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NATIONAL SENIOR CERTIFICATE

GRADE 12

CIVIL TECHNOLOGY: WOODWORKING

NOVEMBER 2022

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, 4.9, 5.5, 6.2, 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 Choose the correct word(s) from those given in brackets. Write only the word(s) next to the question numbers (1.1.1. to 1.1.5) in the ANSWER BOOK, e.g. 1.1.6 casement.

- 1.1.1 (Oil or water-based paint/Silicone/Acid) is used to protect metal against corrosion. (1)
- 1.1.2 Curing (increases the strength of concrete/increases the density of concrete/allows concrete to set faster). (1)
- 1.1.3 Electroplating can be applied using (electrodes/electro jacks/electrolysis). (1)
- 1.1.4 Powder coating is the process of applying a layer of (plastic/paint/zinc) to a metal. (1)
- 1.1.5 Galvanising is the process of applying a (zinc/copper/tin) coating to the base of metals. (1)

- 1.2 FIGURE 1.2 below shows an incomplete construction of a staircase.

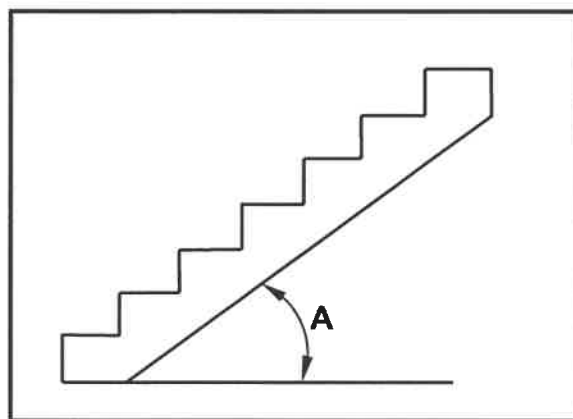


FIGURE 1.2

- 1.2.1 Name the maximum angle of A. (1)
- 1.2.2 How will you ensure the safety of workers when using the treads? (1)
- 1.2.3 Explain the purpose of metal pan treads as part of the construction of a staircase. (1)
- 1.3 Discuss TWO safety precautions that must be adhered to when transporting long ladders. (2)
- 1.4 Name ONE safety component that can be positioned above workers to protect them against falling objects. (1)

- 1.5 Name the component that will ensure stability to scaffolding in all directions. (1)
- 1.6 Predict what could happen if the ends of scaffold planks exceed 230 mm beyond the last support. (1)
- 1.7 Determine the maximum height of stacked material if the width of the stack is 1 m. (1)
- 1.8 By means of sketches, explain the difference between a Rawl bolt with a hook and a Rawl bolt with an eye. (4)
- 1.9 You have been asked to do renovations in a bathroom. Name the tool you will use to:
- 1.9.1 Detect existing copper pipes in a wall (1)
- 1.9.2 Align mirrors horizontally against a wall (1)
- [20]**

QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

Start this question on a NEW page.

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

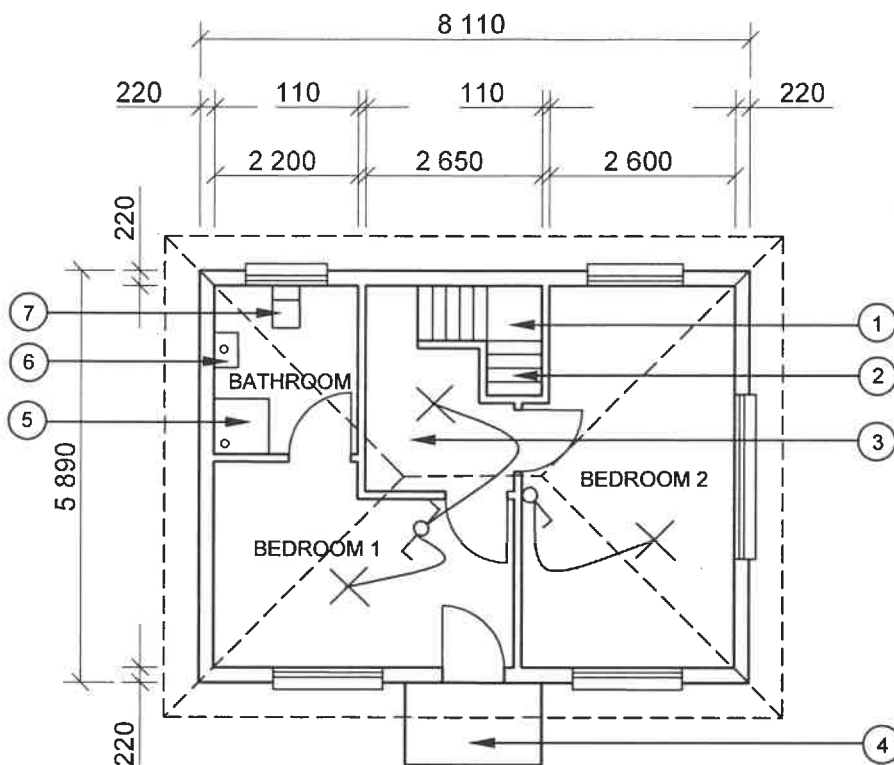


FIGURE A

NOTES:

Contractors must verify all dimensions and levels on site before commencing work.
Architects to be notified of any discrepancies immediately.

