1)

5.9 Use ANSWER SHEET D and draw a neat line diagram of a couple roof truss on top of the indicated walls. The slope of the roof truss is 45°.

Show the following on the drawing:

- Span by means of dimension lines
- Wall plate
- Rafters
- Ridge beam
- Slope of the roof (7)

[30]

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QUESTION 6: SUSPENDED FLOORS, STAIRCASES, IRONMONGERY, DOORS AND JOINING (SPECIFIC)

Start this question on a NEW page.

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

6.1.1 … can be used to fix roof sheeting to purlins.

A Round head nails
B Self-taping hexagonal screws
C Bolts and nuts
D Hurricane clip (1)

6.1.2 A door can be attached to the door frame by using various types of ...

A screws.
B nails.
C clamps.
D hinges. (1)

6.1.3 Gypsum ceiling boards are secured to branderings by using …

A self-taping hexagonal screws. (1)
B oval wire nails.
C 38 mm clout nails.
D counter-sunk screws.

6.1.4 The haunch of a haunched mortise and tenon joint …

A adds strength and prevent rail from twisting.
B decreases the bonding area.
C gives more appealing look to the joint.
D is half the thickness of the rail. (1)

6.1.5 The width of the floor boards for suspended timber floors should be at least 50 mm, not exceeding …

A 100 mm.
B 400 mm.
C 140 mm.
D 299 mm. (1)

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6.2 FIGURE 6.2 shows part of the floor plan of a suspended timber floor. Study the figure and answer the questions that follow.

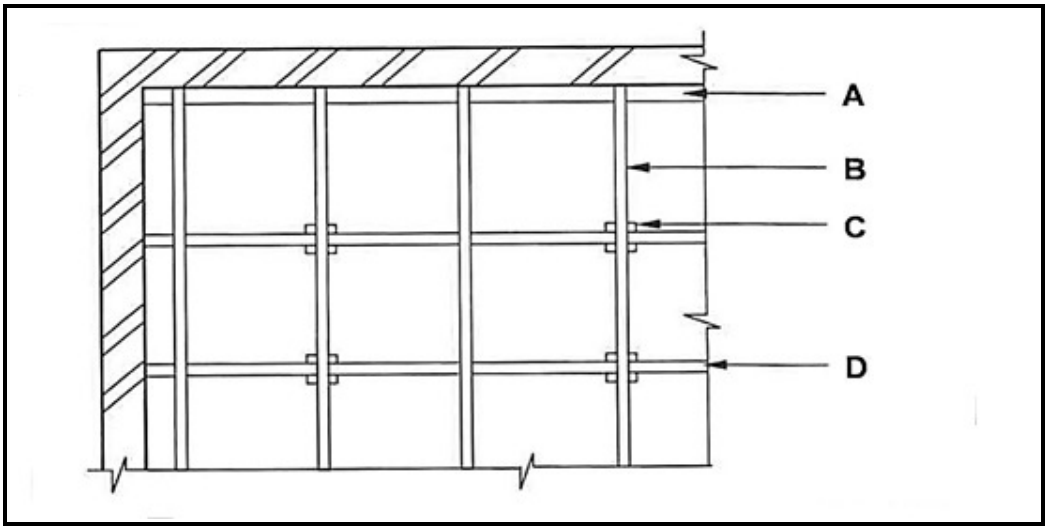

FIGURE 6.2

6.2.1 Name the parts **A** to **D**. (4 x 1) (4)

6.2.2 Motivate why the concrete base under part **C** should be wider than part **C**. (2)

6.3 Briefly explain THREE factors that determines the size of the floor joist in suspended timber floor. (3 x 1) (3)

6.4 Explain why there should be a clearance between the floor boards and the wall. (1)

6.5 At suspended floors of a multi-storey building, there are TWO methods that are commonly used to fix the floor joist to wall.

Differentiate between the TWO methods by means of neat freehand sketches. Write the name of the method below EACH drawing. (2 x 2) (4)

6.6 Describe the difference between the *mortise lock* and *night latch* with regard to their placement. (2)

6.7 Draw in your ANSWER BOOK, in good proportion, a vertical cross-section view through a lock rail and a part of a raised panel door. (6)

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6.8 FIGURE 6.8 below shows the bottom inside corner of a door. Answer the questions that follow.

