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JUNE EXAMINATION GRADE 12

2026

MARKING GUIDELINES

CIVIL TECHNOLOGY: CONSTRUCTION

19 pages



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MARKING GUIDELINES	CIVIL TECHNOLOGY: CONSTRUCTION GR12 0626
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INSTRUCTIONS FOR THE MARKERS

1. Markers should:

- Familiarise themselves with the question and answers before evaluating the responses of candidates.
- Always interpret the responses of the candidates within the context of the question.
- Consider any relevant and acceptable answer during pre-marking but adhere strictly to the answers after finalisation of the marking guidelines.
- There are TWO approaches to answering questions; these are (1) to describe and (2) to explain.
 - If a candidate is required to explain, e.g. a process in 4 steps, only the first 4 responses should be considered.
 - If however a candidate is required to e.g. to explain or describe how to transfer heights from one point to another using a transparent pipe level we need to consider that candidates may write a long description, not necessarily well organised, as an intellectual response may do. In this case the marker needs to evaluate the complete statement to judge if the candidate explained the required outcome satisfactorily and allocate marks on merit. The marker should apply his/her professional judgement with these types of questions.
- Mark what the candidate wrote and do not award marks for answers that the marker thinks the candidate meant based on what was written.
- Indicate the tick or cross at the position where the mark needs to be awarded or where the candidate made the error.
- Accept the letter corresponding to the correct answer as well as the answer written in full in multiple-choice questions.
- Accept incorrect spelling in one-word answers unless the spelling changes the meaning of the answer.

2. For calculations:

- A mark is only awarded if the correct unit is written next to the answer.
- If TWO marks are awarded ONE mark is awarded for the answer and ONE mark for the correct unit.
- Where the candidate made a principle error, e.g. added instead of multiplying, no marks will be awarded for the steps. If the answer is correct according to what the candidate did, the mark for the answer can be awarded for the application of skills.
- Where an incorrect answer could be carried over to the next step, the first answer will be deemed incorrect. However, should the incorrect answer be carried over correctly, the marker has to recalculate the values, using the incorrect answer from the first calculation. If correctly used, the candidate should receive the full marks for subsequent calculations.
- Markers should consider when and where a candidate has rounded off in a calculation, as well as the subsequent effect it has on the final answer obtained. The calculation should therefore be awarded marks on merit.
- Alternative methods of calculation must be considered, provided that the correct answer is obtained.





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3. When marking drawings:

- The member for which the mark should be awarded should be drawn correctly in the correct position to receive a mark.
- A member incorrectly drawn but wrongfully repeated in another position will be awarded the mark for the repeated incorrect member provided that the marking guideline provide for TWO or more marks for that member (positive marking).
- Marks can only be awarded for a label if the label is correctly indicating the correct member.
- Scale drawings should always be marked using an appropriate mask.

When a candidate drew the wrong drawing, e.g.:

- A horizontal section instead of a vertical section, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- If an orthographic view instead of sectional view is presented, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- If an orthographic view instead of an isometric view is presented, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- If the incorrect drawing was drawn, the candidate can be awarded marks only for what was asked but mark/s for the correctness of the drawing will not be awarded.



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

- 1.1 1.1.1 Oil or water-based paint ✓ (1)
- 1.1.2 Increase the strength of concrete ✓ (1)
- 1.1.3 Electrolysis ✓ (1)
- 1.1.4 Plastic ✓ (1)
- 1.1.5 Zinc ✓ (1)
- 1.2 1.2.1 **A** – Guardrail ✓
B – Kickboard **OR** toe-board ✓
C – Base ✓ (3)
- 1.2.2 Independent scaffolding ✓ (1)
- 1.2.3 1 m **OR** 1 000 mm ✓ (1)
- 1.3 1.3.1 Rawl bolt/Coach screw with a plug/ Threaded rod/ Bolt and nut/ Plastic plug with a screw ✓ (1)
- 1.3.2 • Are strong fasteners ✓
• Resists pull out failure ✓
• Have excellent mechanical properties
• Have excellent carrying capacity/ability/carry heavy weight
• Are suitable for tensile strength and yield stress
• Are suitable for variance of hole sizes.
ANY TWO OF THE ABOVE. (2)
- 1.3.3 • Drill holes into the pier and remove the debris. ✓
• Remove bolts and washers and insert shields into holes. ✓
• Insert bolt with washers through the hinges and tighten. ✓
OR
• Drill holes into the pier and remove the debris.
• Insert plastic plugs into the holes.
• Insert Rawl bolts/coach screws with plugs/ threaded rods/bolts/ plastic plugs with screws through the hinges and tighten. (3)


