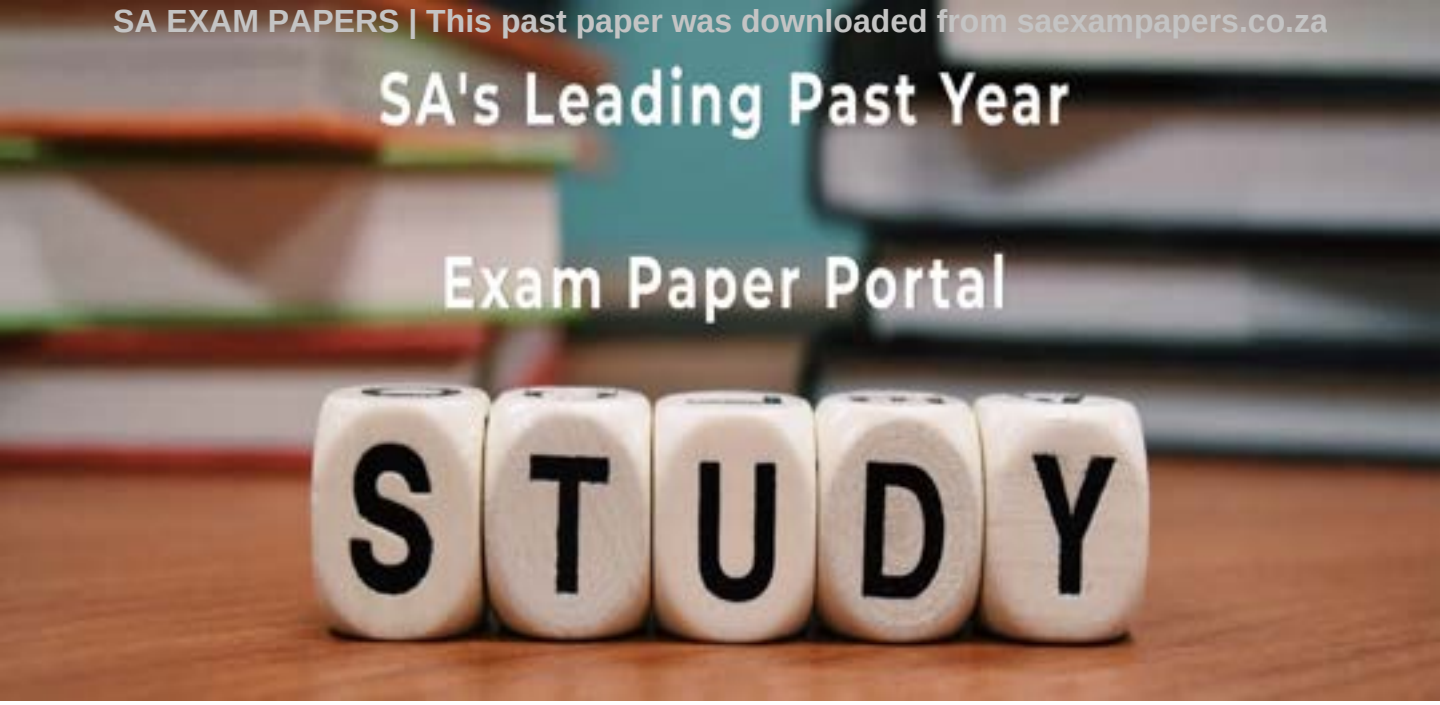

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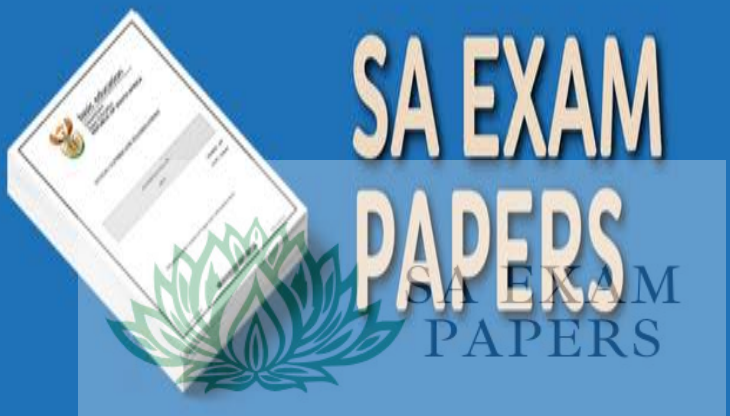


basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

CIVIL TECHNOLOGY: WOODWORKING

NOVEMBER 2023

MARKS: 200

TIME: 3 hours

This question paper consists of 14 pages and 10 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, 3.2, 3.3, 3.4, 5.4, 5.5, 5.6, 6.3, 6.4 and 6.5 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 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 (1.1.1 to 1.1.12) in the ANSWER BOOK, e.g. 1.1.13 D.

1.1.1 Electroplating is the process of …

A applying a plastic coating on metal using electrolysis.
B coating a metal with another metal using electrolysis.
C applying paint to a metal by means of magnetism.
D applying liquid zinc to a metal using pressure. (1)

1.1.2 The process of keeping freshly cast concrete damp will …

A provide concrete with more volume.
B make concrete more watertight.
C increase the risk of cracking concrete.
D lead to poor bonding of concrete. (1)

1.1.3 Why would you coat a metal with a layer of paint?

A To resist extreme temperatures
B To prevent corrosion
C To prevent warping
D Only A and B (1)

1.1.4 The minimum size of a wooden scaffold plank:

A 300 mm wide x 60 mm thick
B 238 mm wide x 12 mm thick
C 150 mm wide x 20 mm thick
D 228 mm wide x 38 mm thick (1)

1.1.5 When using a scaffold, it must be inspected to ensure that ...

A the scaffold is not attached to the building.
B the scaffold platform is supported every 4 m.
C the scaffold is free from any defects.
D All the above-mentioned (1)

1.1.6 ... of scaffolds should be secured vertically.

A Transoms
B Diagonal braces
C Standards
D Base plates (1)

1.1.7 The guard rail on a scaffold will ensure that ...

A a worker does not fall from the scaffold.
B tools do not fall from the scaffold.
C the scaffold is stable.
D the scaffold is braced. (1)

1.1.8 Toe boards must be at least 150 mm high from the level of the ...

A scaffold platform.
B guard rail.
C horizontal transoms.
D base plate. (1)

1.1.9 The employer must ensure that the rungs of wooden ladders are ...

A not painted.
B free from grease.
C not cracked.
D All the above-mentioned (1)

1.1.10 The material safety data sheet for hazardous chemicals must have the following information:

A Quantity in the container
B Cost of the chemicals
C Disposal considerations
D Manufacturing process (1)

1.1.11 Stairways must be installed at a minimum of ... degrees from the horizontal.

A 50
B 30
C 40
D 60 (1)

1.1.12 The purpose of the builder's hoist is to transport ...

A workers and materials.
B materials and heavy construction machines.
C equipment and heavy machines.
D materials and furniture. (1)

