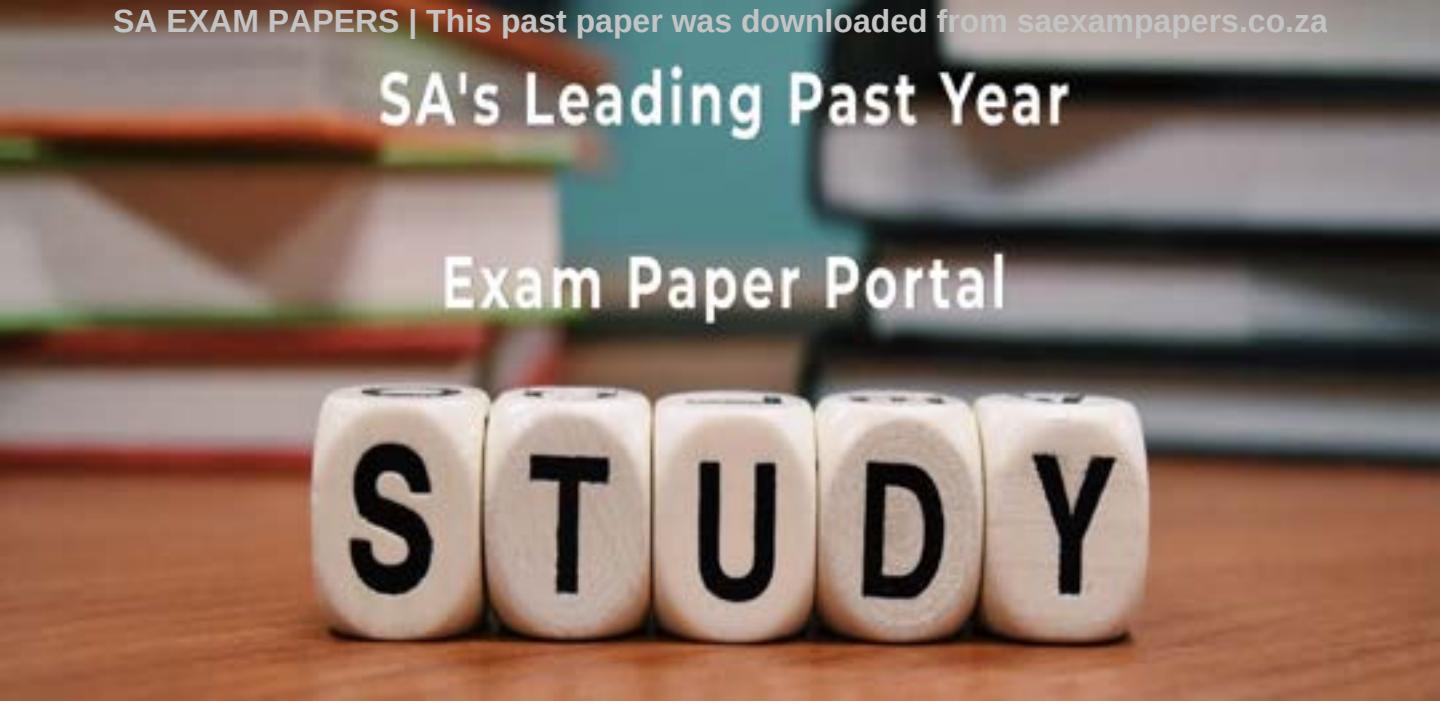

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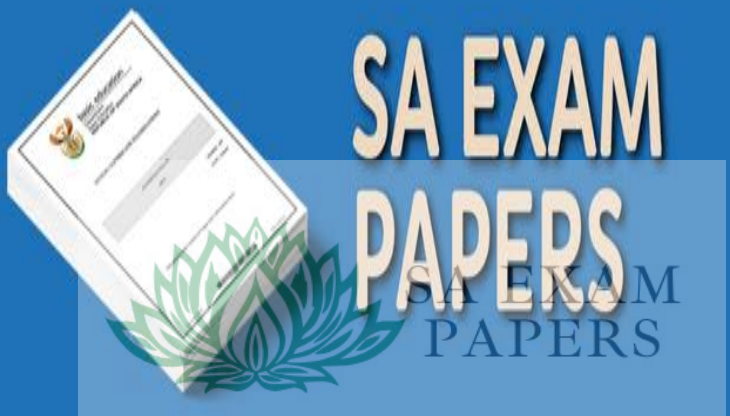

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NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2024

CIVIL TECHNOLOGY: WOODWORKING

MARKS: **200**

TIME: **3 hours**

This question paper consists of 23 pages, including 5 answer sheets.

REQUIREMENTS:

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

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. Number the answers correctly according to the numbering system used in this question paper.
6. Do NOT write in the margins of the ANSWER BOOK.
7. You may use sketches to illustrate your answers.
8. Write ALL calculations and answers in the ANSWER BOOK or on the attached ANSWER SHEETS.
9. Use the mark allocation as a guide to the length of your answers.
10. 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.*
11. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
12. Use your own discretion where dimensions and/or details have been omitted.
13. Answer QUESTIONS 2.1, 3.2, 3.3, 6.3.2 and 6.5 on the attached ANSWER SHEETS using drawing instruments where necessary.
14. Write your NAME on every ANSWER SHEET and hand them in with your ANSWER BOOK, whether you have answered the question or not.
15. Owing to electronic transfer, drawings in the question paper are NOT to scale.
16. Google images was used as the source of all photographs and pictures.
17. Write neatly and legibly.

QUESTION 1: SAFETY AND MATERIALS (GENERIC)

Start this question on a NEW page.

1.1 Choose the correct requirements regarding scaffolding:

1.1.1 It must have a safety factor of at least **2 / 4** (1)

1.1.2 The width of the wooden scaffold platform is at least **114 mm / 228** mm (1)

1.1.3 Guard rails must be at least **750 mm / 900 mm** high (1)

1.1.4 Toe-boards must be at least **150 mm / 1 500 mm** high (1)

1.1.5 Platforms must have a **non-slip layer / rust-free layer** (1)

1.2 Motivate why suspended scaffolding should be as near as possible to the structure where work is being done. (1)

1.3 Identify THREE of the regulations below that apply to the supplier of hazardous chemical substances.

1.3.1 First-aid measures must be indicated

1.3.2 The supplier of the containers must be indicated

1.3.3 Emergency contact numbers must be indicated

1.3.4 Fire-fighting measures must be indicated

1.3.5 Transport information must be indicated

1.3.6 Storage instructions must be indicated (3 x 1) (3)

1.4 What is the minimum and maximum slope of the stairs used during the construction process? (2)

1.5 Briefly motivate why aluminium ladders must not be used close to electrical wires. (2)

1.6 Describe the difference between the type of surface finish of a water-based paint and an oil-based paint. (2)

1.7 Name THREE advantages of the curing process of concrete. (3 x 1) (3)

1.8 Briefly describe the process of powder coating. (2)

[20]

QUESTION 2: GRAPHICS, JOINING AND EQUIPMENT (GENERIC)

Start this question on a NEW page.