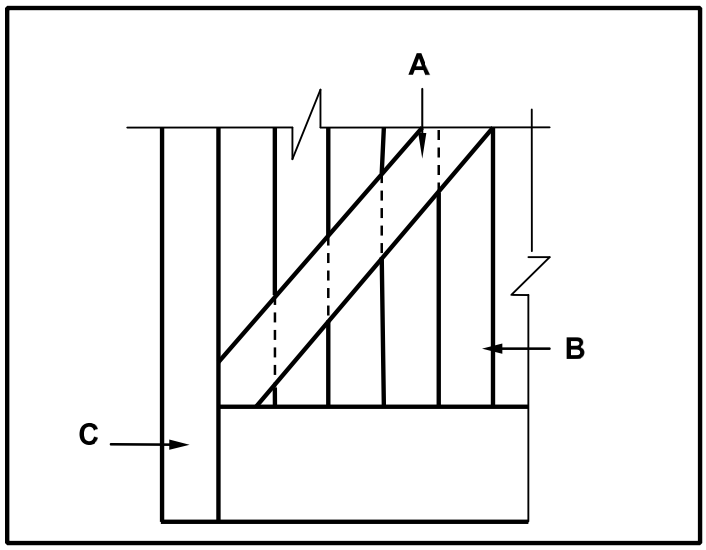

FIGURE 6.8

6.8.1 Identify the type of door. (1)

6.8.2 Explain why the bottom ends of the batten can run over the bottom rail. (1)

6.8.3 Name the joint that can be used to give a neat appearance to members. (1)

6.9 Draw in your ANSWER BOOK a line diagram of the top view of a flight of stairs with a landing between the steps.

Show the following on your drawing:

- 110 mm wall
- Three treads on both sides of the landing
- Landing
- Handrail
- Two newel posts
- Arrows indicating the rise of the stairs (8)

6.10 Explain the purpose of the landing in a flight of stairs. (1)

6.11 What is the minimum measurement between the pitch line and the ceiling of a staircase? (1)

[40]

TOTAL: 200

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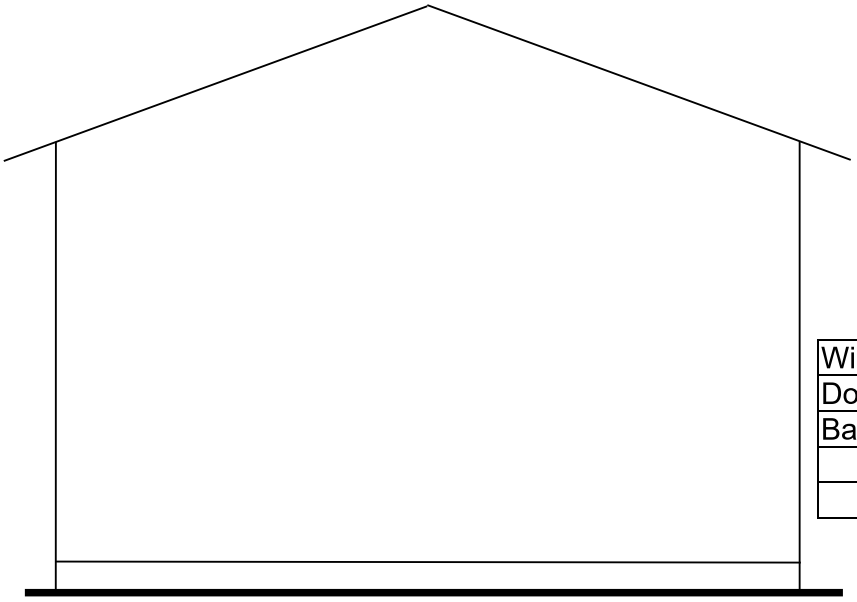
ANSWER SHEET **A**	CIVIL TECHNOLOGY GENERIC	NAME: _____

2.2 FIGURE 2.2 on ANSWER SHEET A shows the incomplete elevation of a building. Complete the elevation by drawing in the following parts on scale 1 : 50.