1.2 You have been tasked by a contractor to install a 20 kg gate to the pier of a boundary wall.

1.2.1 Name the joining fixture you will use to secure the gate to the pier. (1)

1.2.2 Motivate why you will use this joining fixture. (2)

1.2.3 Explain how you will install the gate by using the joining fixture in QUESTION 1.2.1, if the positions of the holes have been marked on the pier. (3)

1.3 Predict what will happen if a laser level is stored in extremely cold areas. (1)

1.4 How will you ensure the accuracy of a dumpy level? (1)
[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.

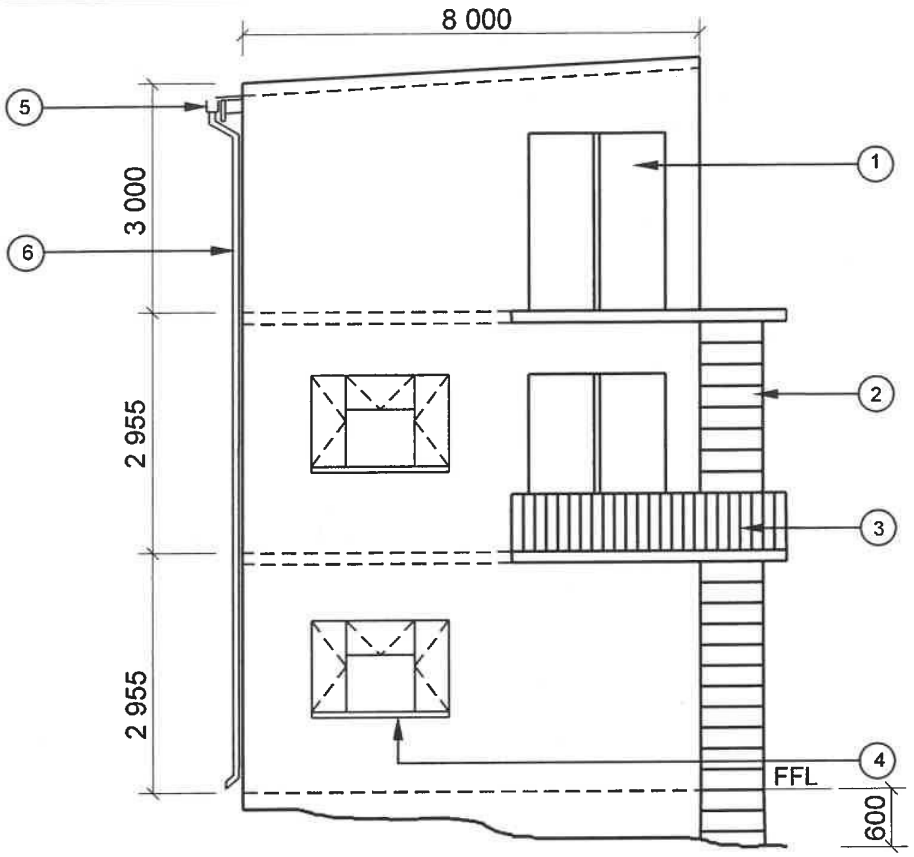


FIGURE A

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

Architects to be notified of any discrepancies immediately.

Emergency escape staircase to be made of mild steel.

Roof: Lean-to roof with parapet walls

Finishing of walls: Plaster and paint

No. 3 indicates the balusters to be made of aluminium.

Dimensions of balusters:
Ø 50 mm x 1 200 mm

Architect's signature .....

Client's signature .....

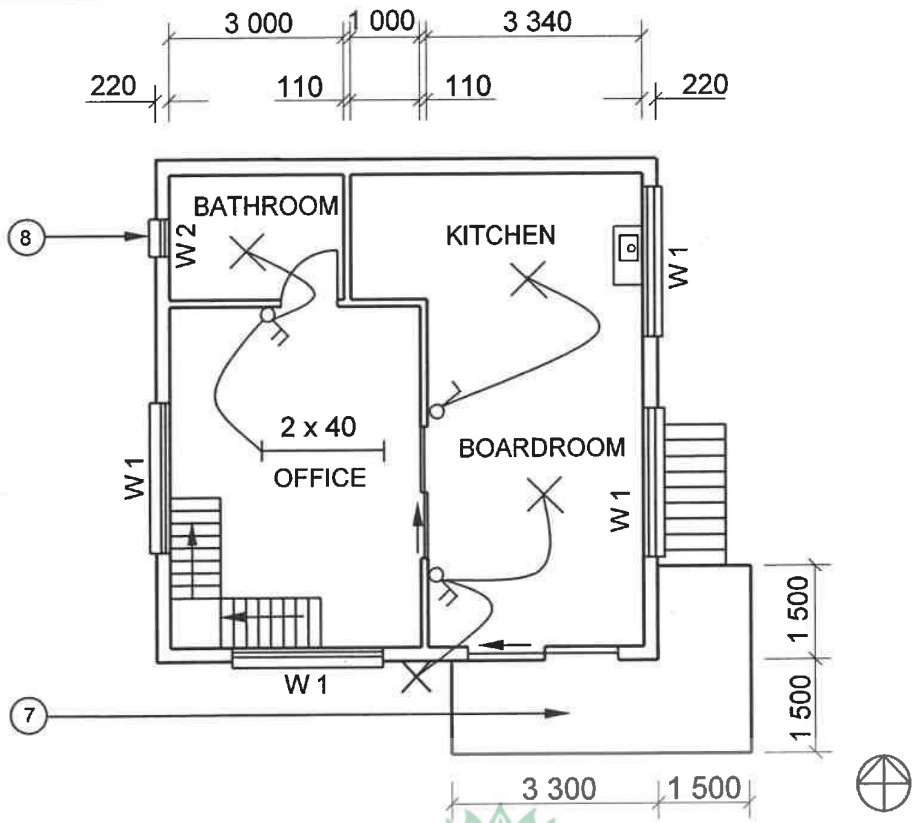
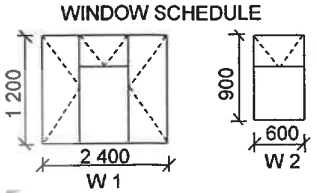


FIGURE B

REVISION 1	DATE: 18/04/2023	DRAWING OF INTERNAL STAIRCASES
PRINTED BY: FOX PRINTERS	DATE OF PRINT: 19/04/2023	
DRAWING TITLE: 1ST FLOOR AND SOUTH ELEVATION		
PROJECT: PROPOSED DWELLING OF MR NTOMBI ON PLOT 42, ISIDINGO STREET, ALBANY		
PROJECT NO.: GR 266-424	DRAWING NO.: 336P5	
DATE: 12/04/2023	DRAWN: NP KOK	CHECKED: J BOK
ELEVATION AND FLOOR PLAN	SCALE 1 : 100	
REFERENCE CODE QP 8 – 2023		

WINDOW SCHEDULE



[40]

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

Start this question on a NEW page.

3.1. FIGURE 3.1 below shows the vertical sectional view of the transom for a double casement window with a fanlight. Use the given information and sketch ONLY the bottom rail of the fanlight in your ANSWER BOOK.