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1.4 1.4.1 Multi-detector ✓

(1)

1.4.2 Care of the multi detector:

- Place the multi-detector in its holder directly after use. ✓
- Do not bump the instrument against objects or drop it. ✓
- Protect the multi-detector against moisture and direct sunlight.
- If the measuring tool is not used for a long period, remove the battery.
- Wipe away dirt or spots with a dry, soft cloth.
- Switch off the device before storing.

ANY ONE OF THE ABOVE

(1)

- 1.5
- Materials can be moved manually ✓
 - by means of a wheelbarrow
 - trolley. ✓
 - Materials can be moved by means of machinery
 - builder's hoist
 - truck
 - crane
 - tractor
 - conveyor
 - forklift.

(2)

[20]

QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

NO.	QUESTIONS	ANSWERS	MARKS
1.	Identify the elevation in FIGURE A.	South Elevation ✓	1
2.	Describe the type of house that is indicated in FIGURE A.	Double-storey house/Building/Multi-storey building ✓	1
3.	Identify number 1.	Ridge Capping/Ridge tile/Ridge plate/Ridge ✓	1
4.	Identify number 3.	Fascia board ✓	1
5.	Identify number 4.	Overhang/Eave/Dimension line ✓	1
6.	Identify the fastener indicated by number 5.	Holder bat/Clamp/Clip ✓	1
7.	Identify number 6.	Window/Window frame/Casement/ Casement frame ✓	1



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8.	Identify number 7.	Shoe/Down pipe outlet/Spout ✓	1
9.	Identify number 8.	Natural ground level/NGL ✓	1

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NO.	QUESTIONS	ANSWERS	MARKS
10.	What does <i>DPM</i> stand for, as indicated in the notes?	Damp proof membrane ✓	1
11.	Identify number 10 .	Built-in cupboard/BIC ✓	1
12.	Recommend a suitable material that can be used for the manufacturing of number 2 in FIGURE A .	Fibre cement/Galvanised sheeting/ Sheet metal/Timber/Wood/Plastic/Fibre glass/Aluminium sheeting ✓	1
13.	Name the TWO elevations on which number 2 is installed.	West elevation ✓ East elevation ✓	2
14.	Describe the purpose of number 3 .	The gutter is fixed against it. ✓ It finishes off the roof. Protects roofs/rafters from rainwater Appealing look/ aesthetically pleasing	1
15.	Deduce ONE feature that has been omitted from the elevation in FIGURE A .	Sill missing at the window ✓	1
16.	Recommend any TWO sanitary fittings carrying wastewater, other than a bath, that can be installed in the room indicated by number 11 .	Hand basin/Wash hand basin/Basin/ WB/WHB/HB ✓ Shower/SH ✓	2
17.	What sanitary fixture carrying soil water can be installed in the room indicated number 12 ?	Water closet/WC Urinal Bidet/BT ✓	1
18.	Describe the error that appears at number 6 in the elevation in FIGURE A .	The two side windows are opening to the wrong sides/No window sill/The window drawn in FIGURE A is not the same as that in the window schedule/ Window opening. ✓	1
19.	State the reference code for this plan.	QP 4 - 2020 ✓	1
20.	Which room will number 13 serve?	Bedroom 2 ✓	1
21.	What does the line between numbers 13 and 14 represent?	Electrical wiring/cable/connection Wiring/Wiring from light switch to light/Shows which switch operates which electrical fitting ✓	1


