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JUNE EXAMINATION GRADE 12

2026

NAME:	
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SCHOOL:	
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SUBJECT:	CIVIL TECHNOLOGY: CONSTRUCTION
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ANSWER ALL THE QUESTIONS IN THE QUESTION PAPER.

MARKER					INT. MODERATOR				DIST. MODERATOR				PROV. MODERATOR			
Question	Marks			Marker's code & initials	Marks			IM's code & initials	Marks			DM's code & initials	Marks			PM's code & initials
1																
2																
3																
4																
5																
6																
TOTAL																

TIME: 3 hours

MARKS: 200

34 pages



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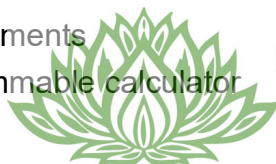
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**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of SIX questions. Answer ALL the questions in the spaces provided.
2. You may use sketches to illustrate your answers.
3. Use the mark allocation as a guide to the length of your answers.
4. 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*.
5. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
6. Use your own discretion where dimensions and/or details have been omitted.
7. Answer QUESTIONS 2; 4.5; 4.6; 6.2; 6.3 and 6.4 on the templates provided, using drawing instruments where necessary.
8. Drawings in the question paper are NOT to scale due to electronic transfer.
9. No pages may be torn from this question paper.
10. Candidates may not retain a question paper or remove it from the examination room. Question papers must be returned to the invigilator at the end of the examination session.
11. Answers must be written in black/blue ink as distinctly as possible. Do NOT write in the margins.
12. Indicate the questions you have answered by drawing a circle around the relevant numbers on the front cover of the question paper where marks are to be recorded.
13. Draw a neat line through any work/rough work that must NOT be marked.
14. In the event that you use the additional space provided:
 - 14.1 Write down the number of the question.
 - 14.2 Leave a line open and rule off after your answer.
15. Write neatly and legibly.

REQUIREMENTS:

1. Drawing instruments
2. A non-programmable calculator

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

1.1	Choose the correct word/phrase from those given in brackets. Write only the word/phrase below the questions (1.1.1 to 1.1.5) in the spaces provided.	
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 metal.	
		(1)
1.1.5	Galvanising is the process of applying a (zinc/copper/tin) coating to the base of metals.	
		(1)

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1.2 Answer the following questions regarding the scaffolding in FIGURE 1.2 below.

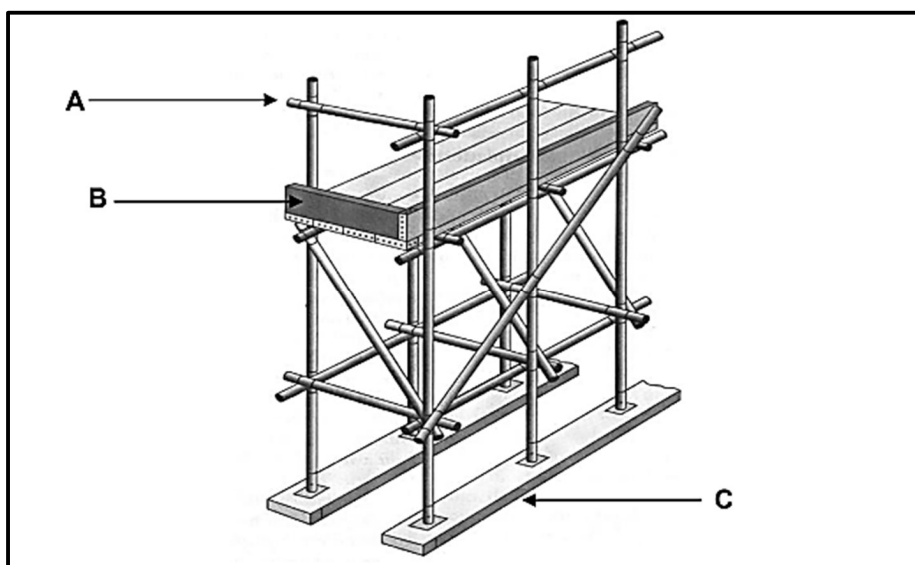


FIGURE 1.2

1.2.1	Name parts A to C .	
		(3)
1.2.2	Is this a dependent or an independent scaffolding?	
		(1)
1.2.3	What is the maximum height that part A must be from the platform?	
		(1)



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1.3	You have been tasked by a contractor to install a 20 kg gate to the pier of a boundary wall.	
1.3.1	Name the joining fixture that you will use to secure the gate to the pier.	(1)
1.3.2	Motivate why you will use this joining fixture.	
		(2)
1.3.3	Explain how you will install the gate by using the joining fixture mentioned in QUESTION 1.3.1, if the positions of the holes have already been marked on the pier.	
		(3)
1.4	You were tasked to locate steel bars and copper pipes placed in a wall.	
1.4.1	Name the tool you would use to detect these materials.	(1)
1.4.2	Describe how you will take care of this tool after using it.	
		(1)





1.5	Name TWO methods that can be used to move building material around a site.	
		(2)

[20]**QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)**

FIGURE **A** and FIGURE **B** on the next page shows drawings that appear on a building plan.