Wall thickness: External = 220 mm
Internal = 110 mm

Architect's signature

Client's signature

Concrete stairs must be according to engineering specifications.

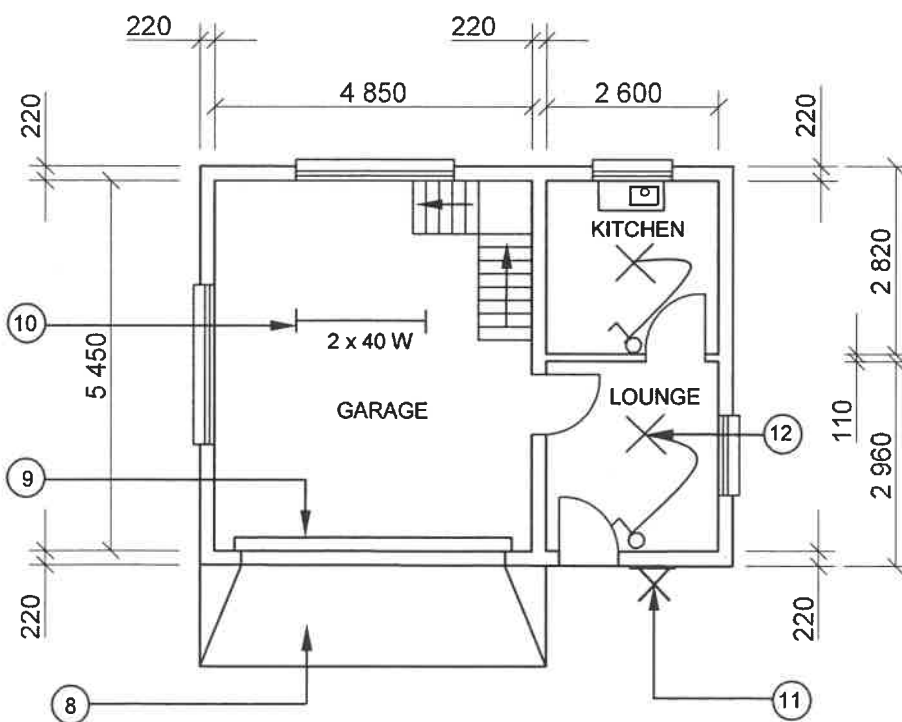


FIGURE B



REVISION 1	DATE: 24/06/2022	DRAWING OF SANITARY FITMENTS
REVISION 2	DATE: 26/06/2022	DRAWING OF STAIRCASE
PRINTED BY: XENO PRINTERS		DATE OF PRINT: 27/06/2022
DRAWING TITLE: FLOOR PLAN PLOT 36		
PROJECT: PROPOSED DWELLING ON PLOT 36, BENONI		
PROJECT NO.: GR 288-620		DRAWING NO.: 446P5
DATE: 20/06/2022	DRAWN: HB NEL	CHECKED: K KLEIN
FLOOR PLAN		SCALE 1 : 100
REFERENCE CODE QP 6 – 2022		

[40]

FIGURE 2

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

Start this question on a NEW page.

- 3.1 Draw in the ANSWER BOOK a neat freehand sketch of the sectional view of a transom. (4)
- 3.2 FIGURE 3.2 below shows the floor plan of a storeroom with a gable roof. The roof consists of couple roof trusses.

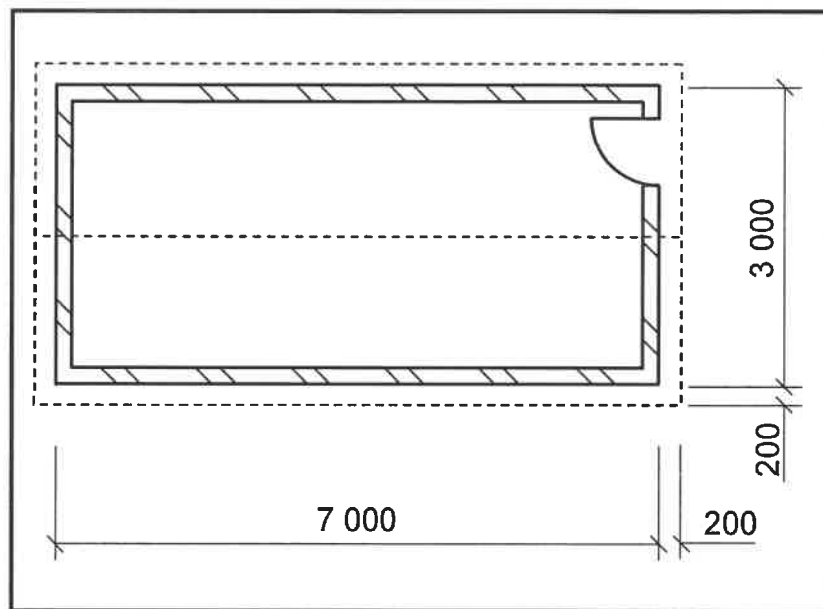


FIGURE 3.2

Use the following specifications:

- The walls are 220 mm thick
- Centre-to-centre spacing between the trusses = 1 000 mm
- Rafter: 2 400 mm x 228 mm x 50 mm
- Gutter: 75 mm x 75 mm

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

- 3.2.1 The number of roof trusses (3)
- 3.2.2 The total length of barge board needed. Give the answer in metres.

Use the following formula:

$$\text{Length of bargeboard} = \text{Length of rafter} + \text{diameter of gutter} + 50 \text{ mm} \quad (6)$$

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

- 3.3 Use ANSWER SHEET 3.3 and draw the front view of a freestanding cupboard, without doors, up to ceiling height.

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 left side.
- The right-hand side has an oval hanging rail.
- The cupboard should have a front rail and a kick plate/base.

NOTE: Draw the freestanding cupboard between the ceiling and the floor. (12)

- 3.4 Use ANSWER SHEET 3.4 and complete the drawing of a vertical section of the top part of the wall panelling. Show ALL detail at the top to provide a good aesthetic appearance.

(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 an item in COLUMN A. Write only the letter (A–K) next to the question numbers (4.1.1 to 4.1.8) in the ANSWER BOOK, e.g. 4.1.9 L.

COLUMN A		COLUMN B	
4.1.1	Gutter	A	used to finish off the gable ends of the roofs
4.1.2	Open eaves	B	a popular galvanised roofing used in South Africa
4.1.3	Corrugated iron sheeting	C	special fire-proof material is used as underlay
4.1.4	Storm clips	D	the part of the roof that projects beyond the walls
4.1.5	Thatched roofs	E	internal angle between two sloping sections of a roof
4.1.6	Batten	F	attached at right angles to the rafters
4.1.7	Verge/Barge board	G	prevent tiles from being lifted by strong winds
4.1.8	Valley	H	placed against the fascia board
		I	reduces the amount of dust inside the roof space
		J	only available in one standard length
		K	galvanised steel plate punched to form a nail pattern

(8 x 1)

(8)

- 4.2 FIGURE 4.2 below shows TWO woodworking machines. Study the pictures and answer the questions that follow.