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NO.	QUESTIONS	ANSWERS	MARKS
22.	Differentiate between number 15 in FIGURE B and number 17 in the notes.	15: Single tube fluorescent light/ 17: Double tube fluorescent light. 15: Will use less electricity/Watt than 17 15: Will provide less light than 17 15: Running cost will be cheaper than 17. 15: Has one tube 1 x 40 Watt. 17: Has two tubes 2 x 40 Watt. ✓ ✓	2
23.	Explain the installation of brick force from the top of the window to the wall plate, as indicated by the architect.	Brick force must be installed between every course above the window up to wall plate. ✓	1
24.	Recommend a possible finish for the outside walls of the house.	Face bricks Plaster and paint/Plaster/Paint/Plaster finish (Smooth finish/Splatter finish/Wavy finish/Bagging finish) Cladding/Tiling ✓	1
25.	Deduce from FIGURE A which elevations does not have windows.	East elevation ✓	1
26.	Deduce the thickness of the external wall in FIGURE B .	220 mm ✓	1
27.	Name the material that can be used to close the open sides of number 16 .	Wood/Timber/Stainless steel/Mild steel/Steel/Aluminium/Glass/Perspex ✓	1
28.	Name the town in which the proposed dwelling will be build.	Cradock ✓	1
29.	Calculate the area of the bathroom. Show ALL calculations. Give your answer in m ² .	$l \times b$ OR $l \times b$ $= 2 \text{ m} \checkmark \times 2 \text{ m} \checkmark$ $= 4 \text{ m}^2 \checkmark$ OR $2\,000 \text{ mm} \times 2\,000 \text{ mm}$ $= 4 \text{ m}^2$	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 meters.	$220 \checkmark + 3\,000 \checkmark + 110 \checkmark$ $+ 1\,400 + 110 + 2\,000 \checkmark + 220 \checkmark$ $= 7\,060 \text{ mm}$ $= 7,06 \text{ m} \checkmark$ OR $220 + 3\,000 + 110 + 3\,510 + 220$ $= 7\,060 \text{ mm}$ $= 7,06 \text{ m}$	6
			[40]


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CONSTRUCTION GR12 0626**
QUESTION 3: QUANTITIES (SPECIFIC)

3.1

3.1.1

A	B	C	D
			Volume of the concrete needed for the concrete foundation:
1/ ✓	28,4 ✓		
	0,7 ✓		
	0,4 ✓	<u>7,952 m³</u> ✓	7,95 m ³ (5)
			(5)

3.1.2

			Bags of cement will be needed for the concrete foundation:
$\frac{1}{10} / \checkmark$	7,95 ✓	<u>0,795</u> ✓	Cement $\frac{1}{10}$ part X total volume
			Standard cement bag = 50 kg = 0,03 m ³ $\frac{0,795}{0,03} \checkmark$
			26,5 bags
			27 bags ✓ (5)
		OR	
$\frac{1}{10} \checkmark$	7,95 ✓	0,80 ✓	Cement $\frac{1}{10}$ part X total volume
			Standard cement bag = 50 kg = 0,03 m ³ $\frac{0,80}{0,03} \checkmark$
			26,67 bags
			27 bags ✓
			(5)


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3.2

3.2.1

A	B	C	D
			Total length of damp-proof course needed for outer walls:
2/	6 ✓	12 m ✓	Length of the long wall = 6 000 mm
2/	4,5 ✓	9 m ✓	Length of the short wall = 4 500 mm
		<u>21</u> ✓ <u>m</u> ✓	
			OR
			2/6 000 ✓ = 12 000 ✓
			2/4 500 ✓ = 9 000 ✓
			= 21 000 ✓
			21 m ✓ damp-proof course needed
			(6)
1/	2,78 ✓		Number of bricks for inner wall
	2,6 ✓		Length of inner wall: 3 000 – 220 = 2 780 mm
	50 ✓		Height of inner wall: 2 600 mm
		361,4/ 362 ✓ bricks	Use 50 bricks/m ² for half brick wall 362 bricks are needed for the inner wall
			(4)