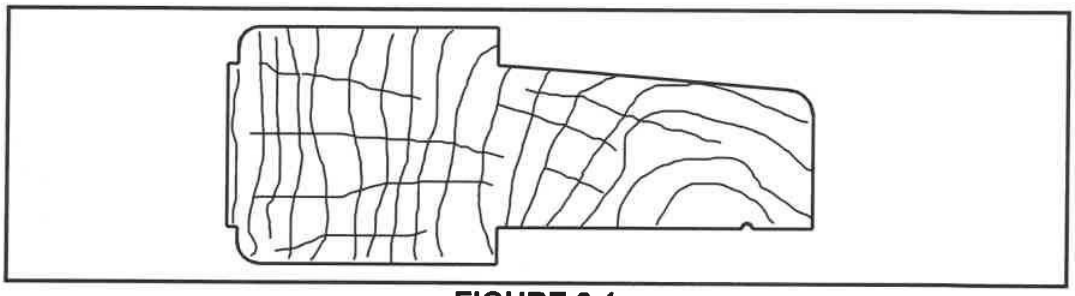


FIGURE 3.1 (4)

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

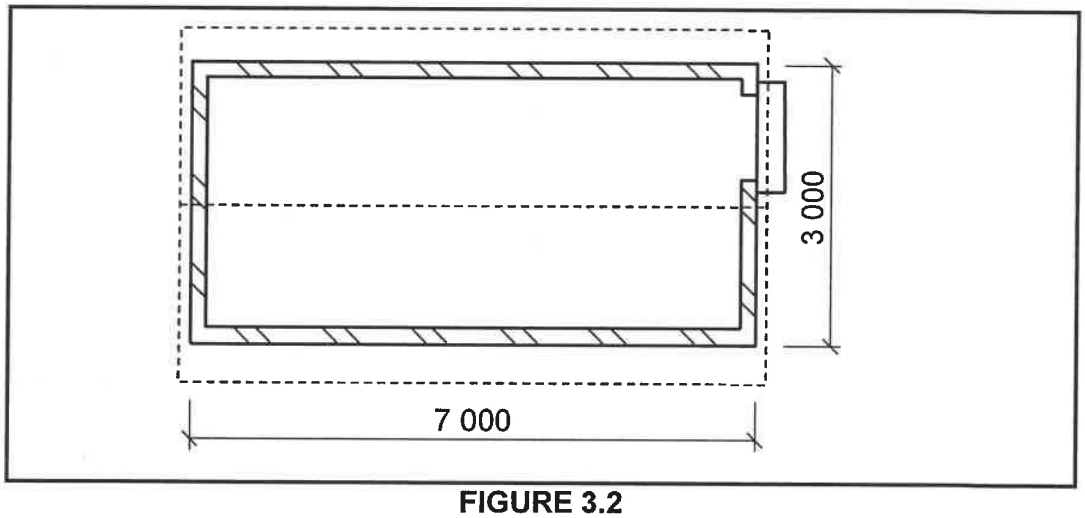


FIGURE 3.2

Use the following specifications:

- Type of roof: South African (Howe) roof truss
- The roof has EIGHT South African (Howe) roof trusses.
- The walls are 220 mm thick.
- The true length of the king post is 870 mm.
- Round off your answer to TWO decimals.

Use the dimension paper on ANSWER SHEET 3.2 and calculate the following:

3.2.1 The total length of wall plate needed for the building (5)

3.2.2 The total length of timber required for the king posts (3)

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

3.3 ANSWER SHEET 3.3 shows the front view of a freestanding cupboard, with an oval hanging rail and a drawer, without a door.

Project the detail of the freestanding cupboard and draw a sectional left view on cutting plane **A-A**.

Use the following specifications:

- The cupboard is made of 16 mm melamine boards.
- The drawer bottom is made of 3 mm hardboard.
- The cupboard back is made of 3 mm hardboard. (13)

3.4 Use ANSWER SHEET 3.4 and complete the drawing of the horizontal sectional view of the wall panelling by drawing TWO tongue and groove boards that are secured by means of secret nailing. Print the label of the rough ground. (4)

[30]

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

Start this question on a NEW page.

4.1 Choose a description from COLUMN B that matches the item in COLUMN A. Write only the letter (A–H) next to the question numbers (4.1.1 to 4.1.5) in the ANSWER BOOK, e.g. 4.1.6 J.

COLUMN A		COLUMN B	
4.1.1	Thickness planer	A	drilling round holes of different sizes
4.1.2	Lathe	B	the blade has to be pulled through the stock by means of a back pressure action
4.1.3	Mortising machine	C	avoid working with timber that is shorter than the distance between the feeding rollers
4.1.4	Radial arm saw	D	make sure that the splitter is in position
4.1.5	Band saw	E	the chisel attachment can drill square holes vertically into wood
		F	do not shape timber pieces shorter than 250 mm
		G	remove the tool rest when sanding or polishing
		H	the top blade guide must always be adjusted to 6 mm above the stock

(5 x 1) (5)

4.2 Change the underlined word(s) in the following to make the statements TRUE. Write the appropriate word(s) next to the question numbers (4.2.1 to 4.2.5) in the ANSWER BOOK.

4.2.1 When selecting timber for windows and doors, the line pattern must be considered. (1)

4.2.2 The head of each graded timber board is marked in blue with the SABS symbol. (1)

4.2.3 The length of truss members can be 114 mm. (1)

4.2.4 Store a belt sander in a wooden box away from sunshine. (1)

4.2.5 Use both hands to carry an electric plane. (1)

4.3 FIGURE 4.3 below shows an incomplete view of the constructional detail of the framework for a trap door.

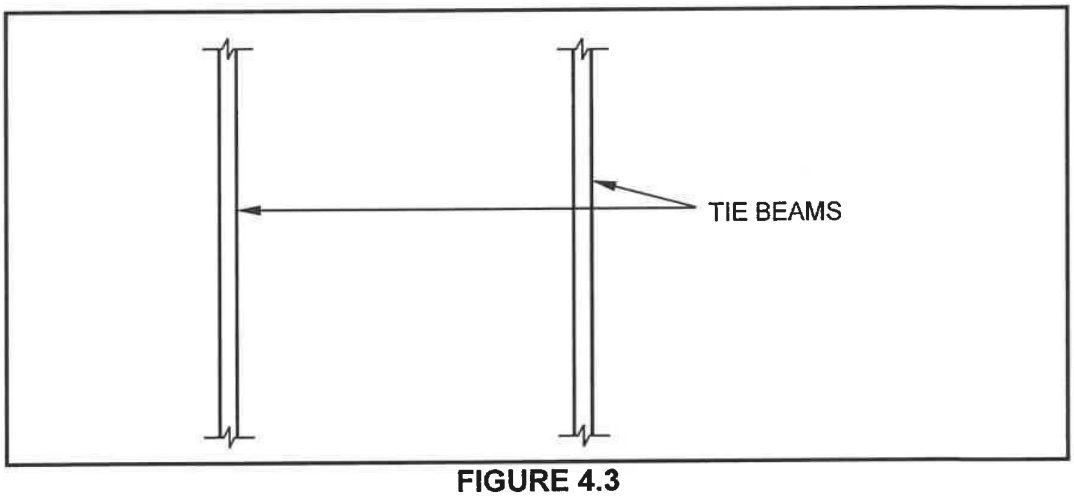


FIGURE 4.3

4.3.1 Explain the value of having a trap door in a building. (1)

4.3.2 What is the size of the timber that is commonly used for a trap door construction, below the roof trusses? (1)

4.3.3 Draw, in your ANSWER BOOK, the detail of the framework for a trap door opening between the two roof trusses as seen from below. Print any ONE label. (5)