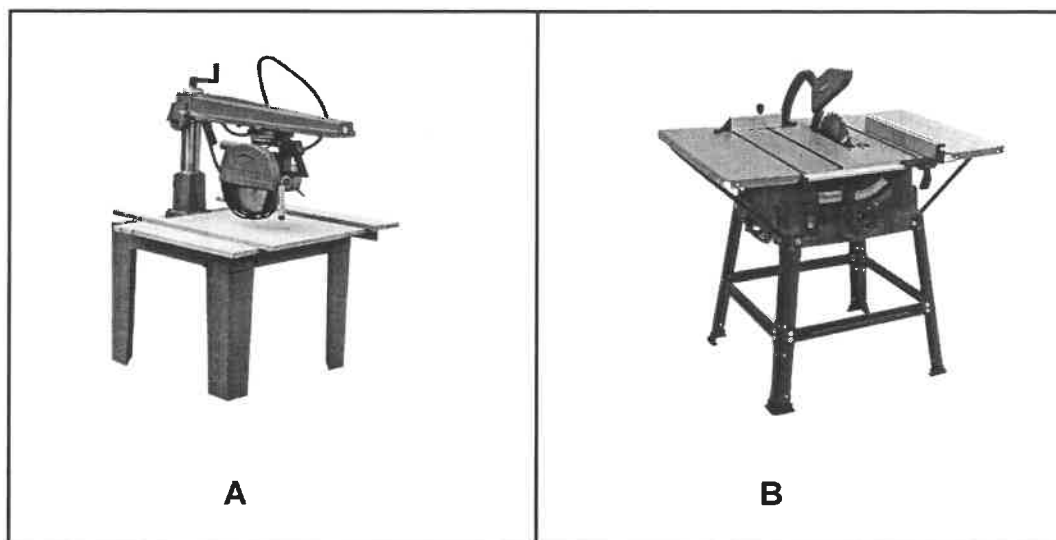


FIGURE 4.2

- 4.2.1 Identify machines **A** and **B**. (2)
- 4.2.2 Explain TWO safety aspects that you would apply when doing crosscutting on machine **A**. (2)
- 4.2.3 Explain how you would take care of the electrical cords on machine **B**. (1)
- 4.2.4 Explain how you would take care of the blades on machine **B**. (1)
- 4.3 Describe ONE consequence if the work piece/stock is not fastened tightly on a lathe. (1)
- 4.4 Name TWO aspects that will determine the speed of a lathe when working on it. (2)
- 4.5 You want to select timber for a folding table that must be mounted to a wall. Name TWO factors that should be taken into consideration when selecting the timber. (2)
- 4.6 The heads of graded timber boards are marked with a letter, a symbol and a number.
- 4.6.1 Explain what the letter indicates. (1)
- 4.6.2 Name the symbol that must appear on the head. (1)
- 4.6.3 Explain what the number indicates. (1)

- 4.7 Show, by means of pictorial views, the difference between a *cover strip* and a *metal T-strip* used to keep a trapdoor of a ceiling in position. Print the title below each pictorial view. (5)
- 4.8 Show, by means of an orthographic view, the front elevation of a hipped roof. Show only the top part of the building. (2)
- 4.9 Use ANSWER SHEET 4.9 and draw a collar-tie roof truss with a pitch of 45° . Label any ONE part. (11)
- [40]**

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

Start this question on a NEW page.

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, e.g. 5.1.6 D.

- 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 fishplate in formwork for staircases is to fix the ...
- A head of the prop/strut 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 level the formwork.
 - D All the above-mentioned (1)

- 5.2 FIGURE 5.2 below shows a line diagram of a shore. Analyse the drawing and answer the questions that follow.

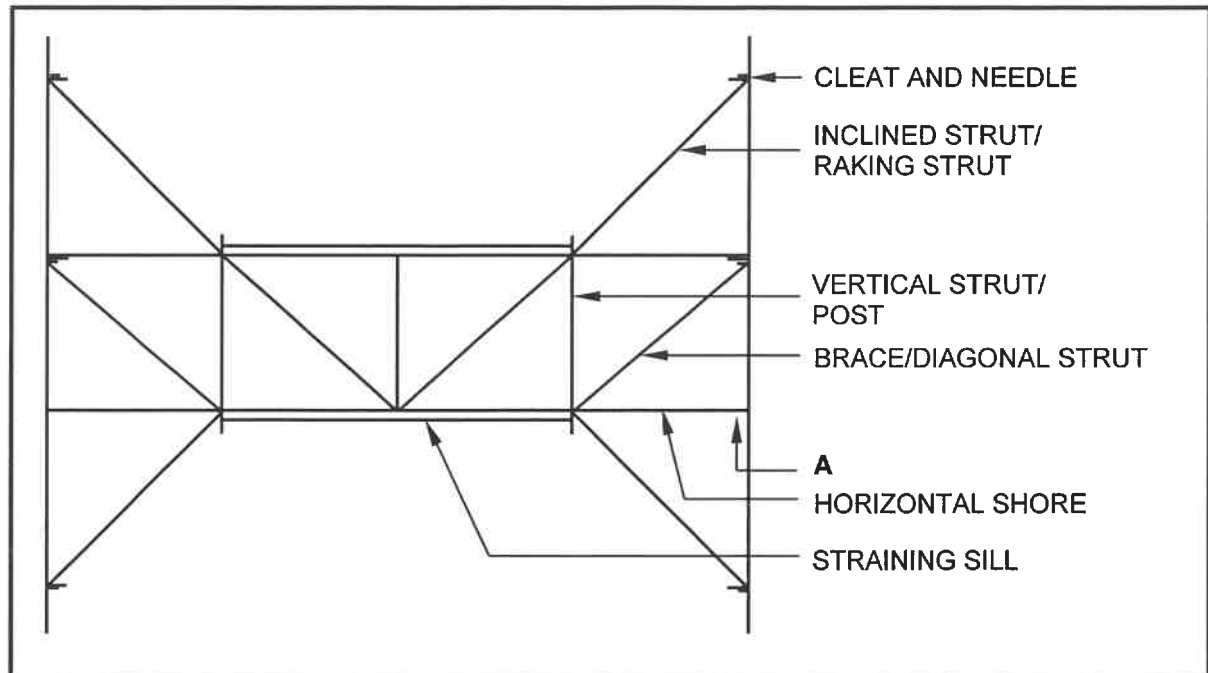


FIGURE 5.2

- 5.2.1 Identify the type of shore. (1)
- 5.2.2 Name ONE of the members that is omitted at A. (1)
- 5.2.3 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 the horizontal shores. (2)
- 5.3 Describe the purpose of the following components of a dead shore:
- 5.3.1 Needles (1)
- 5.3.2 Folding wedges (1)
- 5.4 Draw in the ANSWER BOOK a neat line diagram of a king post roof truss. (8)
- 5.5 ANSWER SHEET 5.5 shows an incomplete front elevation of the constructional detail of the centering for a semi-circular arch.