3.2.2


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3.3

3.3.1

A	B	C	D
			Length of roof:
			= 6 500 mm ✓ + 2/150 mm ✓
			= 6 800 mm ✓
			OR
			= 150 mm + 6 500 mm + 150 mm
			= 6 800 mm
			Area of roof underlay required:
			When a candidate did not calculate the length of the roof but used the correct length 4 marks will be allocated for the correct substitution.
2/ ✓	6,8 ✓		
	3,15 ✓	42,84 m ² ✓	(7)
	OR		
1/ ✓	6,8 ✓		
	6,3 ✓	42,84 m ² ✓	
			Total length of fascia board needed:
2/ ✓	6,8 ✓	13,6 m ✓	(3)

3.3.2

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

4.1 4.1.1 in a factory✓ (1)

4.1.2 expensive✓ (1)

4.1.3 boom pump✓ (1)

4.1.4 proprietary fixing✓ (1)

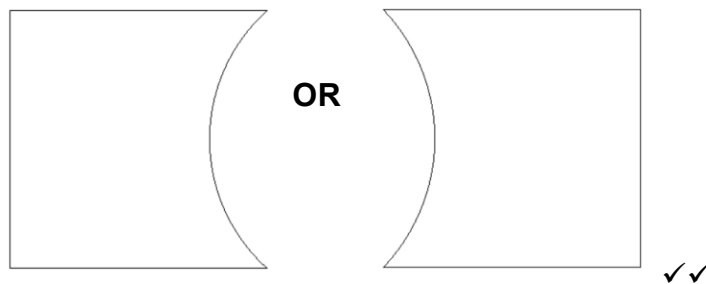
4.1.5 7 ✓ (1)

4.2

4.2.1 A True slump✓
B Shear slump✓
C Collapsed slump✓ (3)

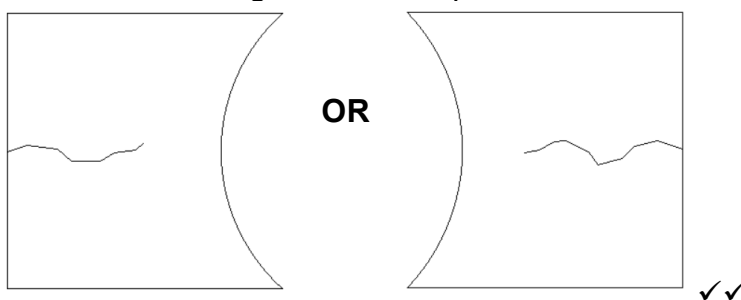
4.2.2 A True slump: Just enough water was used in the concrete mixture ✓
B Shear slump: Not enough water was added to the concrete mixture. ✓
C Collapsed: Too much water was added to the concrete mixture ✓ (3)

4.3 4.3.1 Excessive crushing on one face



(2)

4.3.2 Excessive crushing on one face plus horizontal tensile crack



(2)

4.4

- Damp sand/Sand ✓
- Clean sand
- Soil
- Sacking
- Straw
- Wood shavings
- Canvas
- Hessian

ANY ONE OF THE ABOVE.


