basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE/ NATIONAL SENIOR CERTIFICATE

GRADE 12

CIVIL TECHNOLOGY: CONSTRUCTION

NOVEMBER 2020

MARKING GUIDELINES

MARKS: 200

These marking guidelines consist of 20 pages.

INSTRUCTIONS FOR THE MARKERS

1. Markers should:

- Familiarise themselves with the question and answer 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 should strictly adhere to the answers after finalisation of the marking guideline.
- 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., 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 with what was written.
- Indicate the tick or cross right at the position where the mark needs to be awarded or where the candidate made the error.
- Accept the letter corresponding with 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 calculations must be considered, provided that the correct answer is obtained.

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.
- An orthographic view instead of sectional view, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- An orthographic view instead of an isometric view, 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 for only what was asked but mark/s for the correctness of the drawing will not be awarded e.g., if a King Post roof truss was asked in the question, and candidate drew SA-Howe Truss

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

1.1 1.1.1 E ✓ (1)

1.1.2 C ✓ (1)

1.1.3 D ✓ (1)

1.1.4 H ✓ (1)

1.1.5 B ✓ (1)

1.1.6 F ✓ (1)

1.1.7 A/I ✓ (1)

1.1.8 G/K ✓ (1)

1.2 Galvanising:
- Adds strength to the original, uncoated metal. ✓
- Make it last longer/Preservation/Durable.
- Decorative/Enhance appearance.
- Makes metal thicker than the uncoated metal.
- Nails and screws prevent staining.
- Prevent the material from rusting/corroding.

ANY ONE OF THE ABOVE (1)

1.3
- Material safety data sheet. ✓
- Sufficient information regarding the protection of health and safety.

ANY ONE OF THE ABOVE (1)

1.4
- Materials can be moved manually/by means of a wheelbarrow/trolley. ✓
- Materials can be moved by means of machinery/builders hoist/truck/ crane/tractor/conveyor/fork lift. ✓ (2)

1.5 Water-based paint:
- Dry quickly. ✓
- Allows marks/smudges to be easily cleaned with water. ✓
- Give an elastic flexible finish.
- Durable
- Gives a decorative finish.
- Enhances the appearance.
- Resistant to cracking.
- Cost effective/Cheaper
- Easy to apply.

ANY TWO OF THE ABOVE (2)

1.6 1.6.1 Multi detector ✓ (1)

1.6.2 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 TWO OF THE ABOVE (2)

1.7
- Drill a hole in the wall. ✓
- Insert the plastic plug into the hole. ✓
- Align the hole in the bracket with the hole in the wall and fasten the screw. ✓

(3)
[20]

QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

NO.	QUESTION	ANSWER	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
8	Identify number 7.	Shoe/Down pipe outlet/ Spout ✓	1
9	Identify number 8.	Natural ground level/NGL ✓	1
10	What does *DPM* stands 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. Protect roofs/rafters from rainwater.	1
15	Deduce ONE feature that has been omitted from the elevation in FIGURE A.	Step missing at the door ✓ Sill missing at the window	1
16	Recommend any TWO sanitary fitments carrying waste water other than a bath that can be installed in the room indicated by number 11.	Hand basin/Wash hand basin/Hand basin/Basin/WB/WHB/HB ✓ Shower/SH ✓	2

17	What sanitary fixture carrying soil water can be installed in the room indicated by number 12?	Water closet/WC ✓ 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
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 2 which elevation does NOT have windows.	East elevation ✓	1
26	Deduce the thickness of the external wall from FIGURE 2.	220 mm ✓	1
27	Name a 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 m².	ℓ x b = 2 ✓m x 2 m ✓ **OR** ℓ x b = 4 m² ✓ 2 000 mm x 2 000 mm = 4 m²	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.	220 ✓+ 3 000 ✓ + 110✓ + 1 400 + 110 + 2 000 ✓+220✓ = 7 060 mm = 7,06 m ✓ **OR** 220 + 3 000 + 110 + 3 510 + 220 = 7 060 mm = 7,06 m	6
		TOTAL:	**40**

QUESTION 3: ROOFS, STAIRCASES AND JOINING (SPECIFIC)

3.1.1 760 mm ✓ (1)

3.1.2 Sisalation/Fire-proof material ✓ (1)

3.1.3 300 mm ✓ (1)

3.1.4 Fibre cement tiles ✓ (1)

3.1.5 76 x 50 mm/38 x 38 mm ✓ (1)

3.2 3.2.1 750 mm ✓ (1)

3.2.2 1,5 m/2 m/2,1 m ✓ (1)

3.2.3
- All stairs must have handrails/Stairs must be secured. ✓
- The regulations as stipulated by local authorities or SANS should be met when stairs are built or cast.