4.4 Explain how you will install the first corrugated iron sheet to a roof. (4)

4.5 Distinguish between a *truss hanger* and a *gang nail* with regard to their uses. (2)

4.6 Draw, in your ANSWER BOOK, a line diagram of a close-coupled roof truss. Indicate the overhangs. (4)

4.7 FIGURE 4.7 below shows the profile of a metal roof sheet.

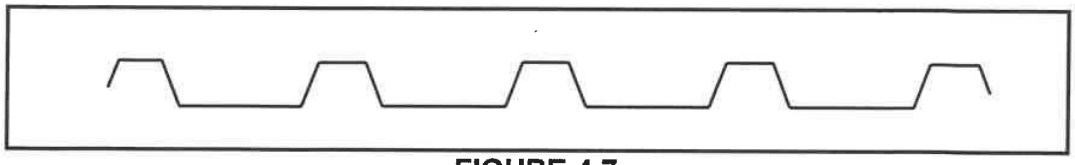


FIGURE 4.7

4.7.1 Identify the type of metal roof sheet. (1)

4.7.2 Motivate why it is important to galvanise and factory-coat metal roof sheets used in coastal areas. (2)

4.7.3 State ONE regulation regarding storing/placing of roof sheets before installation. (1)

4.8 Calculate the centre-to-centre distance between the battens, for interlocking roof tiles, if the tile is 450 mm long and has an overhang of 75 mm. (3)

4.9 State TWO requirements for the design and construction of roof trusses. (2)

4.10 When using an orbital sander, as shown in FIGURE 4.10 below, safe handling and care is very important.

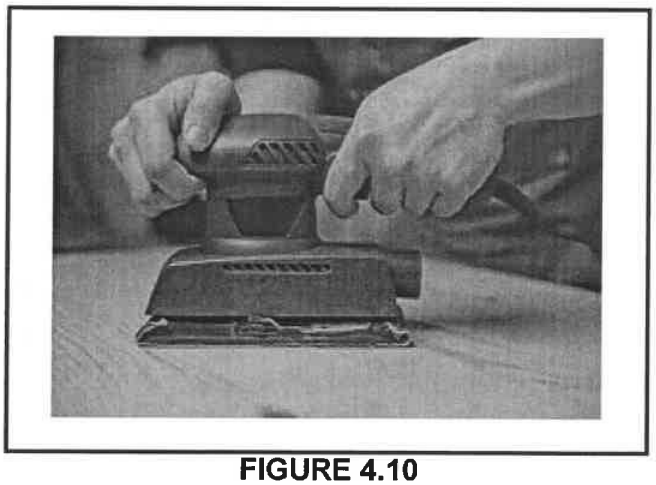


FIGURE 4.10

4.10.1 State ONE advantage of using an orbital sander regarding the grain of the wood. (1)

4.10.2 Explain why you should place the power cord over your shoulder when using an orbital sander. (1)

4.10.3 Explain why sanding dust must be removed regularly from a work piece. (1)

4.10.4 Predict what will happen to the wood if you neglect to remove wood dust. (1)

[40]

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

Start this question on a NEW page.

5.1 Recommend a type of shore that will be used in the following scenarios:

5.1.1 A new opening is cut into an existing wall (1)

5.1.2 Two parallel walls showing signs of failure (1)

5.2 Name ONE material used to make needles for shoring. (1)

5.3 Name the component that is used to secure the joint between props and needles. (1)

5.4 ANSWER SHEET 5.4 shows an incomplete horizontal sectional view of formwork for a round column.

Draw only ONE quarter (the top right quarter, indicated by **A**) of the formwork with a shaped yoke/collar fastened with bolts and nuts. (6)

5.5 ANSWER SHEET 5.5 shows an incomplete front elevation of the constructional detail at the base of a centre with open laggings.

Complete the drawing by adding the omitted members. Print any ONE label. (8)

5.6 ANSWER SHEET 5.6 shows a drawing of the exploded isometric view of an incomplete long and short shoulder mortice and tenon joint for rebated frames.

Use the detail in the stile to project and draw the tenon on the rail. Do NOT show any hidden detail. (12)
[30]

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

Start this question on a NEW page.

6.1 State TWO different ways to install locks on doors. (2)

6.2 FIGURE 6.2 below shows the steps for marking and cutting a twin mortise and tenon joint for the bottom rail of a door.