Complete the drawing by drawing the omitted members.

Draw open laggings on the right half and closed laggings on the left half of the centre.

(11)
[30]

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

Start this question on a NEW page.

6.1 FIGURE 6.1 below shows a lock.

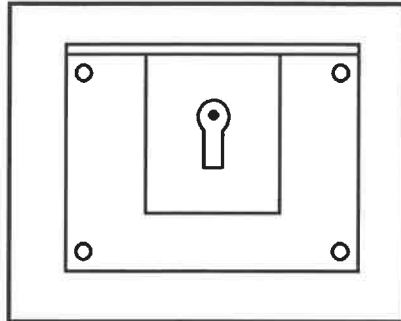


FIGURE 6.1

6.1.1 Identify the type of lock. (1)

6.1.2 State ONE use of this lock. (1)

6.2 Use ANSWER SHEET 6.2 and draw to scale 1 : 10 the front elevation of a three-panel door with raised and fielded panels and a high-lock rail.

Use the following specifications:

- The outside dimensions of the door are 2 032 mm high and 813 mm wide
 - Top rail 114 mm x 44 mm
 - Stiles 144 mm x 44 mm
 - High lock rail 220 mm x 44 mm
 - Height to the top of the lock rail is 1 330 mm from the bottom of the door
 - Bottom rail 220 mm x 44 mm
 - Muntin 75 mm x 44 mm
- (13)

6.3 ANSWER SHEET 6.3 shows an incomplete drawing of a side elevation of a straight flight of stairs with a landing.

Use ANSWER SHEET 6.3 and draw the complete handrail installation. (6)

6.4 ANSWER SHEET 6.4 shows the isometric view of the rail of a haunched mortise and tenon joint.

Use ANSWER SHEET 6.4 and draw the isometric view of the adjoining stile. No hidden detail is required. (6)

- 6.5 ANSWER SHEET 6.5 shows the top view of part of a suspended timber floor. Study the figure and answer the question that follows.

Use ANSWER SHEET 6.5 and project and draw vertical section **A–A**, using the foundations as a starting point.

The following should also be shown on the drawing:

- Plaster on the inside of the wall
- Natural ground level
- Projection lines

Ignore the ant guard, airbrick and DPC.

(13)
[40]

TOTAL: 200

CENTRE NUMBER:

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EXAMINATION NUMBER:

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ANSWER SHEET 2

NO.	QUESTIONS	ANSWERS	MARKS
1.	Name the FIGURE that represents the ground floor. Give ONE reason for your answer.		2
2.	Deduce the scale that was used to draw the floor plan of the house from the given building plan.		1
3.	Identify number 1.		1
4.	Identify number 4.		1
5.	Identify number 5.		1
6.	Identify number 6.		1
7.	Give the abbreviation for the symbol at number 7.		1
8.	Identify number 8.		1
9.	Identify number 9.		1
10.	Identify number 10.		1
11.	Identify the number that indicates the wall-mounted light.		1
12.	Give the abbreviations for the following: - Finished floor level - Natural ground level		2
13.	Name a suitable material that can be used for constructing number 2.		1

CENTRE NUMBER:

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EXAMINATION NUMBER:

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14.	Recommend ONE use for the area indicated by number 3.		1
15.	Recommend ONE permanent fixture for bedroom 1 that can be used for storage.		1
16.	Who is the architect that was responsible for the drawing?		1
17.	Describe what is indicated by the arrows on the staircase in FIGURE B.		1
18.	State what was done during revision 1 and revision 2 of the house plan.		2
19.	Deduce the reference code from the building plan.		1
20.	Who must be notified when a contractor sets out levels on a site and there are variances?		1
21.	Identify ONE important fixture that is omitted in the bathroom.		1
22.	Draw the symbol for face brick.		2
23.	Draw the electrical symbol for earth.		2

CENTRE NUMBER:

EXAMINATION NUMBER:

24.	Draw the symbol for a grease trap.		2
25.	Prove, by means of a control test, that the total vertical dimensions on the left and right of the plan in FIGURE B are equal.		7
26.	Calculate the area of the first floor. Show ALL calculations. Give your answer in m ² .		3
		TOTAL:	40

[illegible]

Dimension paper

(1)

[illegible]

(3)

(6)

CENTRE NUMBER:							
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EXAMINATION NUMBER:													
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ANSWER SHEET 3.3