ANY TWO OF THE ABOVE (1)

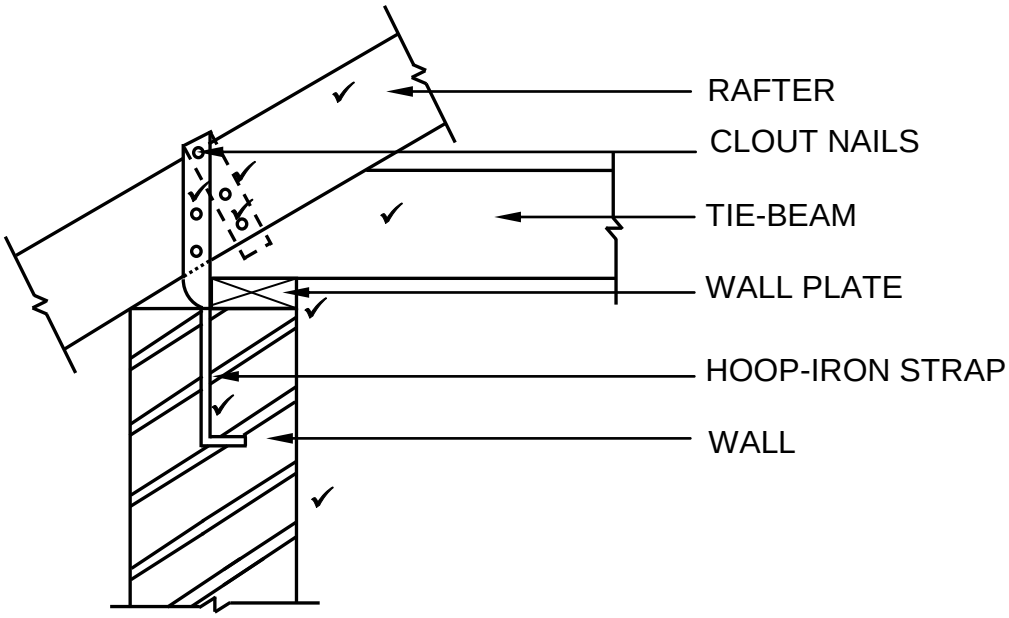
3.3 Rise: vertical distance between two consecutive threads. ✓
Riser: vertical member between two consecutive threads. ✓ (2)

3.4 Pitch board ✓ (1)

3.5 Balustrades:
- hold up the handrail. ✓
- fills the space between the handrail and string on the open side of a staircase. ✓
- prevent people from falling off the staircase.

ANY TWO OF THE ABOVE (2)