Analyse the drawings and complete the table that follows.

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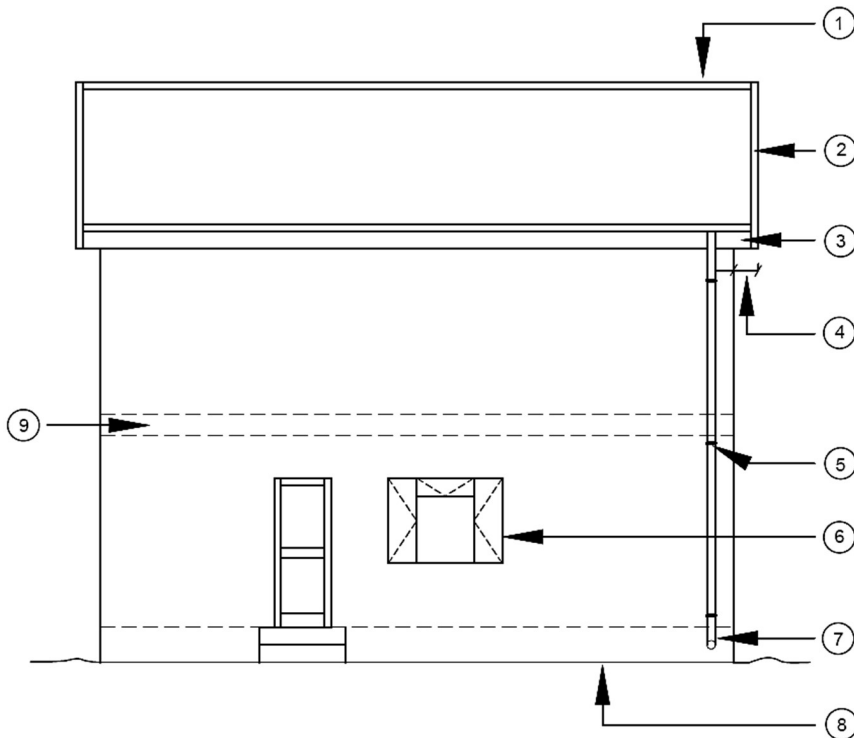


FIGURE A
SCALE 1 : 100

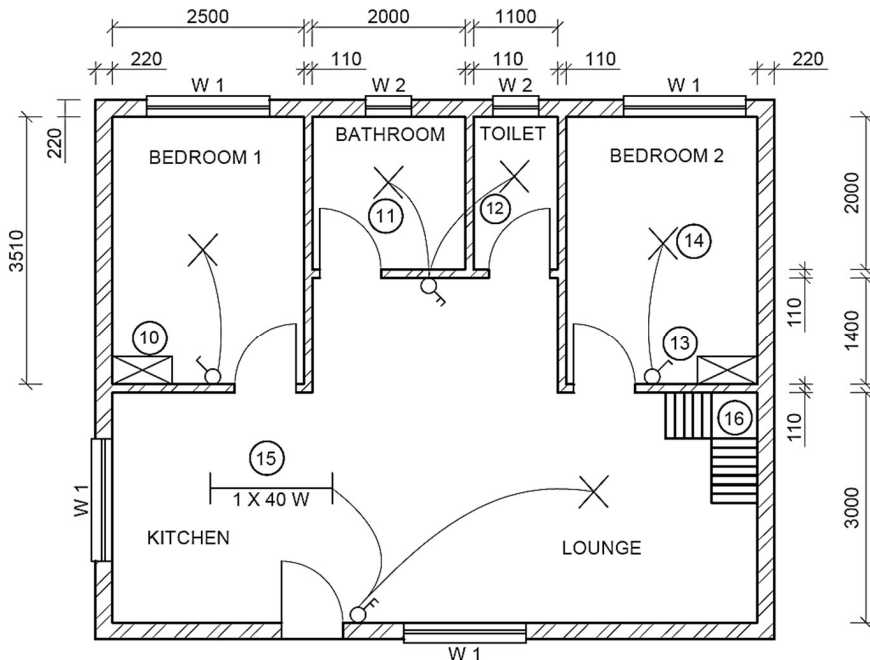


FIGURE B
SCALE 1 : 100

NOTES:

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

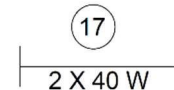
ARCHITECT'S SIGNATURE

CLIENT'S SIGNATURE

Brick force must be installed at every third course up to window height. From the top of the window, brick force must be installed between every course up to wall plate height.