CEILING

FLOOR

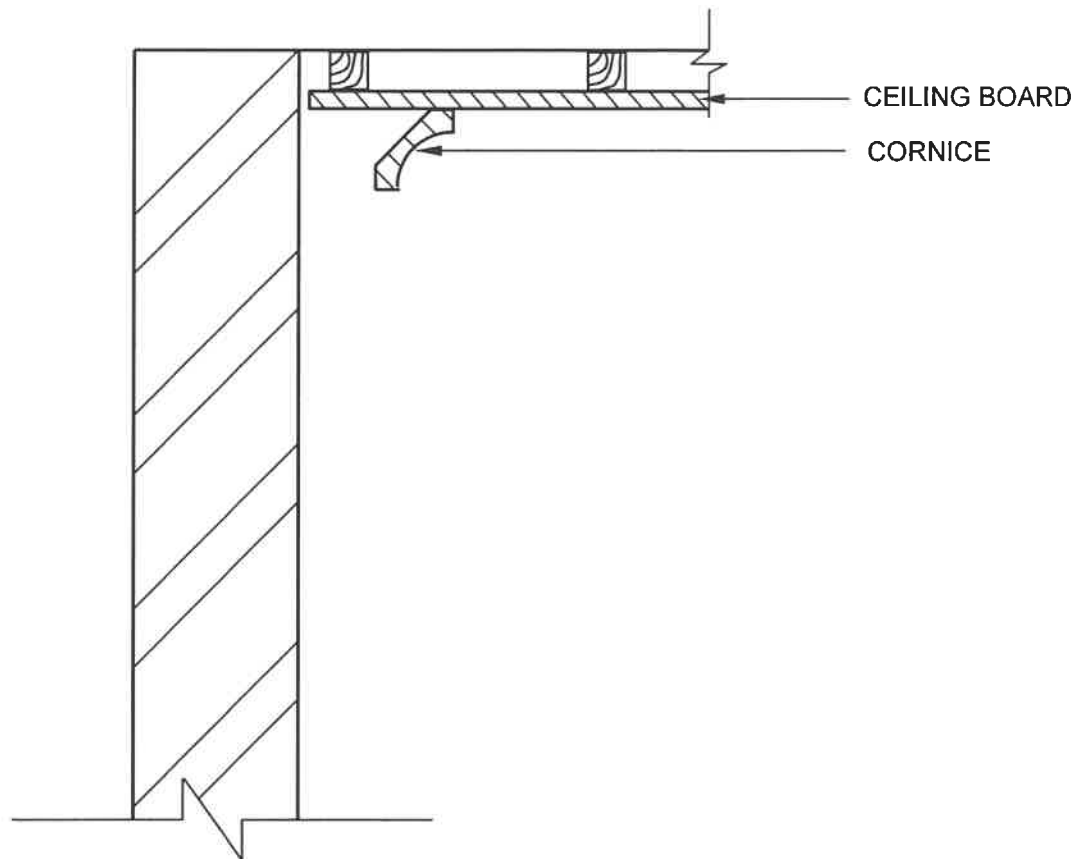
ASSESSMENT CRITERIA	MARK	CM
Correctness of cupboard	2	
Members of cupboard	10	
TOTAL:	12	

CENTRE NUMBER:

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EXAMINATION NUMBER:

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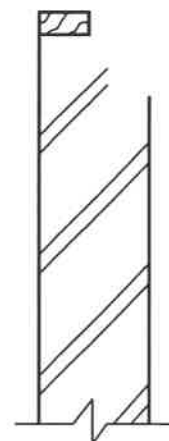
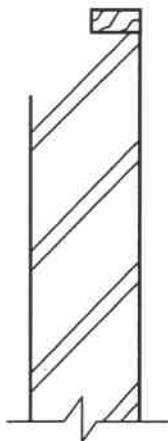
ANSWER SHEET 3.4

ASSESSMENT CRITERIA	MARK	CM
Correctness of top part of wall panelling	1	
Members of panelling	3	
TOTAL:	4	

CENTRE NUMBER:

EXAMINATION NUMBER:

ANSWER SHEET 4.9



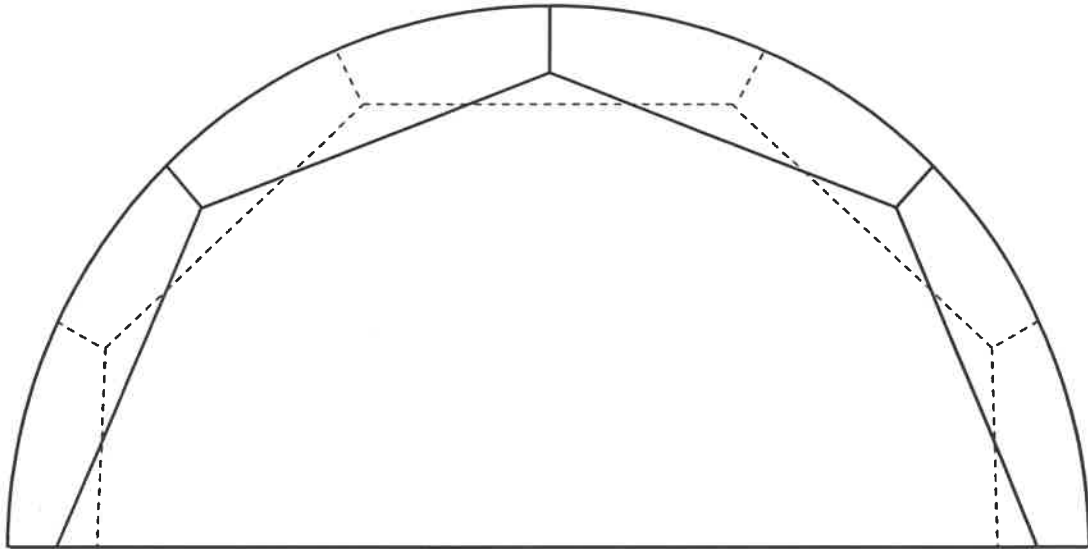
ASSESSMENT CRITERIA	MARK	CM
Correctness of collar-tie roof	2	
Members	8	
Any ONE label	1	
TOTAL:	11	

CENTRE NUMBER:

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EXAMINATION NUMBER:

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ANSWER SHEET 5.5

ASSESSMENT CRITERIA	MARK	CM
Correctness of centering	3	
Members	8	
TOTAL:	11	

CENTRE NUMBER:								
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EXAMINATION NUMBER:														
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ANSWER SHEET 6.2

ASSESSMENT CRITERIA	MARK	CM
Correctness of door	2	
Members	9	
Application of scale	2	
TOTAL:	13	

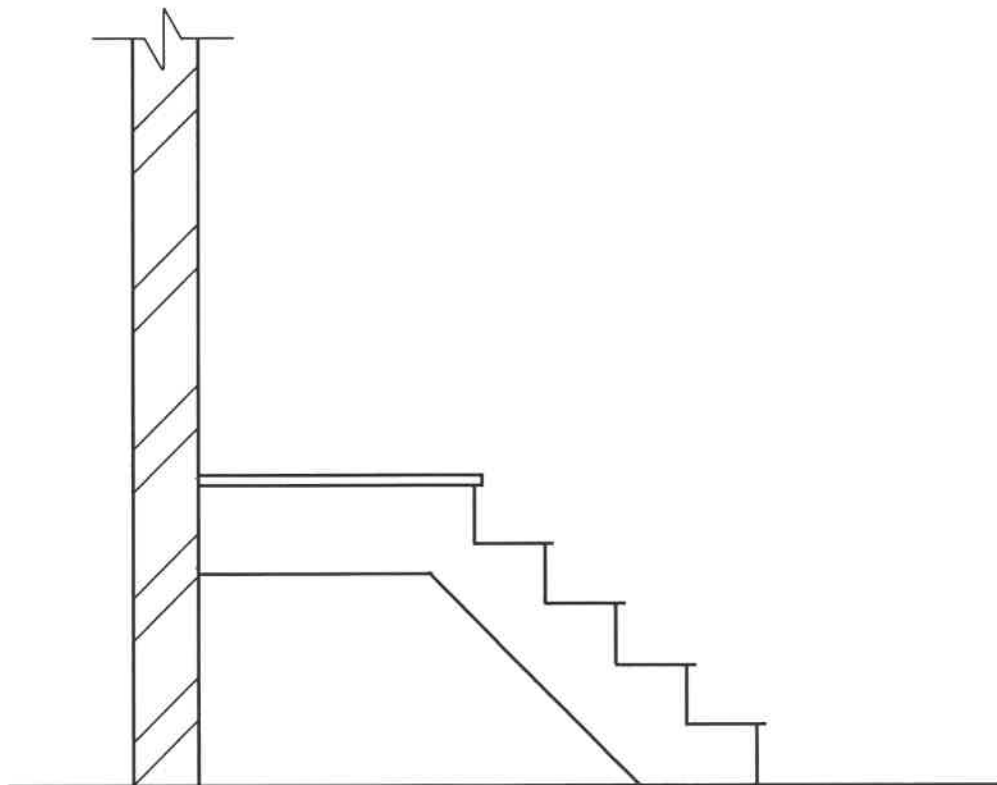


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EXAMINATION NUMBER:

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ANSWER SHEET 6.3

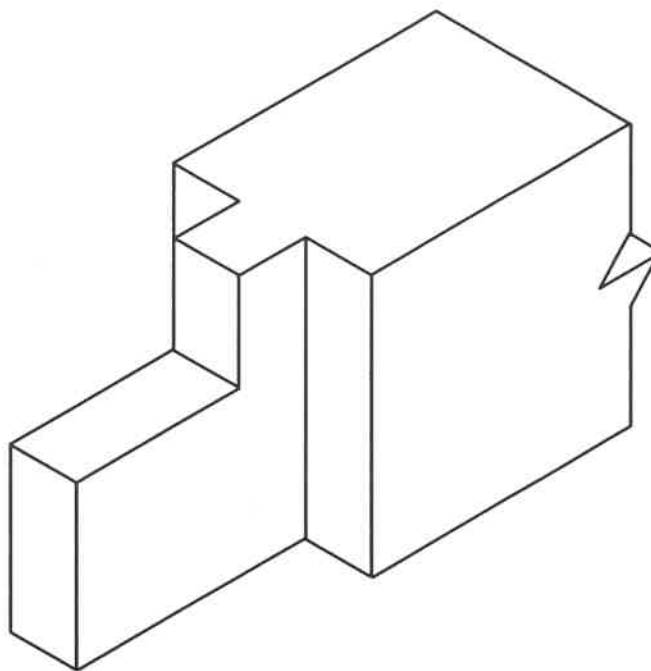
ASSESSMENT CRITERIA	MARK	CM
Correctness of handrail installation	1	
Members	5	
TOTAL:	6	

CENTRE NUMBER:

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EXAMINATION NUMBER:

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ANSWER SHEET 6.4

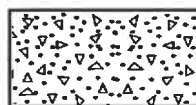
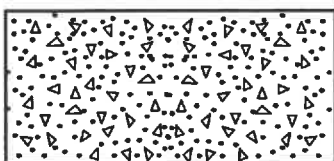
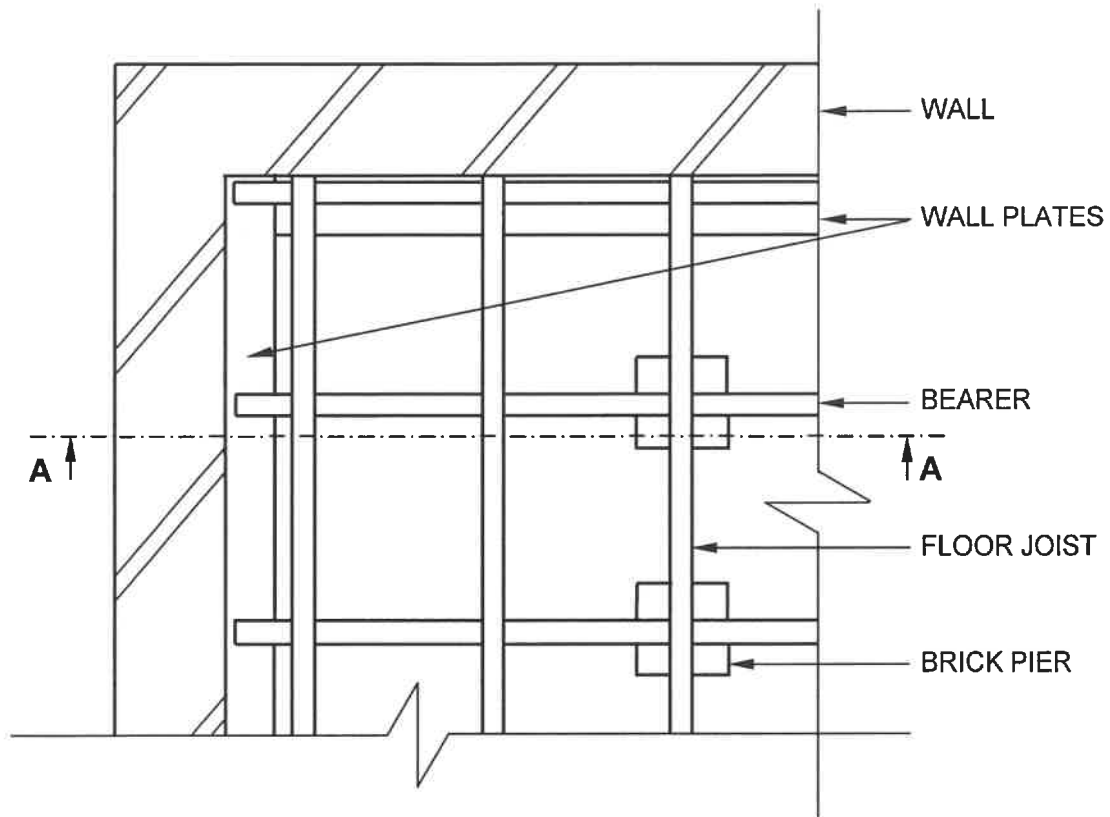
ASSESSMENT CRITERIA	MARK	CM
Correctness of stile	1	
Parts of style	5	
TOTAL:	6	

CENTRE NUMBER:

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EXAMINATION NUMBER:

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ANSWER SHEET 6.5

ASSESSMENT CRITERIA	MARK	CM
Correctness of sectional view	2	
Members	10	
Projection lines	1	
TOTAL:	13	