2.1 Use the information on ANSWER SHEET A and complete the site plan on a scale of 1 : 200 according to the following requirements:

2.1.1 The site boundaries are measured from point **A**
The site boundaries in front and back are 23 m long
The site boundaries on the sides are 25 m long (2)

2.1.2 The front building line is 4 m from the site boundary
The back and side building lines are 2 m from the site boundaries (2)

2.1.3 Show the site entrance, 3 m from the western site boundary (1)

2.1.4 Show the datum level in the north-eastern corner of the site (1)

Complete the sewage lay-out and abbreviations of the sewage appliances according to the following requirements:

2.1.5 The main sewage from the bathroom to the municipal connection (2)

2.1.6 The branch sewage to the bathroom and kitchen (2)

2.1.7 Manhole on the site, before the municipal connection (2)

2.1.8 Rodding eyes (4)

2.1.9 Inspection eyes (4)

2.2 Name the FOUR particulars of a bolt which must be provide when it is purchased. (4 x 1) (4)

2.3 Briefly describe the advantage of the square shoulder bolt. (2)

2.4 Name parts **A** to **D** of the bolt in FIGURE 2.4.

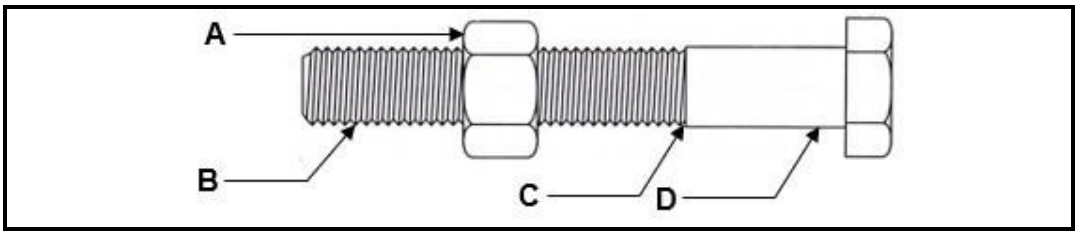


FIGURE 2.4

(4 x 1) (4)

2.5 Name TWO requirements to which a trestle scaffold must comply before employees use it. (2 x 1) (2)

2.6 Name TWO precautionary measures which must be taken when transporting a ladder. (2 x 1) (2)

2.7 Briefly motivate why wooden ladders must not be painted. (2)

2.8 Briefly describe ONE use of the dumpy level. (1 x 2) (2)

2.9 Name TWO materials that can be detected in walls by a multi-detector. (2 x 1) (2)

[40]

QUESTION 3: CASEMENTS, CUPBOARDS, WALL-PANELLING AND QUANTITIES (SPECIFIC)

Start this question on a NEW page.

3.1 FIGURE 3.1 below shows the vertical sectional view through a part of a casement with a fanlight. Study the sketch and answer the questions that follow.