DPM must be fitted under the floor slab to prevent water from the substructure.

The following electrical fittings must be installed in the kitchen:



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PROJECT NO.
GR 448-210

DRAWING NO.
559P7

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27/03/2020

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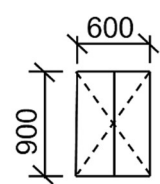
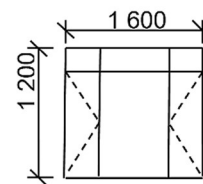
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WINDOW 1

WINDOW 2



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NO.	QUESTIONS	ANSWERS	MARKS
1.	Identify the elevation in FIGURE A.		1
2.	Describe the type of house that is indicated in FIGURE A.		1
3.	Identify number 1.		1
4.	Identify number 3.		1
5.	Identify number 4.		1
6.	Identify the fastener indicated by number 5.		1
7.	Identify number 6.		1
8.	Identify number 7.		1
9.	Identify number 8.		1
10.	What does <i>DPM</i> stand for, as indicated in the notes?		1
11.	Identify number 10.		1
12.	Recommend a suitable material that can be used for the manufacturing of number 2 in FIGURE A.		1
13.	Name the TWO elevations on which number 2 is installed.		2
14.	Describe the purpose of number 3.		1
15.	Deduce ONE feature that has been omitted from the elevation in FIGURE A.		1
16.	Recommend any TWO sanitary fitments carrying wastewater, other than a bath, that can be installed in the room indicated by number 11.		2





NO.	QUESTIONS	ANSWERS	MARKS
17.	What sanitary fixture carrying soil water can be installed in the room indicated by number 12 ?		1
18.	Describe the error that appears at number 6 in the elevation in FIGURE A .		1
19.	State the reference code for this plan.		1
20.	Which room will number 13 serve?		1
21.	What does the line between numbers 13 and 14 represent?		1
22.	Differentiate between number 15 in FIGURE B and number 17 in the notes.		2
23.	Explain the installation of brick force from the top of the window to the wall plate, as indicated by the architect.		1
24.	Recommend a possible finish for the outside walls of the house.		1
25.	Deduce from FIGURE A which elevation does not have windows.		1
26.	Deduce the thickness of the external wall in FIGURE B .		1
27.	Name the material that can be used to close the open sides of number 16 .		1
28.	Name the town in which the proposed dwelling will be built.		1





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CIVIL TECHNOLOGY: CONSTRUCTION**GR12 0626****10**

NO.	QUESTIONS	ANSWERS	MARKS
29.	Calculate the area of the bathroom. Show ALL calculations. Give your answer in m ² .		3
30.	Calculate the total length of the wall on the EASTERN side of the building. Show ALL calculations. The length must be indicated in metres.		6

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**QUESTION 3: QUANTITIES (SPECIFIC)**

3.1 A concrete foundation for a double garage with a centre-line of 28,4 m must be cast.

Use the following specifications:

- The concrete foundation size is 400 mm × 700 mm.
- The concrete mix ratio is 1 : 3 : 6.

Use the dimension paper given below and calculate the quantities of the following:

3.1.1 Calculate the volume of concrete needed for the concrete foundation.

A	B	C	D
			Volume of concrete needed for the concrete foundation:
			(5)

3.1.2 Calculate how many bags of cement will be needed for the concrete footing.

A	B	C	D
			Bags of cement that will be needed for the concrete foundation:
			(5)



- 3.2 FIGURE 3.2 below shows the floor plan of a store room with a window and an opening for a door.