2.2.1 A window with a length of 1 800 mm and a height of 900 mm. The window is built in 700 mm from the right-hand side and one-third of the right side of the window can open. (7)

2.2.2 A door according to standard measurements, 900 mm from the left side of the building. The door opens to the left. There is one step to the ground level. (5)

2.2.3 The barge board against the gable end. (2)



Window	7	
Door	5	
Barge board	2	
TOTAL:	**14**	

FIGURE 2.2

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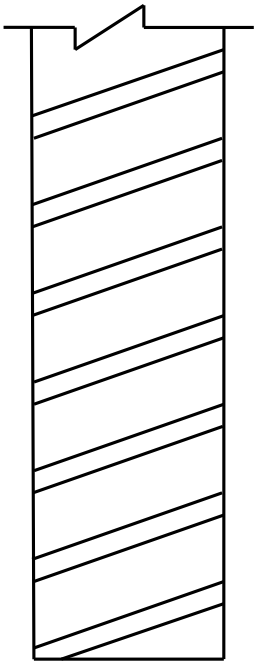
ANSWER SHEET **B**	CIVIL TECHNOLOGY SPECIFIC	NAME: _____

3.4 Use ANSWER SHEET B and draw in good proportion a neat sketch of a vertical section through the finishing of the top wall panelling below the ceiling and the cornice.
Show labels for any TWO parts.



ASSESSMENT CRITERIA	MARK	L/ M
Capping	1	
Rough ground	1	
Tongue and groove board	1	
Correctness of drawing	2	
TOTAL:	**5**	

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ANSWER SHEET **C**	CIVIL TECHNOLOGY SPECIFIC	NAME: _____

Dimension paper

		A	B	C	D
3.5	3.5.1				
	3.5.2				
	3.5.3				

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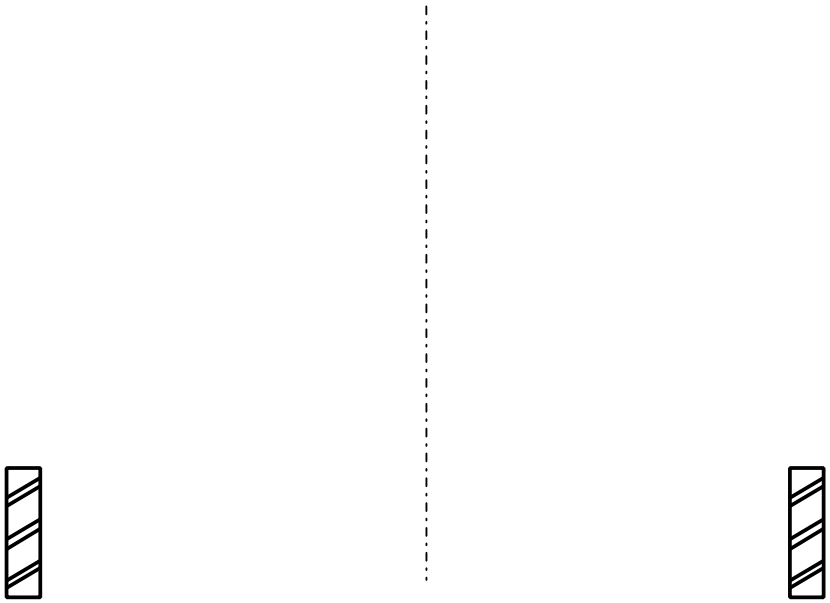
ANSWER SHEET **D**	CIVIL TECHNOLOGY SPECIFIC	NAME: _____

5.9 Use ANSWER SHEET D and draw a neat line diagram of a couple roof truss on top of the indicated walls. The slope of the roof truss is 45°.

Show the following on the drawing:

- Span by means of dimension lines
- Wall plate
- Rafters
- Ridge beam
- Slope of roof



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Span	1	
Wall plates	2	
Rafters	2	
Ridge beam	1	
Slope of roof	1	
TOTAL:	**7**	

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