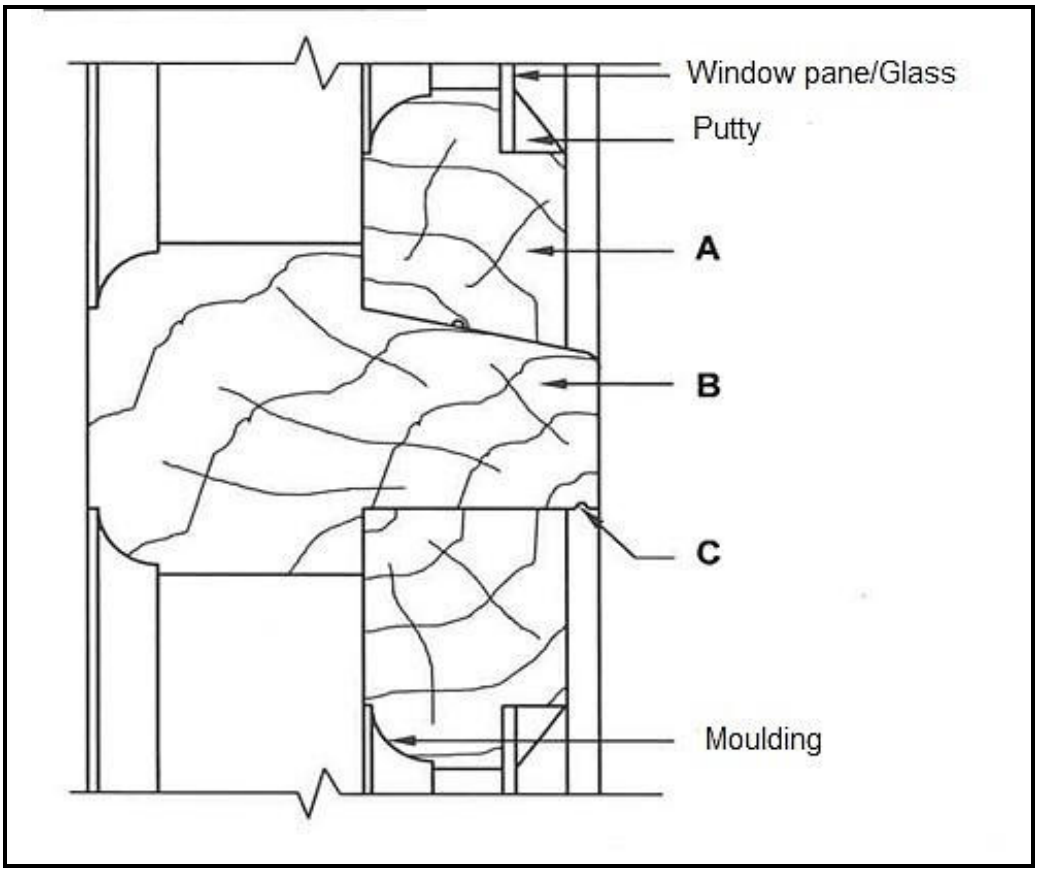


FIGURE 3.1

3.1.1 Identify part **A.** (1)

3.1.2 Name the horizontal member that separate the casement and fanlight. (1)

3.1.3 Recommend ONE other material besides putty, that can be used to secure glass in position. (1)

3.1.4 Give ONE reason why the rails and stiles of the casement are moulded. (1)

3.1.5 Explain the term *fanlight*. (2)

3.1.6 Describe the purpose of **C**. (1)

3.2 FIGURE 3.2 below shows the floor plan of a storeroom with a gable roof.

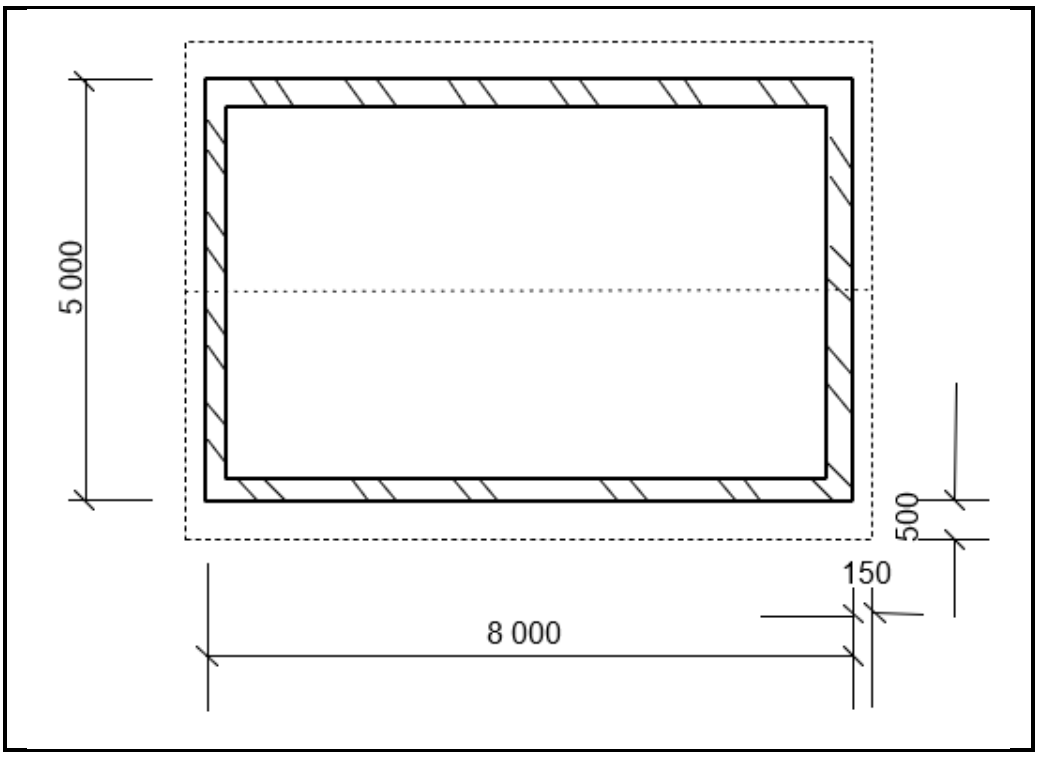


FIGURE 3.2

Use the following specifications:

- Type of roof: South African (Howe) roof truss
- The roof has EIGHT roof trusses
- The walls are 220 mm thick
- The true length of the tie-beam is 5 280 mm

Round off your answer to TWO decimals.

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

3.2.1 The total length of the wall plate needed for the building (4)

3.2.2 The total length of timber required for the tie-beam (3)

NOTE: A mark will be awarded for the correct use of the dimension paper. (1)

3.3 ANSWER SHEET C shows the front view of the framework of a built-in cupboard without the doors.

Use ANSWER SHEET C and complete in good proportion the given drawing.

Use the following specifications:

- The cupboard is made of 16 mm melamine boards
- The cupboard should have a top unit
- Divide the bottom part of the cupboard into TWO equal parts with an intermediate side
- The cupboard has four equal shelf spaces on the right-side
- The left-hand side has an oval hanging rail
- The cupboard should have a front rail and a kick/base plate (8)

3.4 Differentiate between *built-in cupboards* and *free-standing cupboards* on recommended depths. (2)

3.5 FIGURE 3.5 below shows the sectional view of a tongue and groove wall panel from floor to ceiling, fastened to a 110 mm thick wall. Study the drawing and answer the questions that follow.

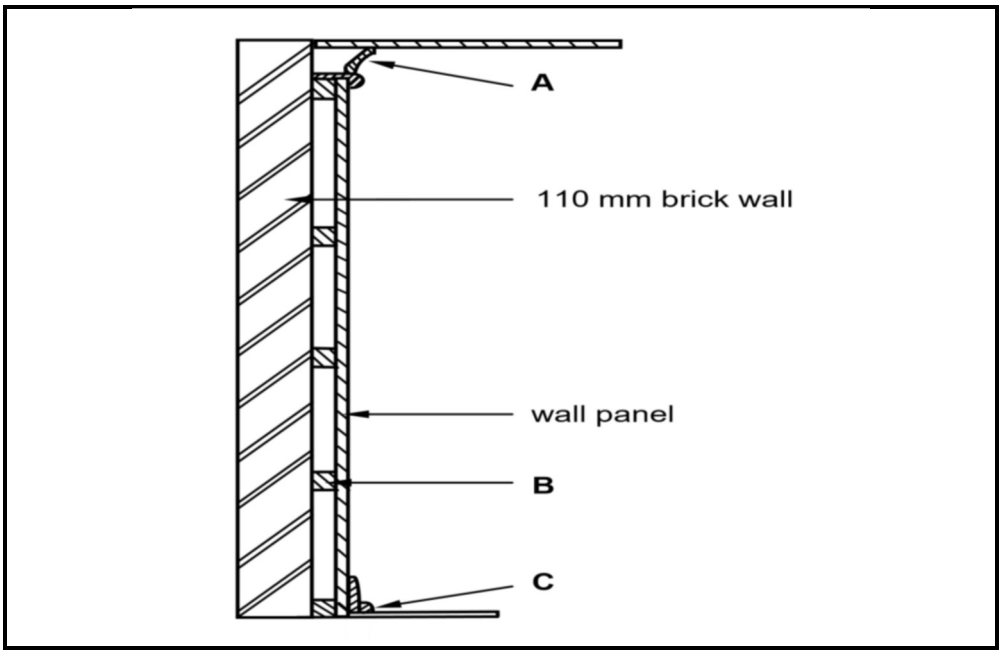


FIGURE 3.5

3.5.1 Identify parts **A**–**C**. (3 x 1) (3)

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

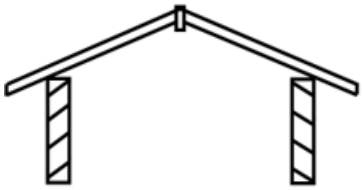
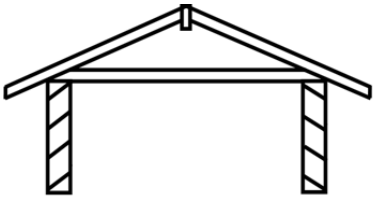
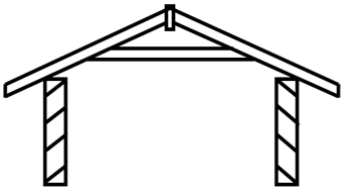
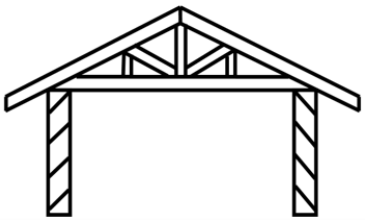
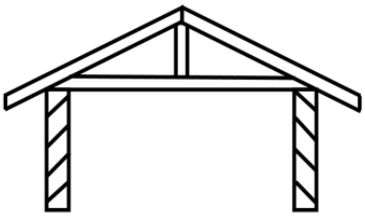
3.5.3 Describe the purpose of capping as fitted on top of tongue-and-groove wall panelling. (1)