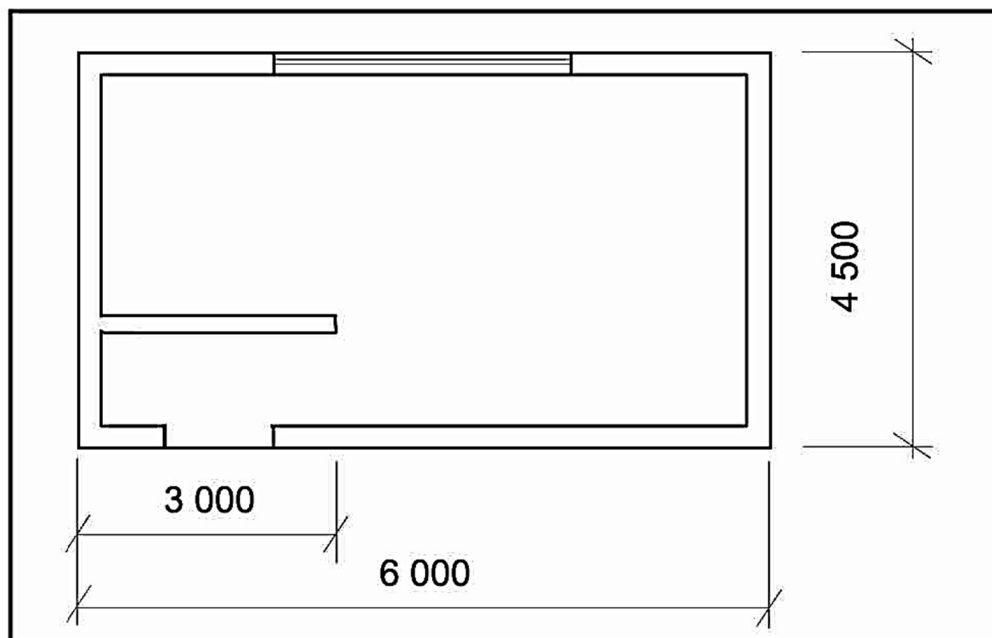


FIGURE 3.2

Use the following specifications:

- The external walls are 220 mm thick.
- The internal wall is 110 mm thick.
- The internal wall is 2 600 mm high.
- 50 bricks are used per m² for a half-brick wall.

Use the dimension paper given below and calculate the quantities of the following materials:

3.2.1 The length of damp-proof course (DPC) needed for external walls in m

A	B	C	D
			Total length of damp-proof course (DPC) needed for external walls:

3.2.2 The total number of bricks needed for the internal wall

A	B	C	D
			Total number of bricks needed for the internal wall:
			(4)

3.3 FIGURE 3.3 below shows the floor plan of a building with a gable roof.

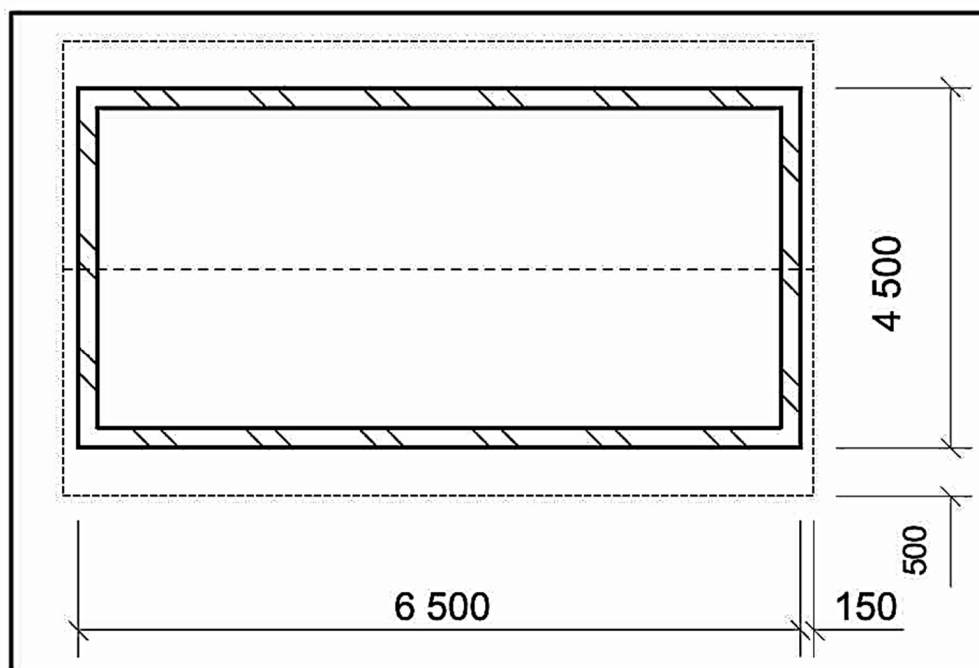


FIGURE 3.3

Use the following specifications:

- The walls are 220 mm thick.

Use the dimension paper provided on the next page and calculate the quantities of the following materials:



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QUESTION 4: TOOLS AND EQUIPMENT, MATERIALS AND EXCAVATIONS (SPECIFIC)

4.1 Choose the correct word/phrase from those given in brackets. Write only the word/phrase below the questions (4.1.1 to 4.1.5) in the spaces provided.

4.1.1	Ready-mix concrete is concrete that is manufactured (on site/in a factory) according to a set recipe.	
		(1)
4.1.2	One of the disadvantages of using ready-mix concrete is that it is very (cheap/expensive).	
		(1)
4.1.3	Concrete that is pumped directly from the truck through a fixed pipeline to three or four sections that unfold is referred to as a (boom pump/line pipe).	
		(1)
4.1.4	A (face fixing/ proprietary fixing) is used when cladding needs to be fixed to a metal structure using secret fixing clips with a levelling bolt.	
		(1)
4.1.5	A compression strength test must be carried out on day (7/15/30).	
		(1)



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4.2 Answer the following questions regarding the test in FIGURE 4.2 below.