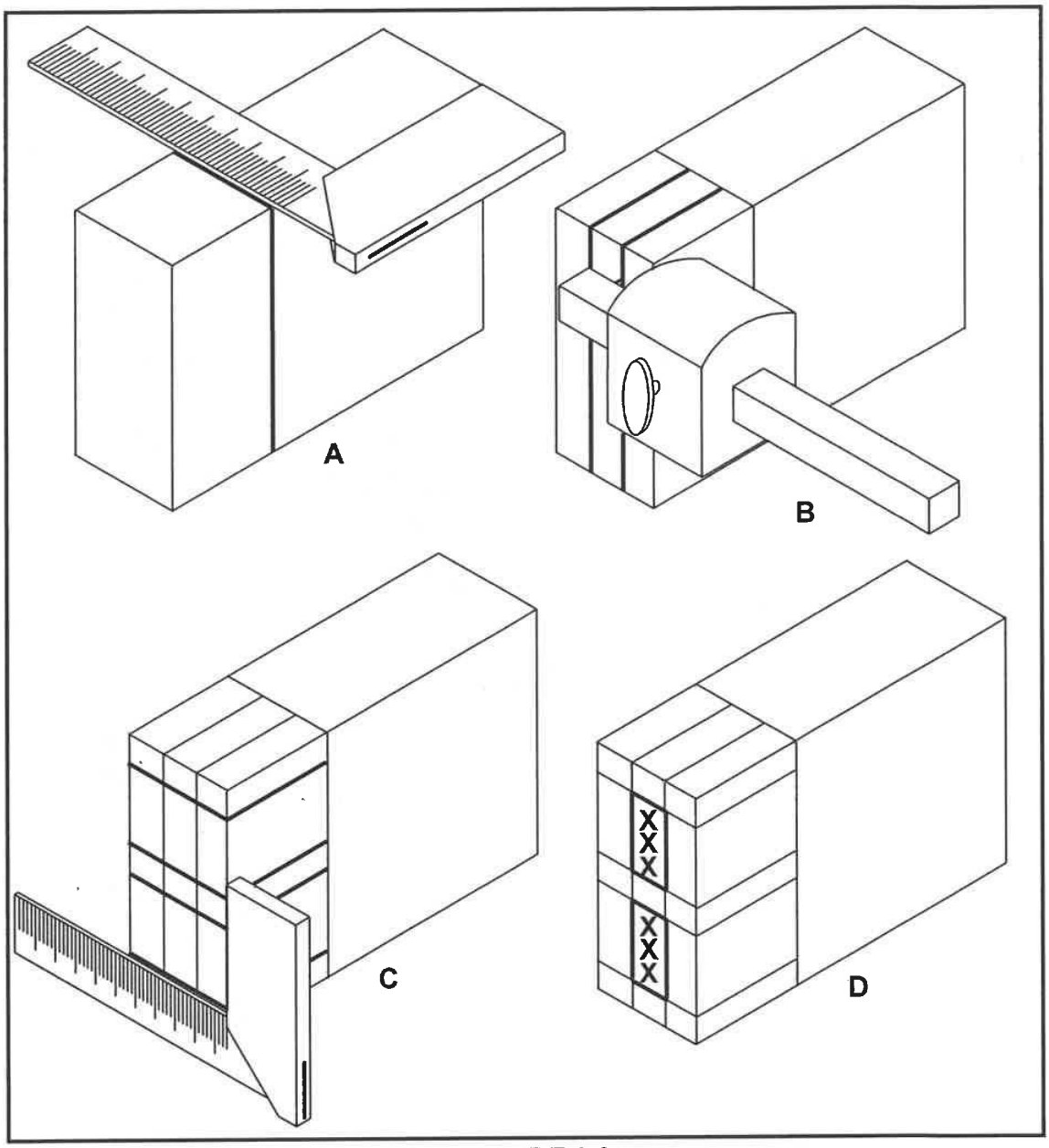


FIGURE 6.2

6.2.1 Explain what was done in steps **A–D** above. (4)

6.2.2 Explain the steps of cutting out the tenon for this joint. (4)

6.3 ANSWER SHEET 6.3 shows the top part of a framed ledged and braced batten door with section line **A-A**. Use the detail on ANSWER SHEET 6.3 to project and draw the vertical sectional view **A-A**. (7)

6.4 You need to design a flight of stairs for an old age-home so that residents can move from point **A** to point **B** with a landing in between to rest.

ANSWER SHEET 6.4 shows the incomplete view of a straight flight of stairs indicating the following:

- The riser and tread at **A**
- The newel post, handrail and top landing at **B**

Draw FOUR steps before and FIVE steps after the landing with the newel posts and handrails in position to complete the drawing. (9)

6.5 FIGURE 6.5 below shows the top view of part of a suspended timber floor with two cutting lines indicated. Use the detail on ANSWER SHEET 6.5 and complete the sectional views by differentiating between the sectional views as seen from **A-A** and **B-B**. Draw the floorboards on both sectional views.

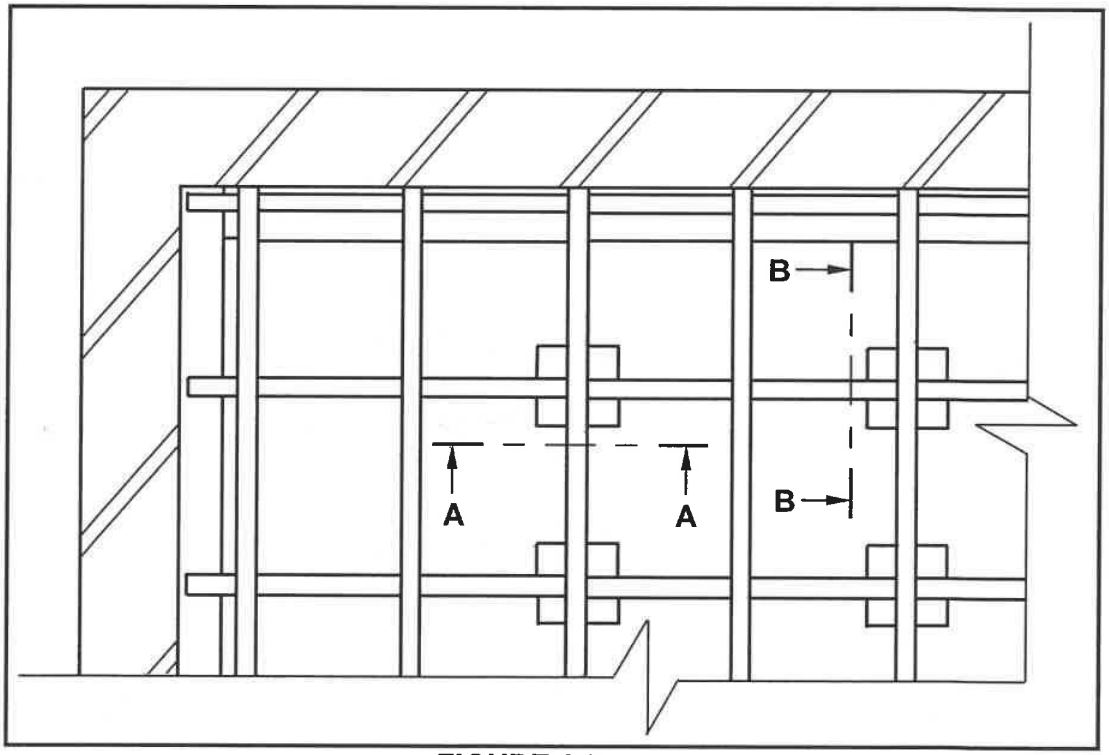


FIGURE 6.5

(14)
[40]

TOTAL: 200

CENTRE NUMBER: | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

ANSWER SHEET 2

NO.	QUESTIONS	ANSWERS	MARKS
1	Give ONE reason why FIGURE B represents the first floor plan.		1
2	Name the SI unit that is used to indicate dimensions on building plans.		1
3	Identify number **1**.		1
4	Identify the number indicating the emergency exit.		1
5	What is the purpose of number **3**?		1
6	Identify number **4**.		1
7	Identify number **5**.		1
8	Identify number **6**.		1
9	Identify number **7**.		1
10	Deduce from the window schedule the dimensions of the window that is installed at number **8**.		2
11	Who is the owner of the new dwelling?		1
12	Name the elevation where the sink is located.		1
13	Identify the safety error in FIGURE A.		1
14	Deduce from the building plan why it was not approved after the first submission.		1

CENTRE NUMBER: | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

15	Name the material that must be used for the balusters.		1
16	Deduce from the notes column the type of roof illustrated in FIGURE A.		1
17	How many signatures must be indicated on this building plan?		1
18	What are the dimensions for the balusters as indicated by the architect?		2
19	Name the material that must be used for the final finishing of the outside wall.		1
20	Describe the end shape of the balusters.		1
21	How many hinged openings are indicated on Window 1 in the window schedule?		1
22	Draw the symbol for finished wood for the boardroom table.		2
23	Draw the electrical symbol for a three-pole one-way switch.		2
24	How many fluorescent tubes are indicated in the office?		1