[30]

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

Start this question on a NEW PAGE.

4.1 Choose a term from COLUMN B that matches a roof in COLUMN A. Write only the letter (A–G) next to the question numbers (4.1.1 to 4.1.5) in the ANSWER BOOK, for example 4.1.6 H.

COLUMN A	COLUMN B
4.1.1 	A lean-to roof
4.1.2 	B couple roof
4.1.3 	C king post roof
4.1.4 	D collar-tie roof
4.1.5 	E South African (Howe) roof
	F close-couple roof
	G thatch roof

(5 x 1) (5)

4.2 FIGURE 4.2 below shows roof profiles for building **A** and building **B**. Study the sketches and answer the questions that follow.

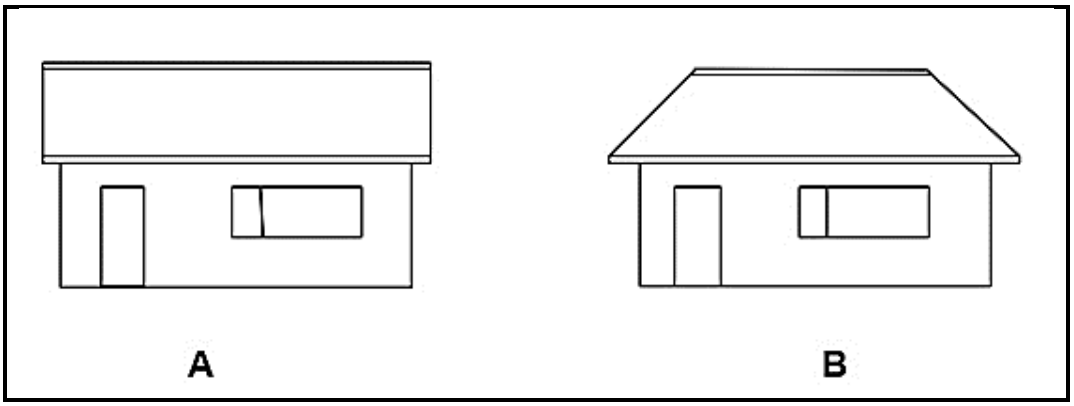


FIGURE 4.2

4.2.1 Name the roof profiles for buildings **A** and **B** respectively. (2 x 1) (2)

4.2.2 Draw a neat line sketch of the top view of the roof for building **B**. (4)

4.2.3 Explain THREE characteristics of a good roof covering. (3 x 1) (3)

4.3 Describe the purpose of underlay for the following roof coverings:

4.3.1 Concrete or clay roof tiles (1)

4.3.2 Thatched roof (1)

4.3.3 IBR and corrugated iron sheeting (1)

4.4 Distinguish between a *truss hanger* and *gang nail* regarding their uses. (2 x 1) (2)

4.5 Describe the regulation that applies if the area of a thatched roof exceeds 20 m². (1)

4.6 Explain what you understand about the eaves of a roof. (1)

4.7 Describe TWO advantages of mechanical grading. (2 x 1) (2)

4.8 The steps on how to prepare and apply sanding sealer are given below in random order.

Analyse and rearrange the steps in the correct sequence. Write ONLY the number of the statements below in the CORRECT sequence in your ANSWER BOOK.

1. Clean the brush in thinners after each application
2. Stir sanding sealer before application
3. Remove all dust
4. Allow 60 minutes drying time between consecutive coats
5. Sand the wood surface with different grades of sandpaper until it is smooth and free from scratches
6. Lightly sand and dust the wood before next coat is applied
7. Apply several (usually two to three) diluted coats of sanding sealer with a brush (7 x 1) (7)

4.9 FIGURE 4.8 below shows a sectional view of a conventional trap door. Study the sketch and give ONE word/term for each of letter (A to D) by choosing a word/term from the list below.

Write only the word/term next to the letter (A to D) in the ANSWER BOOK, for example E – Rafter

Tie beam; Rafter; Strut; Brandering; Trap door; Ceiling board; Cove strip

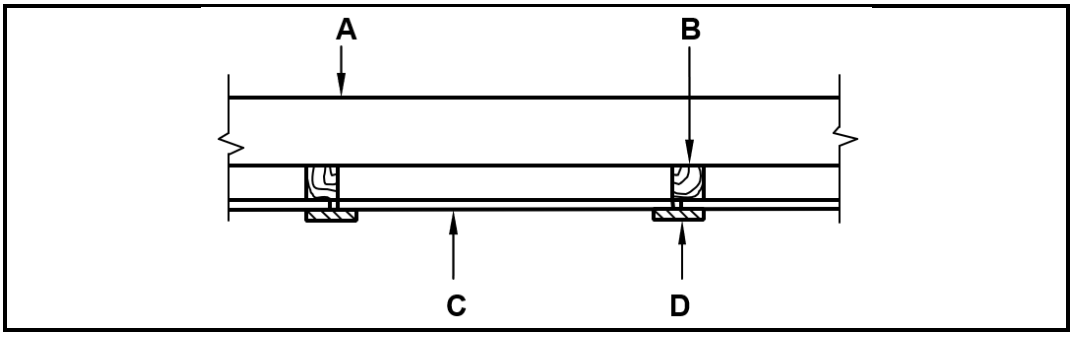


FIGURE 4.8

(4 x 1) (4)