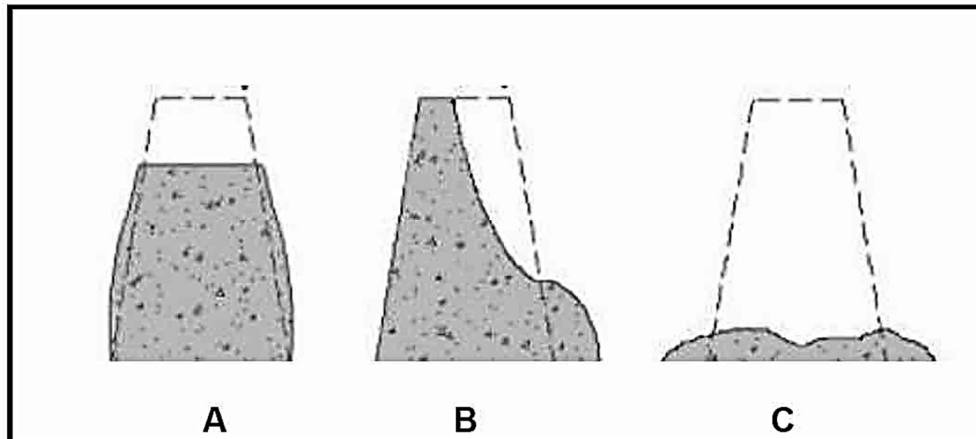


FIGURE 4.2

4.2.1	Identify the results illustrated at A to C .	
		(3)

4.2.2	Give a reason for each of the results mentioned in A to C .	
		(3)





4.3	Make neat, freehand sketches showing the orthographic view of the following failures of cubes:	
4.3.1	Excessive crushing on one face	(2)
4.3.2	Excessive crushing on one face plus horizontal tensile crack	
		(2)
4.4	Which water-retaining material can be used to keep fresh concrete moist?	
		(1)
4.5	The excavation of soil on a building site is necessary to establish a firm foundation.	
4.5.1	What is the minimum distance that excavated soil can be stored from the trench?	(1)





4.5.2	What is a safe distance for heavy machinery to move around a deep excavation?	
		(1)

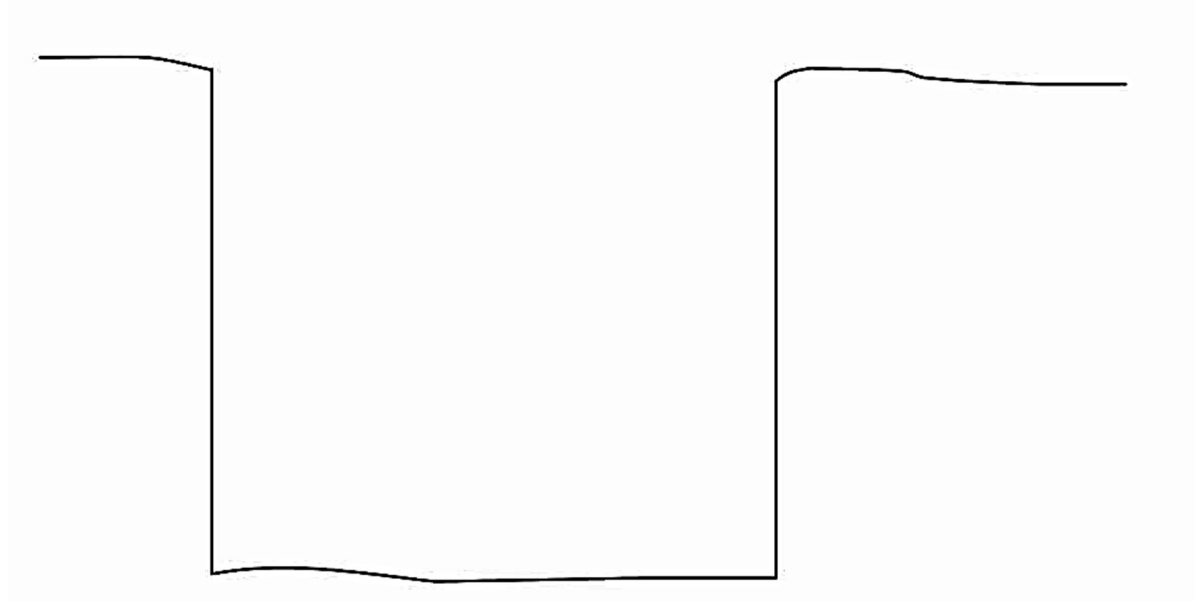
4.5.3	Describe TWO reasons why an excavation can collapse.	
		(2)