CENTRE NUMBER:							

EXAMINATION NUMBER:													

25	Calculate the total height of the wall on the left side of the building from the finished floor level. Give your answer in metre.		4
26	Calculate the area of the exterior wall on the ground floor, that will consist of bricks, from the finished floor level to the top of the floor slab in the south elevation in FIGURE A. Show ALL calculations.		8
		TOTAL:	**40**

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 3.2

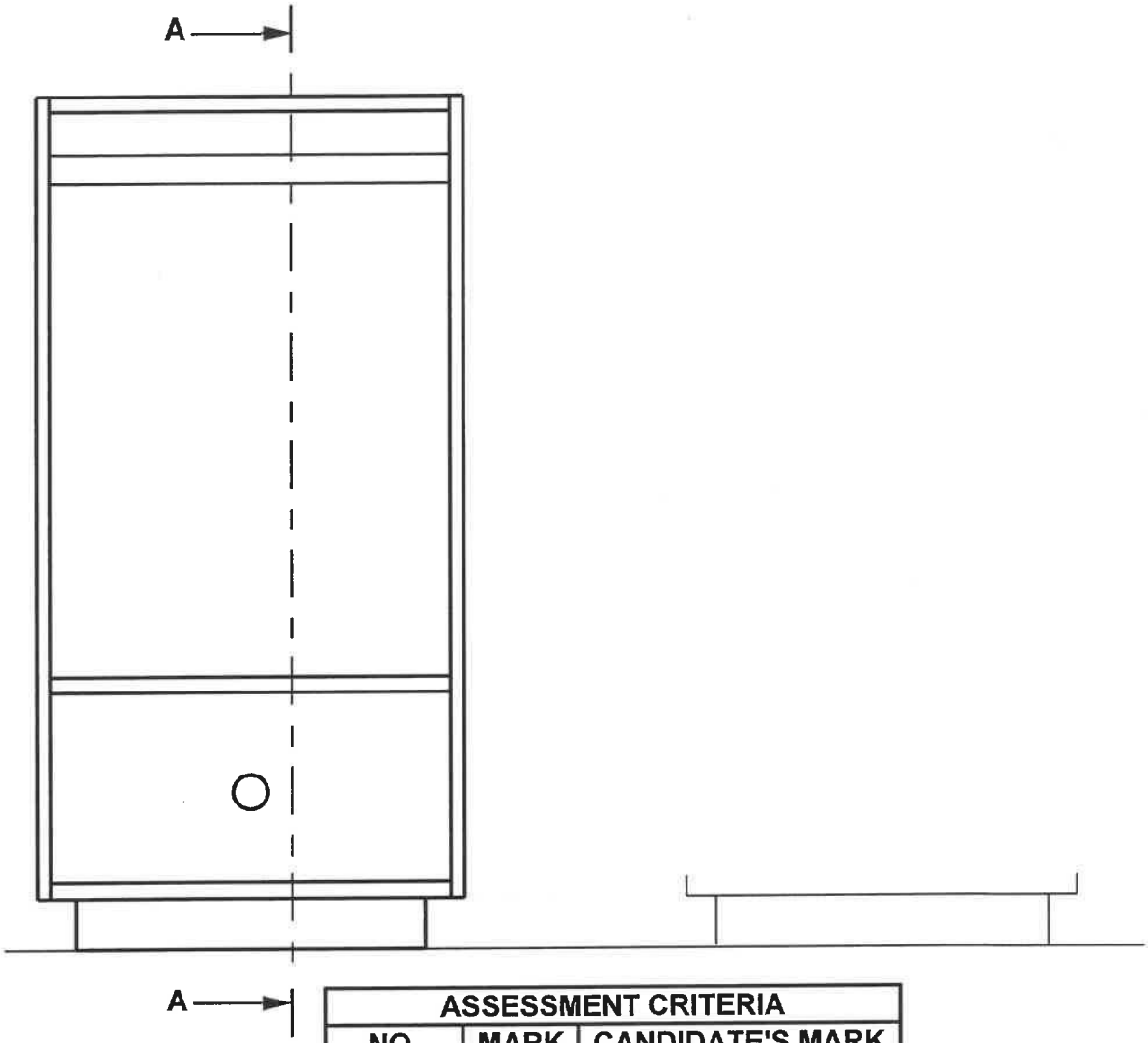
Dimension paper

	A	B	C	D	
3.2.1					
					(2)
					(3)
3.2.2					
					(3)
				Correct use of dimension paper	(1)

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 3.3

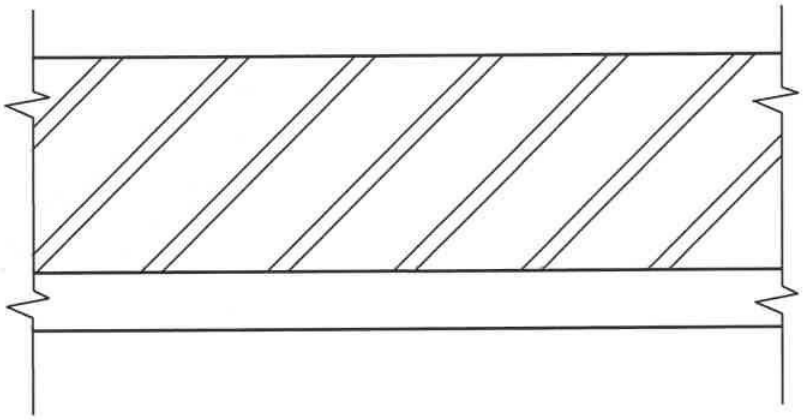


ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	1	
2	1	
3	1	
4	1	
5	1	
6	1	
7	1	
8	1	
9	1	
10	1	
11	1	
12	1	
13	1	
TOTAL:	13	