4.10 State the minimum measurement for the opening of a trap door. (1)

4.11 FIGURE 4.11 below shows four machines. Study the pictures and answer the questions that follow.

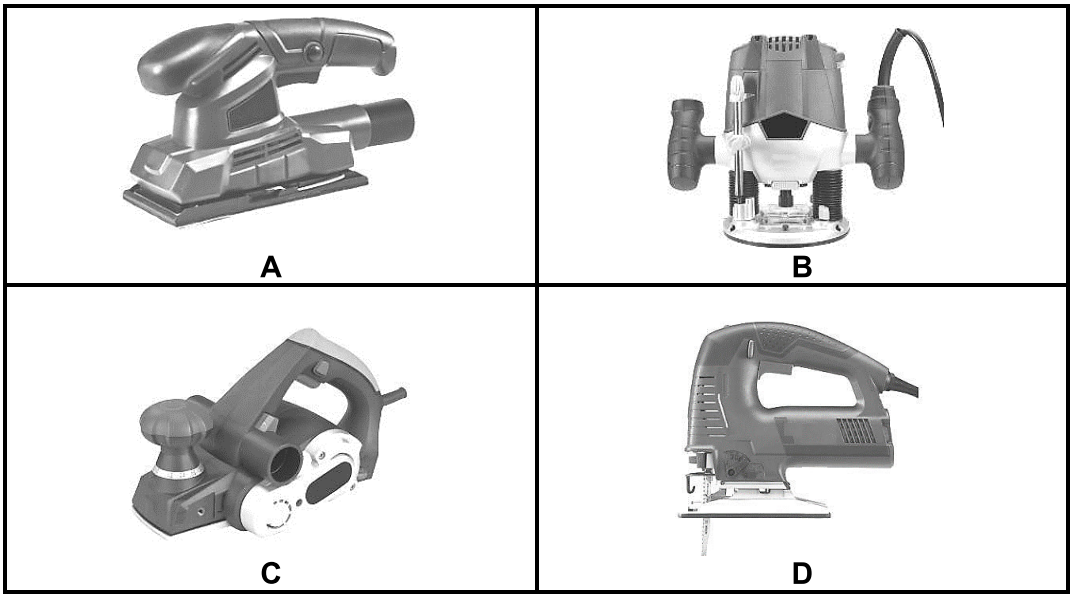


FIGURE 4.11

4.11.1 Name this group of machines. (1)

4.11.2 Identify **B** and **C**. (2 x 1) (2)

4.11.3 Describe ONE aspect that must be considered when taking care of a jig saw in terms of its blade. (1)

4.11.4 Describe ONE way in which a router can be stored. (1)
[40]

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

5.1 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 (5.1.1 to 5.1.5) in the ANSWER BOOK, for example. 5.1.6 E.

5.1.1 … props are used as braces to ensure that the formwork for a column is held in its plumb position.

A Inclined
B Vertical
C Horizontal
D Vertical and horizontal (1)

5.1.2 When erecting formwork for columns, secure the sides with the …

A cleats.
B nuts.
C yokes.
D wedges. (1)

5.1.3 The formwork for the … is constructed first, followed by the sloped construction of the stair.

A riser
B landing
C tread
D None of the above-mentioned (1)

5.1.4 The use of a fish plate in formwork for staircases is to fix the …

A head of the props/struts to the bearer.
B lower part of the prop/strut to the cleats.
C bearer to the soleplate.
D bottom part of the folding wedges to the soleplate. (1)

5.1.5 When erecting formwork for floor slabs, the following should be taken into consideration:

A Place the props on the wedges supported by the sleepers.
B Fix the props to the cross bearers.
C Adjust the wedges to the level of formwork.
D All the above-mentioned (1)

5.2 5.2.1 Recommend any TWO materials that can be used as lining for formwork to obtain a smooth finish. (2 x 1) (2)

5.2.2 Explain why the distance between the yokes decreases towards the bottom of a column. (1)

5.2.3 Justify the use of an adjustable steel prop rather than a wooden prop when installing formwork. (1)

5.3 FIGURE 5.3 below shows a line diagram of a shore. Analyse the drawing and answer the questions that follow.

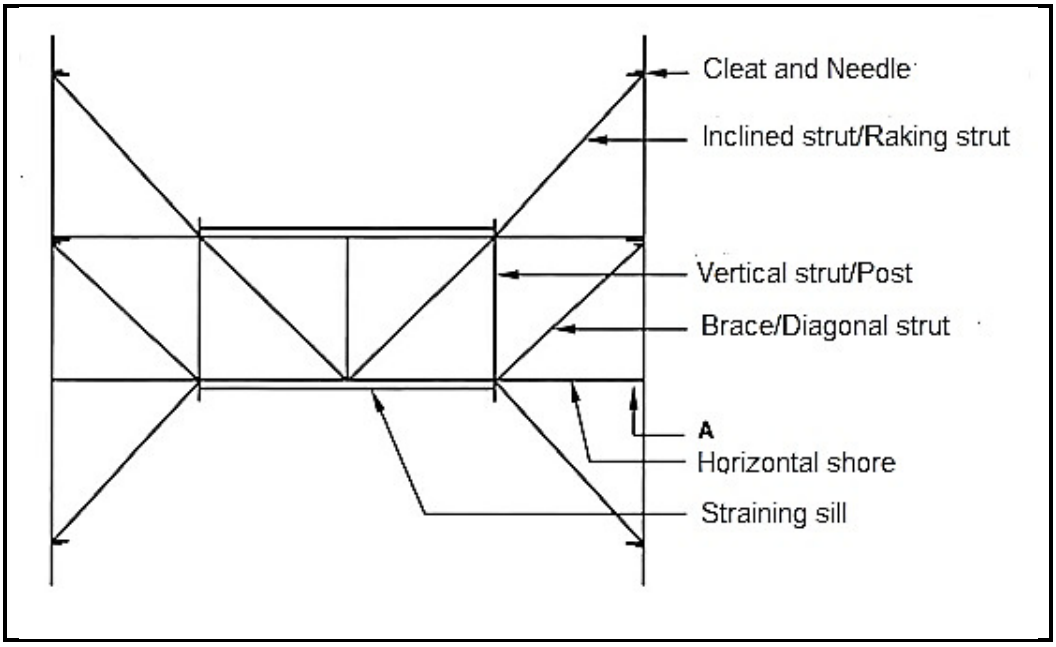


FIGURE 5.3

5.3.1 Identify the type of shore. (1)

5.3.2 Name ONE of the members that is omitted at **A**. (1)

5.3.3 Show, by means of a line diagram, how you will rectify the incorrect braces/diagonal struts. Draw only more than one half of the drawing between horizontal shores. (2)

5.4 Describe the purpose of the following components of a dead shore:

5.4.1 Needles (1)

5.4.2 Folding wedges (1)

5.5 Draw in the ANSWER BOOK a neat line diagram of a king post roof truss. (8)

5.6 FIGURE 5.6 below shows a pictorial view of folding wedges used during the erection of centre centering.

Study the sketch and answer the questions that follow.