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(1)



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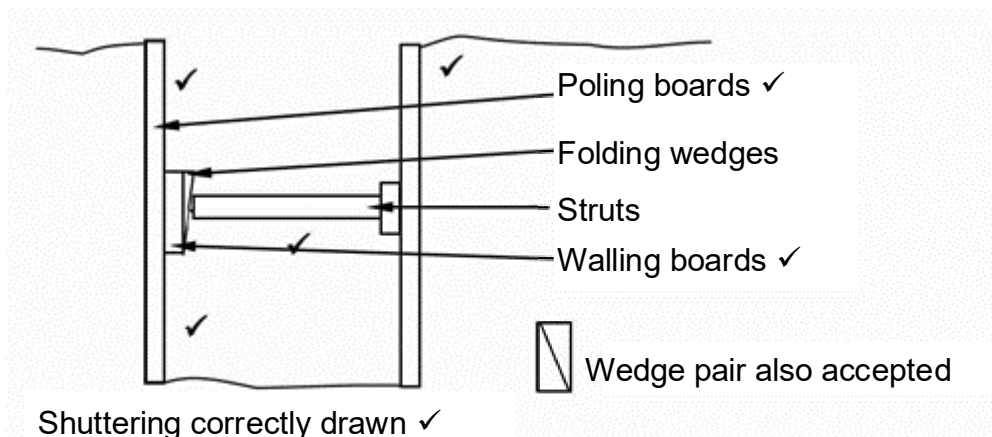
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- 4.5 4.5.1 600 mm ✓ (1)
- 4.5.2 1 metre ✓ (1)
- 4.5.3
- Heavy rains ✓
 - Poor soil strata, structure or composition ✓
 - Sides not dug at correct angle
 - Improper use of formwork or shoring to support the walls
 - Vibration by machinery or heavy vehicles nearby
 - Water seeping into the excavated area
 - Contact with underground service pipes
 - Access to and exit from the excavation
 - Trucks must not go near the edge of the excavation
 - Soil slides due to cracks or loose soil
- ANY TWO OF THE ABOVE.** (2)
- 4.5.4 1,5 metres ✓ (1)
- 4.5.5 Benching can be done/Formwork/Shuttering can be installed. ✓ (1)

4.6



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Folding wedges	1	
Walling boards	1	
Poling boards	2	
Struts	1	
Shuttering correctly drawn	1	
Any TWO labels	2	
TOTAL:	8	

(8)

4.7 Steps to prepare a site after inspection:

- The site must be cleared of all rubble and loose soil must be removed. ✓
- The building site must be levelled. ✓
- A baseline must be established. ✓

(3)



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- 4.8 Atmospheric hazards:
- Low oxygen ✓
 - Hazardous fumes ✓
 - Toxic gases
- ANY TWO OF THE ABOVE** (2)
- 4.9 4.9.1 To quickly mix concrete ✓ (1)
- 4.9.2 Store machine with opening facing downwards:
- To prevent water from remaining in the drum ✓
 - To prevent the drum from rusting
- ANY ONE OF THE ABOVE.** (1)
- 4.10 4.10.1 Tamping rammer/Rammer ✓ (1)
- 4.10.2 Plate compacter ✓ (1)
- 4.10.3 Power trowel float/Power float ✓ (1)
- [40]**

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

- 5.1 5.1.1 J-bolt ✓ (1)
- 5.1.2 Bolted ✓ (1)
- 5.1.3 400 mm ✓ (1)
- 5.1.4 4 mm ✓ (1)
- 5.1.5 600 mm ✓ (1)


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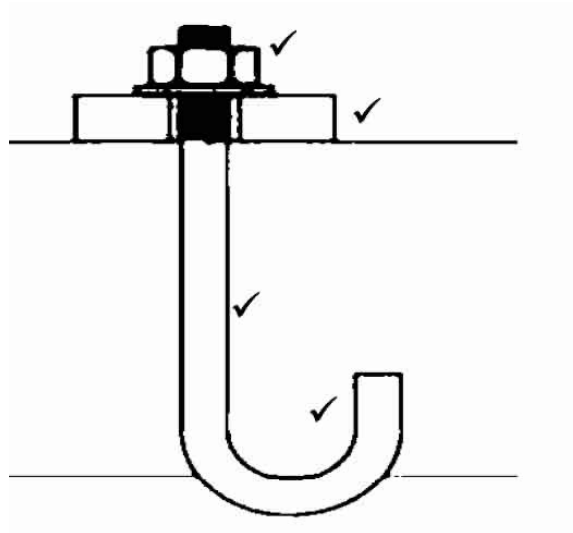
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5.2