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 3.4

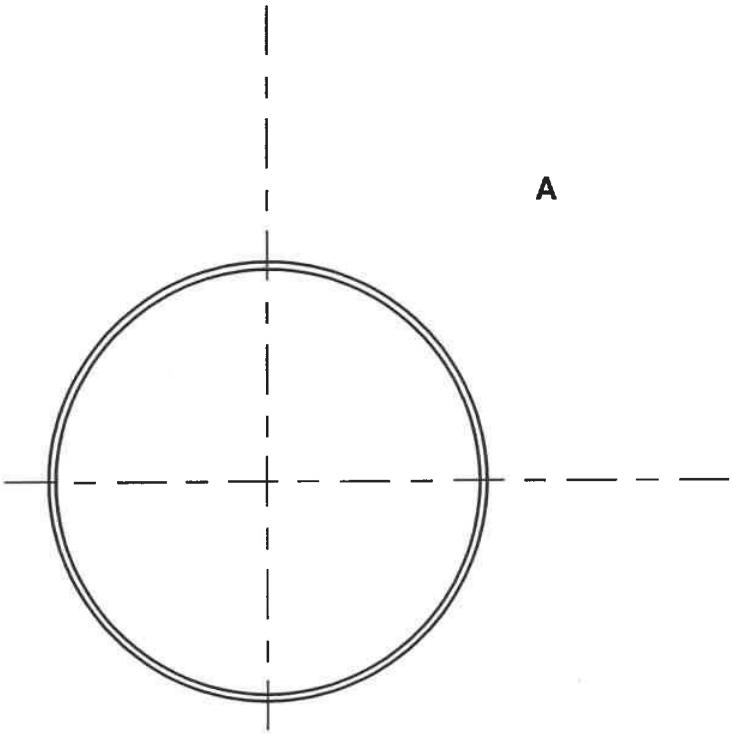


ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	2	
2	1	
3	1	
TOTAL:	4	

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 5.4

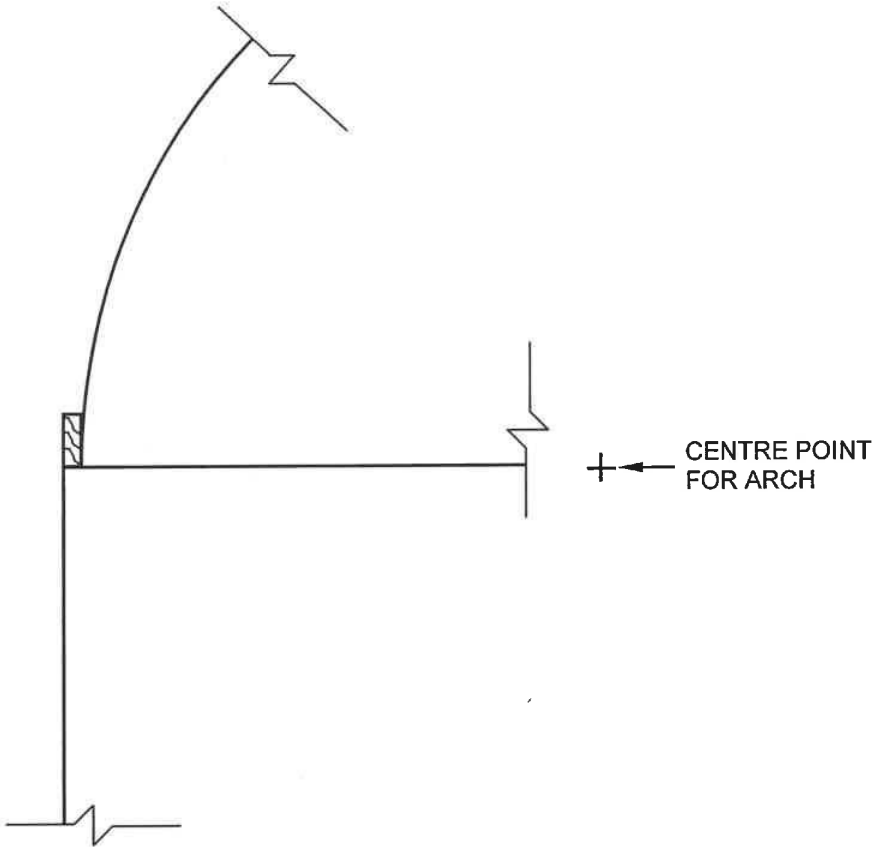


ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	2	
2	1	
3	1	
4	2	
TOTAL:	6	

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 5.5

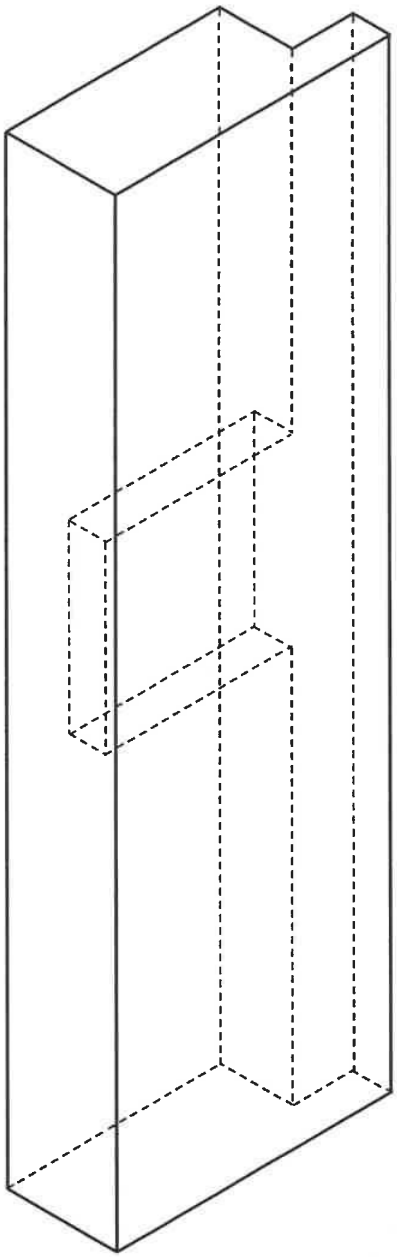


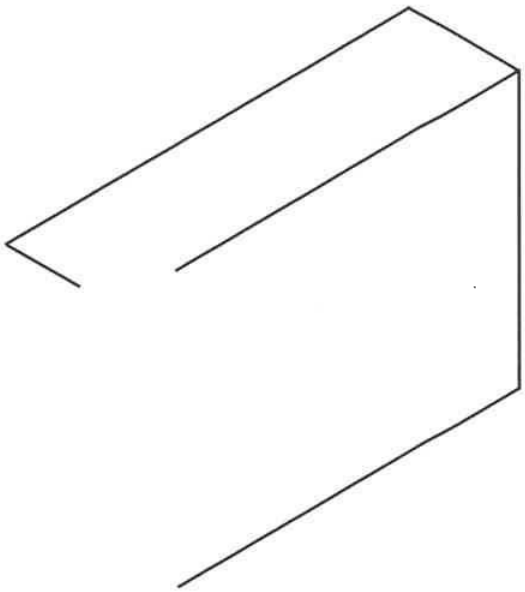
ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	1	
2	1	
3	2	
4	1	
5	1	
6	1	
7	1	
TOTAL:	8	