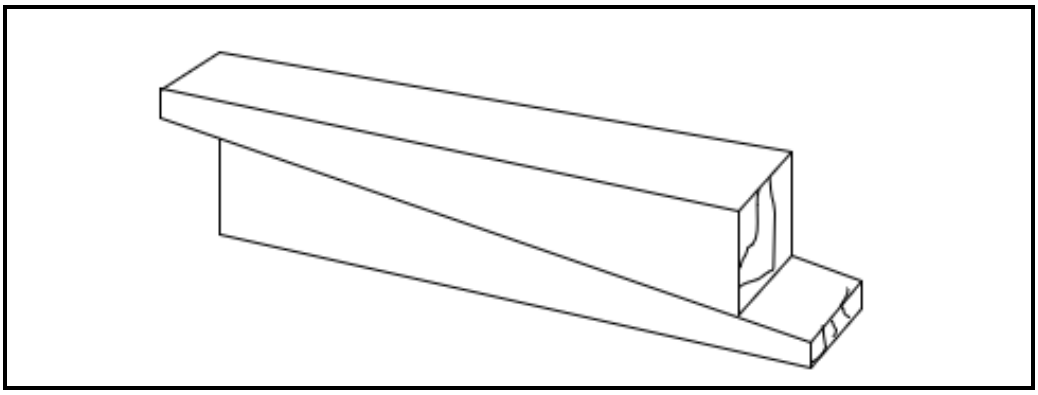


FIGURE 5.6

5.6.1 Describe THREE places where folding wedges are used during the erection of centres. (3 x 1) (3)

5.6.2 Explain TWO purposes of folding wedges during the construction of a centre. (2 x 1) (2)

5.6.3 Differentiate between *rough arch* and *gauged arch* on the types of laggings that you would use when erecting centering. (2 x 1) (2)

[30]

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

Start this question on a NEW page.

6.1 QUESTIONS 6.1.1 to 6.1.4 below describe some of the properties or advantages of different locks.

Name the lock that:

6.1.1 Has the advantage of automatically locking doors when it closes, making them efficient in securing external doors (1)

6.1.2 Is mortised into one of the door stiles, while the back plate is screwed onto the door jamb (1)

6.1.3 Is used as a temporary lock for doors, gates and sheds (1)

6.1.4 Is screwed onto the internal surface of doors and drawers of cupboards (1)

6.2 Explain why you would prefer to use a cut-cupboard lock instead of a straight cupboard lock. (2)

6.3 FIGURE 6.3 shows the incomplete assembled view of an open-haunched mortice and tenon joint. Study the picture and answer the questions that follow.

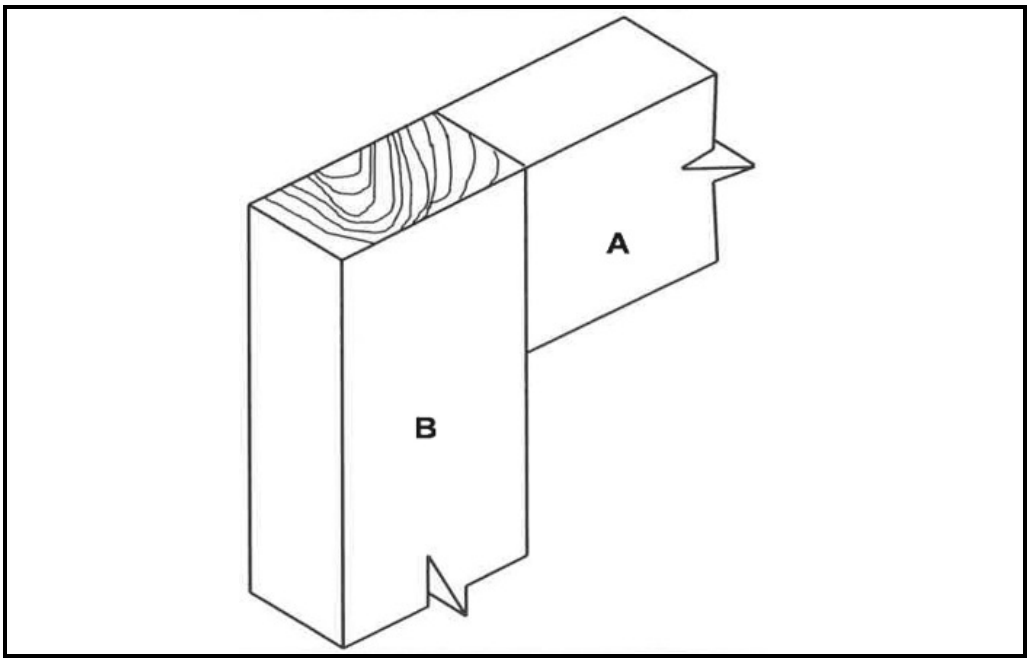


FIGURE 6.3

6.3.1 Name the TWO adjoining parts in the construction of a table where this joint will be used. (2 x 1) (2)

6.3.2 Use ANSWER SHEET D and draw, in good proportion an isometric view of the joint on part **A**. (8)

6.4 FIGURE 6.4 below shows the sectional view of a door. Study the drawing and answer the questions that follow.

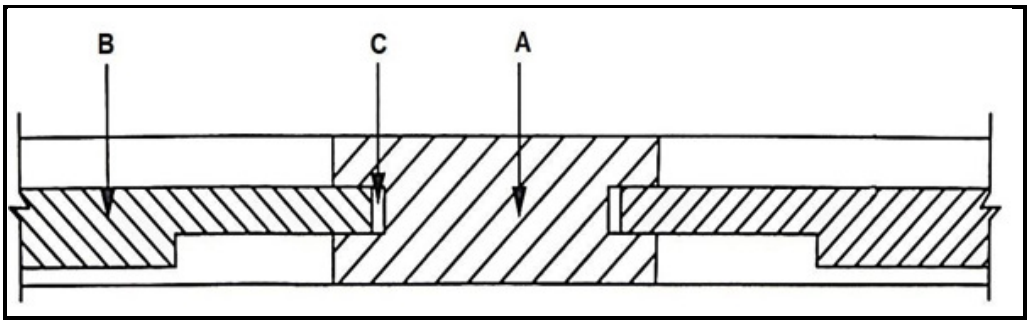


FIGURE 6.4

6.4.1 Provide a title for the sectional view. (1)

6.4.2 Identify parts **A**, **B** and **C**. (3 x 1) (3)

6.4.3 Explain what is meant by the *muntin* of a door. (1)

6.4.4 Explain the purpose of the opening at **C** in FIGURE 6.4. (1)

6.5 FIGURE 6.5 on ANSWER SHEET E shows the external wall of a building to accommodate a suspended timber floor. Draw, in good proportion, the suspended floor on ANSWER SHEET E.