(4)

5.3 5.3.1 Basket-weave paving pattern/ Basket-weave ✓

(1)

- 5.3.2
- Bedding sand/**river sand** is the final layer upon which the paving units are laid. ✓
 - Jointing is river/**plaster** sand is used as grouting between paving blocks. ✓

(2)

5.4 Beam filling is done for the following reasons:

- Keep out insects ✓
- Prevent wind from blowing in under the roof. ✓
- Prevent birds from nesting/perching in the roof.
- Improve the stability of the roofing rafters.

ANY TWO OF THE ABOVE.

(2)

- 5.5
- Construction is time-consuming ✓
 - An uncomfortable area between the purlins in which to work ✓
 - Restricts airflow from the roof to the outside of the building (roof space can get very hot and free flow of air to inside or outside can prevent this)

ANY TWO OF THE ABOVE.

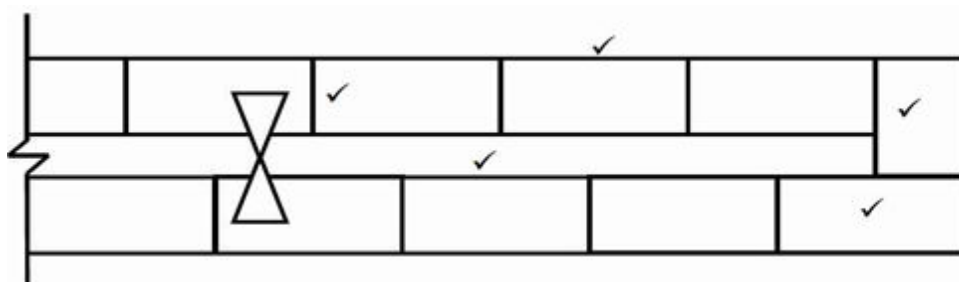
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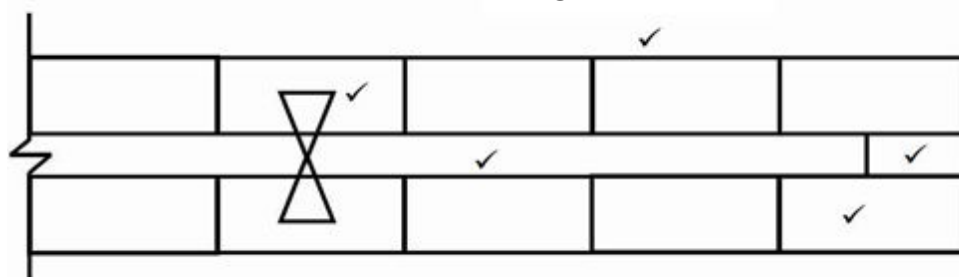
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5.6