4.5.4	What is the maximum depth of a trench in which workers can work without the sides of the trench being braced?	
		(1)

4.5.5	What can help to prevent the sides of excavations from collapsing?	
		(1)

4.6	FIGURE 4.6 shows a trench that has been excavated. Use the space provided and draw a neat sectional drawing, in good proportion, of the shuttering for firm soil. <u>Show the following on your drawing:</u> • Folding wedges • Walling boards • Poling boards • Struts • Any TWO labels	
-----	---	--



**FIGURE 4.6**

ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Correctness of drawing	8	

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4.7	Before construction work can start, environmental engineers and land surveyors must inspect the site for anything that might delay the work. State THREE tasks that must be carried out to prepare the site after the inspection.	
		(3)

4.8	State TWO aspects that will be tested under atmospheric hazards if trenches are more than 1,22 metres deep.	
		(2)



4.9 FIGURE 4.9 below shows a machine used on a construction site.



FIGURE 4.9

4.9.1	What is the purpose of the machine shown in FIGURE 4.9?	
		(1)

4.9.2	Give ONE important reason for storing this machine with the opening facing downwards as illustrated in FIGURE 4.9 above.	
		(1)

4.10	Name the machine that will be most suitable for the following situations:	
4.10.1	Compacting thick layers of backfilling	
		(1)



4.10.2	Compacting thin layers of soil in final preparation for paving	
		(1)

4.10.3	Finishing off a large concrete floor	
		(1)

[40]

QUESTION 5: JOINING, BRICKWORK AND GRAPHICS AS MEANS OF COMMUNICATION (SPECIFIC)

- 5.1 Give ONE word/term for each of the following descriptions by choosing a word/term from the list below and where necessary fill in the missing word/term. Write only the word/term below the question numbers (5.1.1 to 5.1.5) in the spaces provided.

300 mm; 400 mm; J-bolt; 4 mm; 6 mm; 760 mm; 700 mm; bolted;
steel pin; 50 mm x 76 mm; 600 mm

5.1.1	Place it in position while the concrete is still wet.	
		(1)

5.1.2	A method of securing a wall plate to a brick wall	
		(1)

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5.2	Cast-in anchors are used to join steel sections to concrete. Draw a neat two-dimensional drawing below of a J-bolt cast-in anchor showing the sectional views through the concrete.	



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(4)