Use the assessment criteria on the ANSWER SHEET as a guide. (12)

6.6 Answer the following questions regarding the staircase construction in FIGURE 6.6.

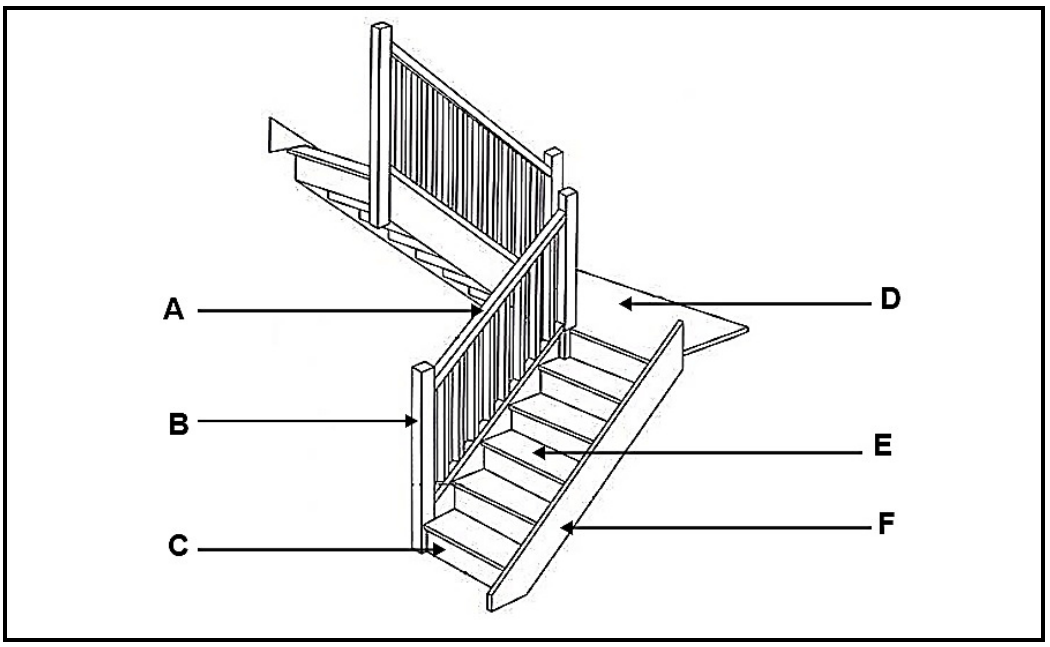


FIGURE 6.6

6.6.1 Name parts **A**, **B** and **F** of the staircase. (3 x 1) (3)

6.6.2 Differentiate between *staircase with half-landing* and *straight flight* of *stairs with a landing*. (2 x 1) (2)

6.6.3 Explain the purpose of part **D** when using a staircase. (1)

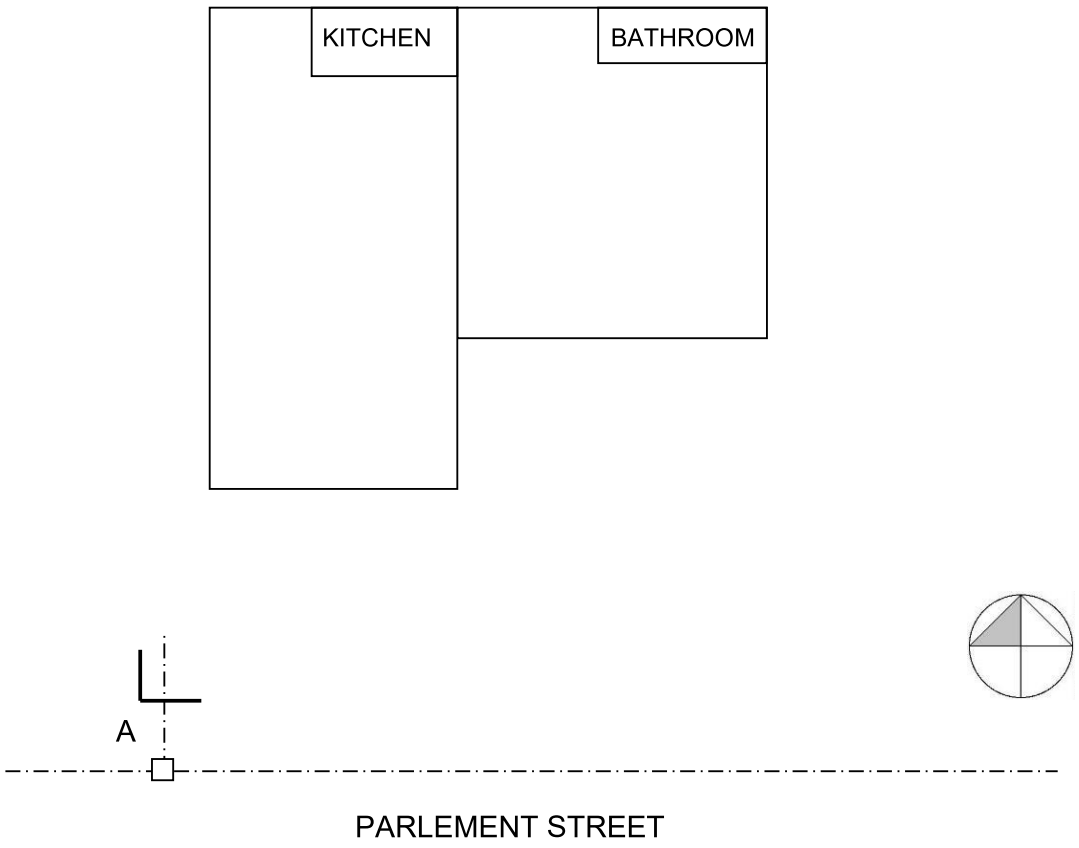
[40]

TOTAL: 200

ANSWER SHEET	A	CIVIL TECHNOLOGY (GENERIC)	NAME AND SURNAME:	