Correctness ✓✓

OR



Correctness ✓✓

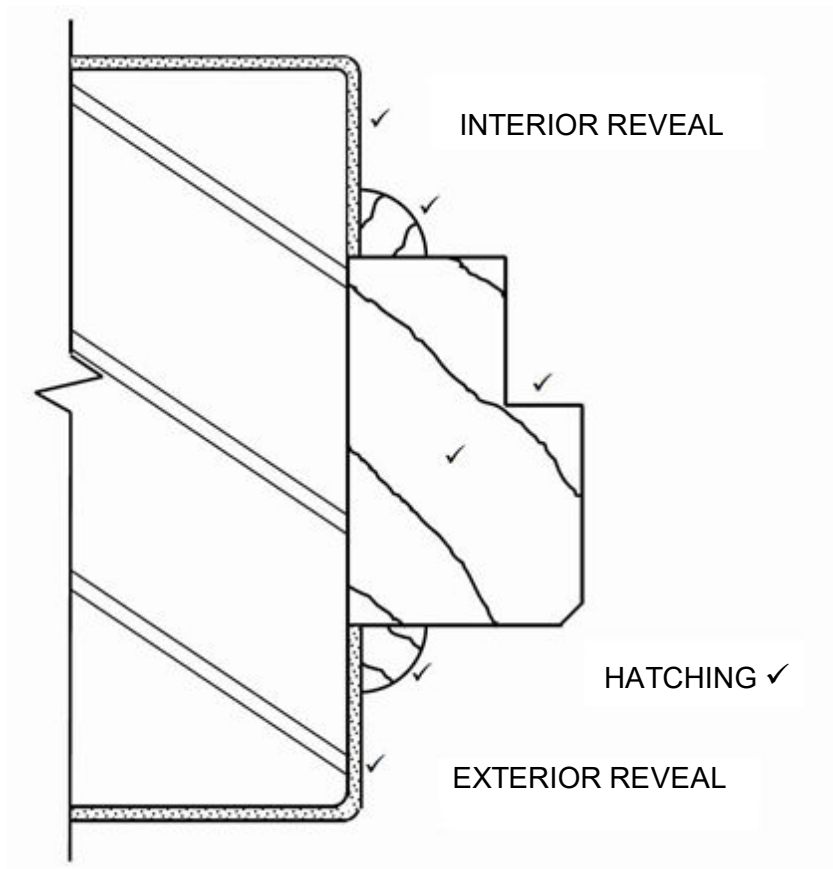
ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Dead end	2	
Inner skin of cavity wall	1	
Outer skin of cavity wall	1	
Wall tie (Any type)	1	
Correctness of drawing	2	
TOTAL:	7	



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5.7



(7)

ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Plaster + Symbol	2	
Quarter rounds	2	
Timber door frame	2	
Hatching	1	
TOTAL:	7	

[30]

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

6.1 6.1.1 C ✓ (1)

6.1.2 B ✓ (1)

6.1.3 D ✓ (1)

6.2 Minimum cover depth in reinforced concrete is important:

- To protect the steel against corrosion. ✓
- To ensure adequate bonding between the steel and the concrete. ✓
- To ensure adequate protection of steel in the event of a fire.

ANY TWO OF THE ABOVE.

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(2)



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- 6.3 Plain round bars as reinforcement provide sufficient bond (connection) while ribbed bars are rolled with pattern ✓ that provide and ensure better bonding with the concrete. ✓ (2)

6.4

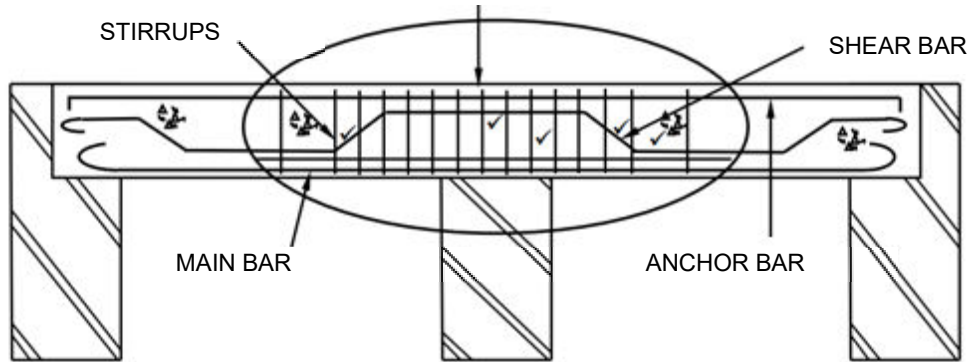


FIGURE 6.4

ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Correctness of drawing		
Binders close spacing	1	
Binders bigger spacing	1	
Shear bar	3	
Minimum concrete over depth	1	
TOTAL:	6	

- 6.5
- Ground conditions not stable/solid enough ✓
 - Distribute the load to more stable ground (underground/water supports) ✓
 - Provides stability when raft/floating foundation is used ✓
 - When structures are subjected to horizontal forces, pile foundations resist bending stress while still lending vertical support
 - Soils prone to swelling and shrinking (clay soil)
 - Superstructure is exposed to uplifting forces (offshore platforms)
 - Where soil erosion is possible (bridges)

ANY THREE OF THE ABOVE.