5.3 FIGURE 5.3 below shows bricks laid for a pavement.

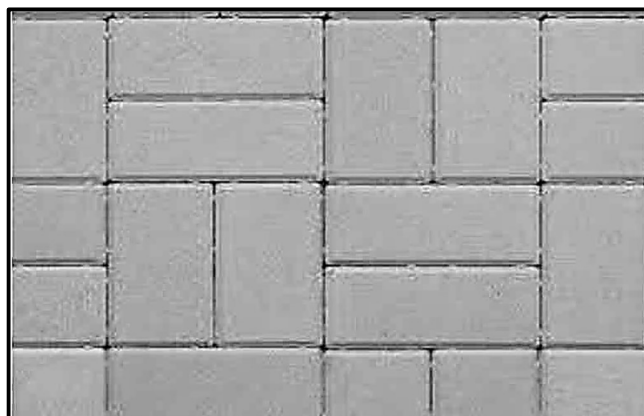


FIGURE 5.3

5.3.1	Identify the paving pattern in FIGURE 5.3.	
		(1)

5.3.2	Describe the difference between <i>bedding sand</i> and <i>jointing</i> regarding brick paving.	
		(2)

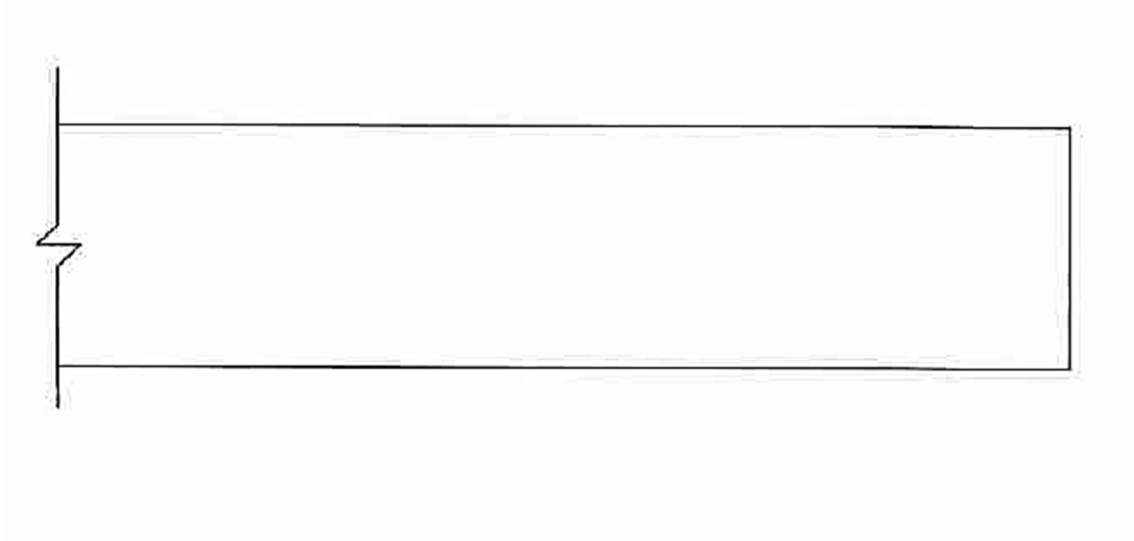
5.4	State any TWO reasons for beam filling in a building.	
		(2)





5.5	Name TWO disadvantages of beam filling.	
		(2)

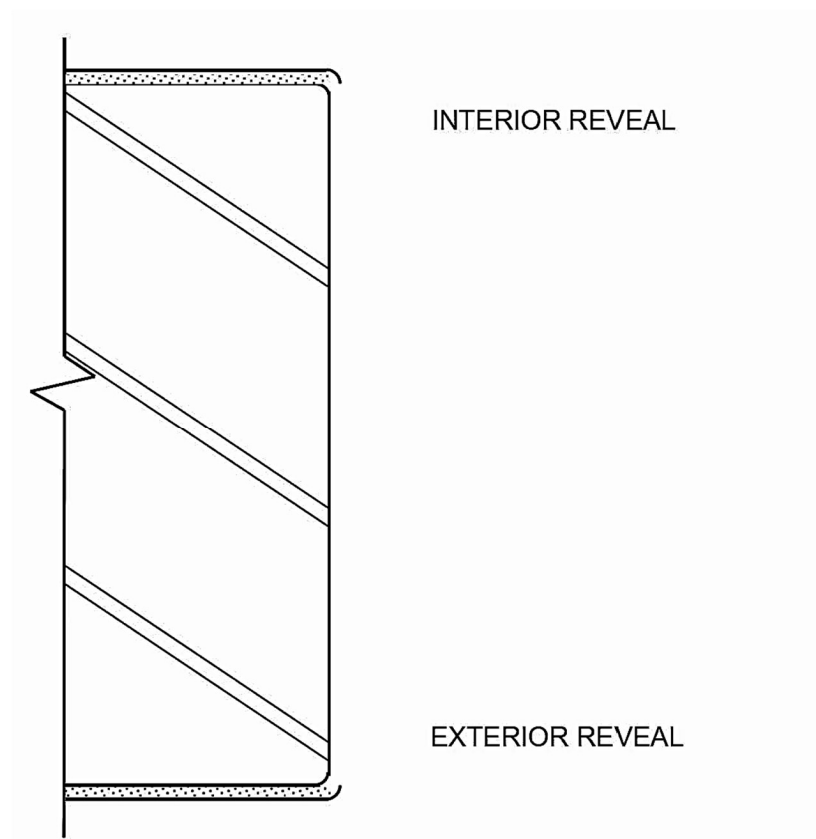
- 5.6 An outline of the top view of a cavity wall with dead end is shown below.
- Use the sketch and draw a ONE brick course of the cavity wall with a wall tie.



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Correctness of drawing	7	

- 5.7 A horizontal sectional view of a part of a one-brick wall and the labels for the exterior and interior reveals are shown below.

Use the diagram below and complete the horizontal sectional view in good proportion to illustrate how a timber door frame is built into a wall. The door opens inwards.



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Correctness of drawing	7	



QUESTION 6: REINFORCEMENT IN CONCRETE, FOUNDATIONS AND CONCRETE FLOORS (SPECIFIC)

6.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A – D) for questions 6.1.1 to 6.1.3 in the blocks provided.