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 5.6



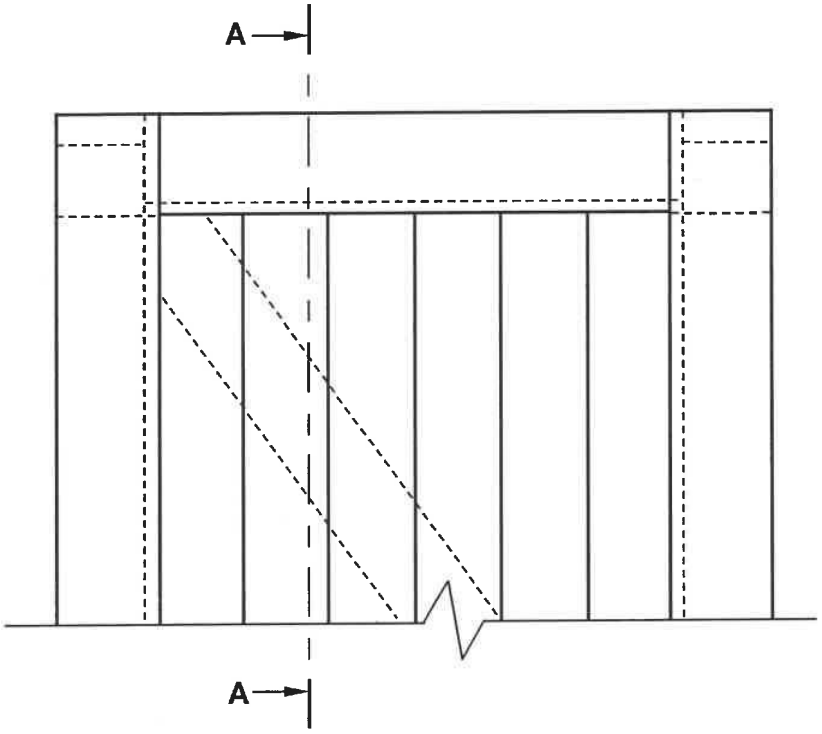


ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	1	
2	2	
3	2	
4	2	
5	2	
6	1	
7	2	
TOTAL:	12	

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 6.3

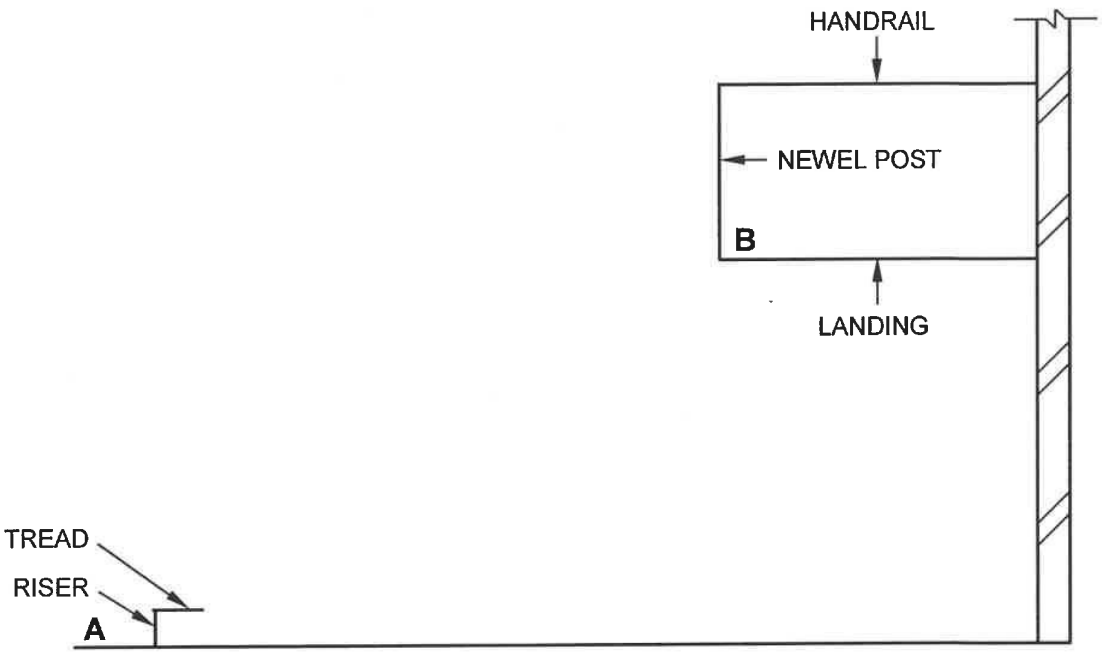


ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	1	
2	1	
3	1	
4	1	
5	1	
6	1	
7	1	
TOTAL:	7	

CENTRE NUMBER:							

EXAMINATION NUMBER:													

ANSWER SHEET 6.4

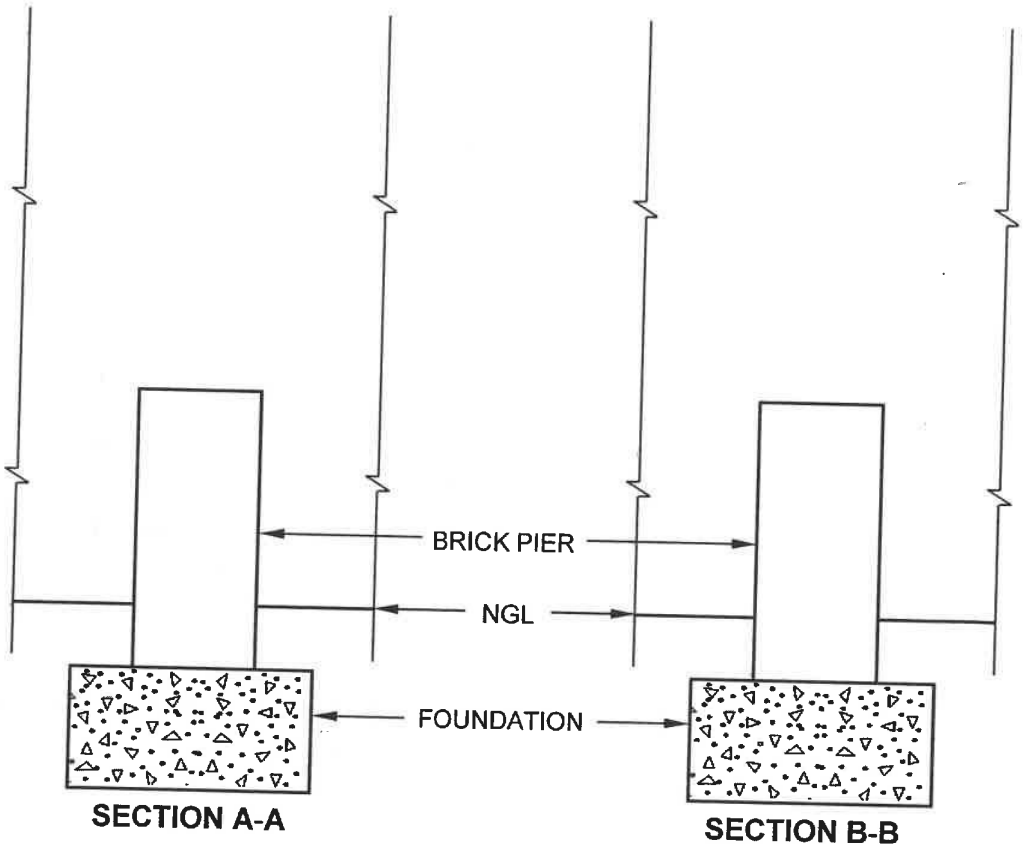


ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	1	
2	1	
3	1	
4	3	
5	3	
TOTAL:	9	

CENTRE NUMBER:

EXAMINATION NUMBER:

ANSWER SHEET 6.5



ASSESSMENT CRITERIA		
NO.	MARK	CANDIDATE'S MARK
1	4	
2	3	
3	3	
4	2	
5	2	
TOTAL:	14	