(3)

- 6.6
- It can be used for soft soil. ✓
 - It can be used on unstable soil or ground. ✓
 - It can be used where the soil is loose.
 - It can be used for non-cohesive soil.
 - It can be used where there is soil movement.
 - It can be used in constantly wet areas.

ANY TWO OF THE ABOVE.

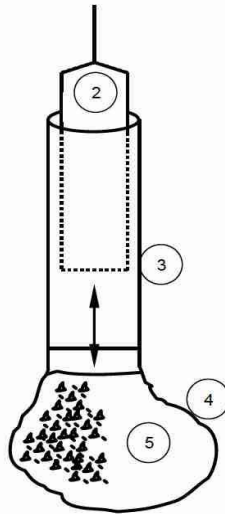
(2)

- 6.7 The purpose of the steel capping is to protect the top of the pile from breaking when it is driven into the ground with the drop hammer. ✓

(1)



6.8



CORRECTNESS OF ENLARGED BASE HAMMERED IN ①

(5)

No.	ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
1	Correctness of enlarged concrete base	1	
2	Drop hammer	1	
3	Steel casing	1	
4	Shape of enlarged base	1	
5	Symbol for concrete in the base	1	
TOTAL:		5	

6.9 6.9.1 Rib and block floor ✓ (1)

6.9.2 28 days ✓ (1)

6.9.3 90 mm ✓ (1)

6.9.4 Consequences:

- Block will not be supported/fall through/collapse. ✓
- No bonding between the rib and block. ✓
- Installation will not be successful.
- The block will be heavy as there are no holes in it.
- Service pipes may not be able to be laid.

ANY TWO OF THE ABOVE.

(2)




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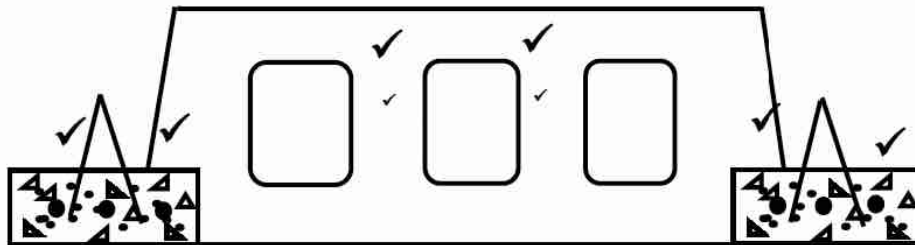
- 6.9.5
- Maximum span ✓
 - Unit weight ✓
 - Nature of props ✓
 - Sound insulation
 - Thickness of units
 - Pre-stressed units
 - Fire resistance
 - Construction speed
 - Reinforcement properties
 - Support and formwork required
 - Safety features
 - Weight reduction
 - Volume reduction
 - Precast top layer

ANY THREE OF THE ABOVE.
(3)

- 6.9.6
- Ensure that the correct curing procedure is followed for seven days to ensure a well-set slab. ✓
 - Allow 28 days for the setting of the concrete slab. ✓
 - Temporary props should only be removed after the concrete slab has reached a crushing strength of 17 MPa.

ANY TWO OF THE ABOVE.
(2)

6.9.7



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Hollow block	2	
Rebates in block	2	
Reinforcement in ribs	2	
TOTAL:	6	

(6)
[40]
TOTAL: 200

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