6.1.1	Reinforcement is indicated on construction drawings with a code. In the code 6 R 12 01 400, the '6' indicates the ...	
	A diameter of the bar. B rod number. C number of rods in the group. D centre-to-centre spacing.	 (1)

6.1.2	Which of the following is NOT a recognised material that is used for reinforcing?	
	A Twisted ribbed bar B Round tubing C Ribbed bar D Twisted square bar	 (1)

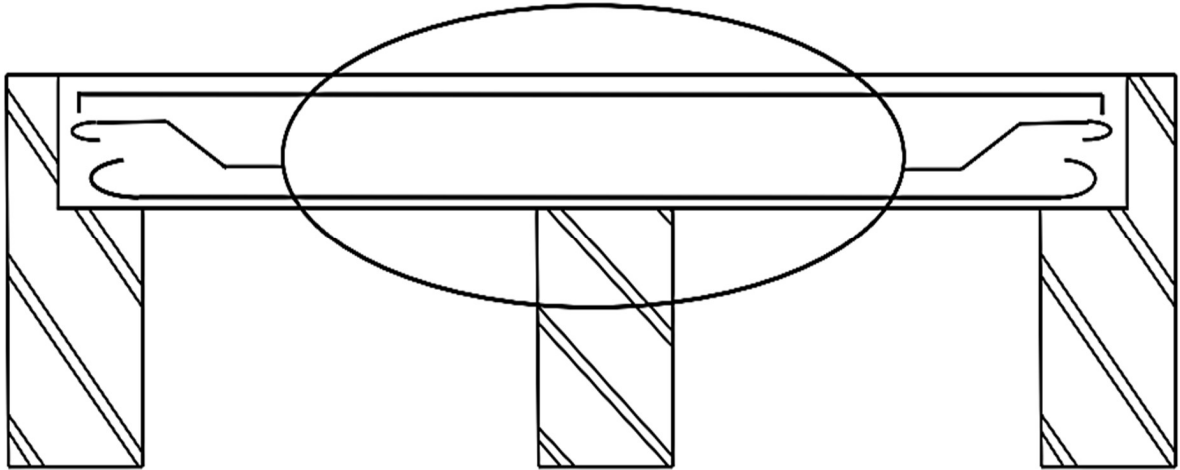
6.1.3	... force causes a column to become shorter and thicker.	
	A Shear B Tensile C Compression D Lateral	 (1)

6.2	State TWO reasons why cover depth is important for reinforcing in concrete.	
		(2)

6.3	Justify why you would use ribbed bars rather than plain round bars as reinforcement.	
		(2)



- 6.4 Use the sketch below and draw the reinforcing of the encircled part. Show and label the minimum concrete cover depth.



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Correctness of drawing	6	

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6.5	Name THREE reasons for the use of pile foundations.	
		(3)
6.6	Name TWO types of soil where precast piling can be used.	
		(2)
6.7	Explain the purpose of the steel capping on a precast concrete pile.	
		(1)



6.8	Draw, in the space provided below, a neat, freehand sketch of the concrete plug of an enlarged base when installing a driven in-situ pile. Indicate the symbol for concrete in the enlarged base.	
		(5)

- 6.9 FIGURE 6.9 below shows a faulty installation of a floor construction. Analyse FIGURE 6.9 and answer the questions that follow.

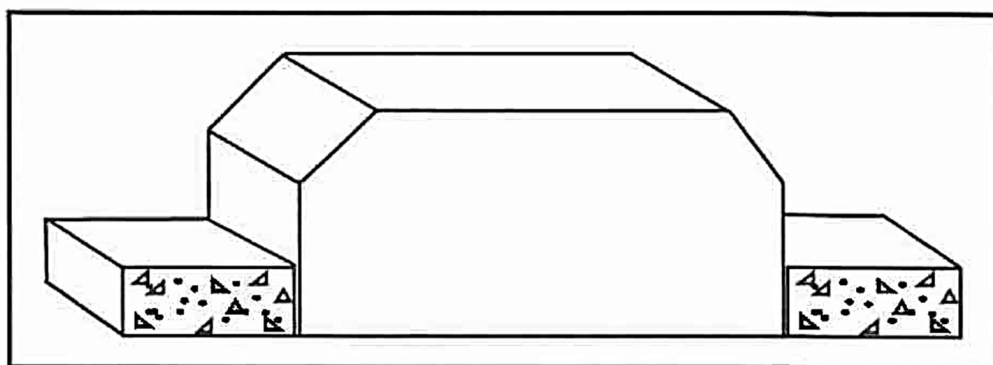


FIGURE 6.9

6.9.1	Identify this type of floor that makes use of the above components.	
		(1)



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6.9.2	For how long should the concrete for this type of floor be cured?	
		(1)
6.9.3	State the minimum length of the end bearing of ribs on the load-bearing walls.	
		(1)
6.9.4	Predict TWO consequences of installing the rib and block floor as shown.	
		(2)
6.9.5	State THREE factors that must be considered when planning the type of construction in FIGURE 6.9.	
		(3)



6.9.6	Name TWO safety factors to be considered after the installation of this type of floor construction.	
		(2)
6.9.7	Draw a neat, freehand drawing in the space provided and rectify the faults in FIGURE 6.9.	
		(6)
		[40]



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