2.1 Use the information on ANSWER SHEET A and complete the site plan on a scale of 1 : 200.

ERF 121 ERF 123 ERF 125



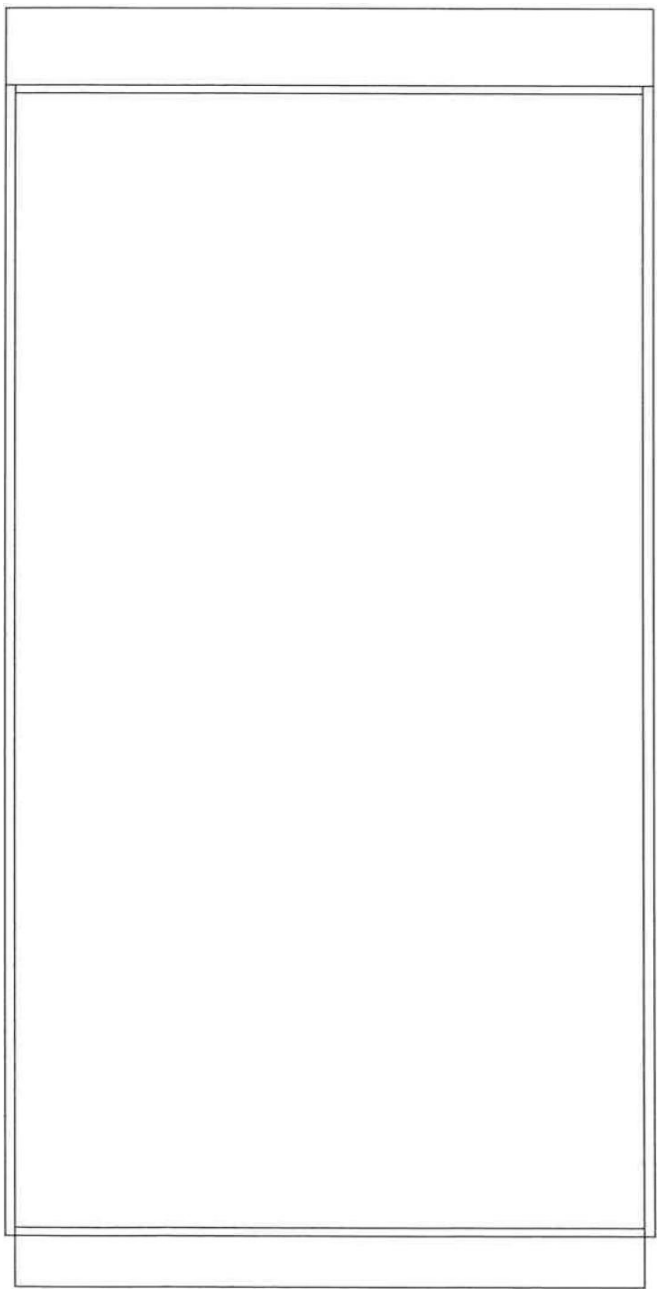
Site boundaries	2	
Building lines	2	
Site entrance	1	
Datum level	1	
Main sewerage	2	
Branch sewerage	2	
Manhole	2	
Rodding eyes	4	
Inspection eyes	4	
TOTAL:	**20**	

ANSWER SHEET	B	CIVIL TECHNOLOGY (SPECIFIC)	NAME AND SURNAME:	

Dimension paper

	A	B	C	D	
3.2.1					
					(4)
3.2.2					
					(3)
				Correct use of dimension paper	(1)

ANSWER SHEET	C	CIVIL TECHNOLOGY (SPECIFIC)	NAME AND SURNAME:	



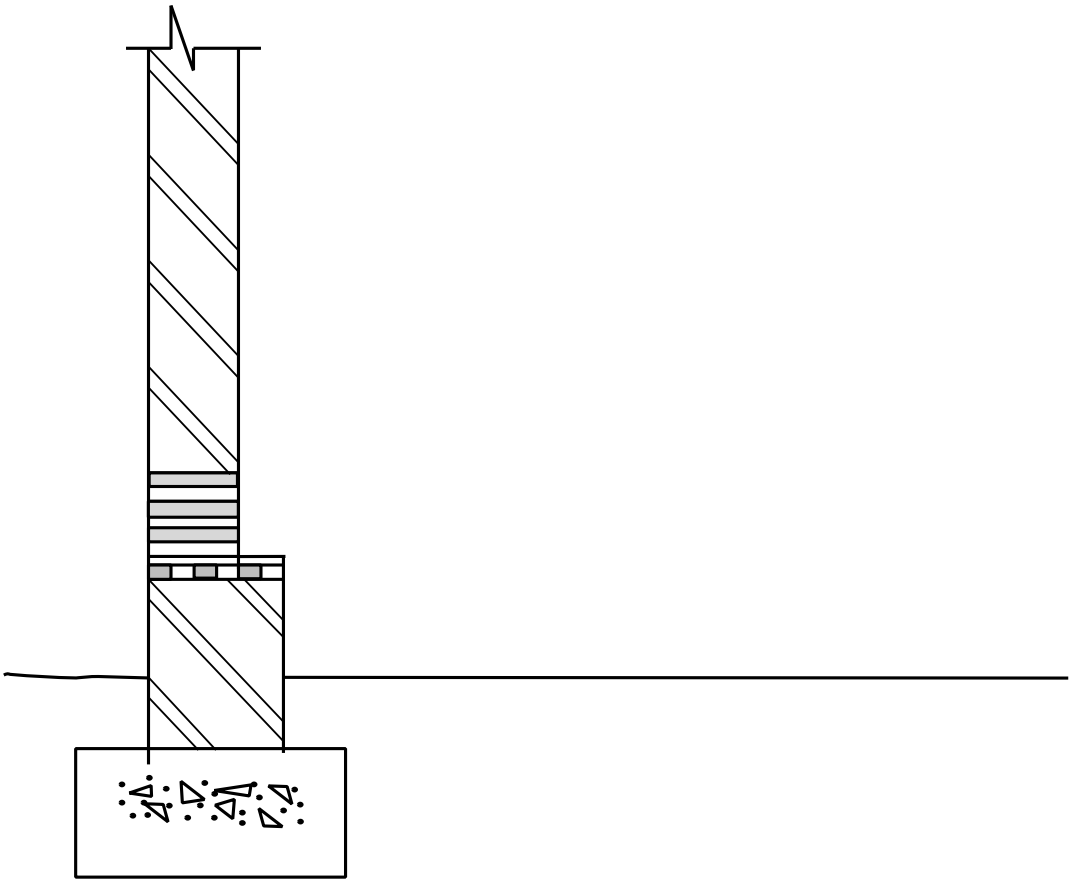
ASSESSMENT CRITERIA	MARK
Top shelf (full width)	1
Intermediate side in middle	1
Hanging space on left-side	1
Oval hanging rail	1
FOUR shelves	1
TWO drawer units below shelving	2
Correctness of the drawing	1
TOTAL:	**8**

ANSWER SHEET	D	CIVIL TECHNOLOGY (SPECIFIC)	NAME AND SURNAME:	

Use ANSWER SHEET D and draw, in good proportion an isometric view of the joint on part **A**.

ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Members	8	
TOTAL:	**8**	

ANSWER SHEET	E	CIVIL TECHNOLOGY (SPECIFIC)	NAME AND SURNAME:	



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Correctness of drawing	1	
Members	11	
TOTAL:	**12**	