3.6

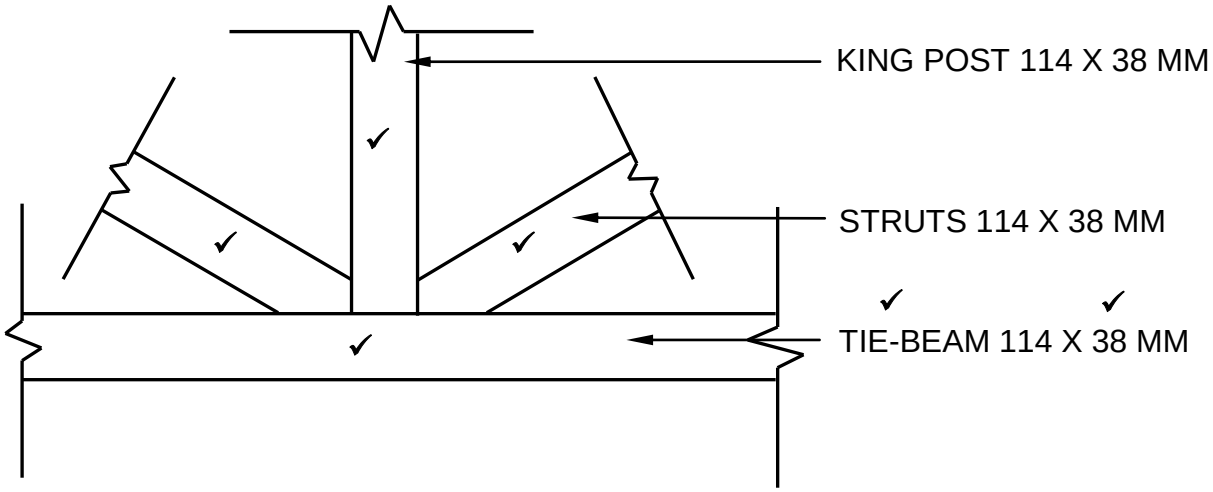


CORRECTNESS OF DRAWING ✓

ASSESSMENT CRITERIA	MARK
Brick wall	1
Wall plate	1
Tie beam	1
Rafter	1
Hoop-iron strap	3
Clout nails	1
Correctness of drawing	1
TOTAL:	**9**

(9)

3.7



JUNCTION AT THE TIE-BEAM, KING POST AND STRUTS
SCALE 1:10

APPLICATION OF SCALE ✓
CORRECTNESS OF DRAWING ✓

(USE A MASK TO MARK THIS QUESTION)

ASSESSMENT CRITERIA	**MARK**
Tie beam	1
King post	1
Struts	2
Any ONE label with dimensions	2
Application of scale	1
Correctness of drawing	1
TOTAL:	**8**

(8)
[30]

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

4.1 Removal of soil/earth. ✓ (1)

4.2 The sides of the excavations can collapse/crack. ✓ (1)

4.3 Tension cracks will appear/collapse. ✓ (1)

4.4 Start at the bottom of the excavation. ✓ (1)

4.5
- A fence/suitable barrier/warning signs must be provided ✓
- The working edge of each ditch deeper than 2 m must be inspected by a competent person before the start of each shift.

ANY ONE OF THE ABOVE (1)

4.6 4.6.1 Location of the following services:
- Electric cables ✓
- Water pipes ✓
- Gas lines
- Communication line
- Sanitation services

ANY TWO OF THE ABOVE (2)

4.6.2 Trenches should be inspected:
- before workers working in it. ✓
- at the start of each shift.
- following rainfall or other water intrusion.

ANY ONE OF THE ABOVE (1)

4.7 4.7.1 Safety precautions to be considered:
- Operate with care. ✓
- Wear appropriate personal equipment e.g., gloves and boots.✓
- Avoid making any adjustments while the machine is vibrating.
- Never use a faulty machine.
- Never lay the machine on its side.
- Do not place your hands and feet near the moving parts.
- Switch off the machine when it is left unattended.
- Use both hands to operate the machine.
- Ensure a firm and well-balanced stance.
- Check the controls for proper response before use.
- Check the condition of the machine at the start and end of every shift.
- Report any defects.

ANY TWO OF THE ABOVE (2)

4.7.2 Stored in a safe, dry place to:
- prevent corrosion/rust. ✓
- protect the machine
- prevent machine from being damaged by moisture.

ANY ONE OF THE ABOVE (1)

4.8 4.8.1 Cube test ✓ (1)

4.8.2 A - Tamping rod/Steel rod ✓
B – Mould/Cube ✓ (2)

4.8.3
- 7 days ✓
- 14 days ✓
- 28 days

ANY TWO OF THE ABOVE (2)

4.8.4 Compressive strength ✓ (1)

4.9 Properties of ductile cast iron:
- Excellent ability to withstand blows and knocks. ✓
- Very good fatigue strength/limit. ✓
- Elasticity makes it ideal for casting.

ANY TWO OF THE ABOVE (2)

4.10 Material to fix cladding to a wall:
- Silicon ✓
- Cement based mixture
- Colour matching screws/Face fixings
- Tile adhesive
- Proprietary fixings

ANY ONE OF THE ABOVE (1)

4.11 Poling boards are used to:
- keep the soil from entering the excavation. ✓
- prevent soil from falling into the trench/collapse.

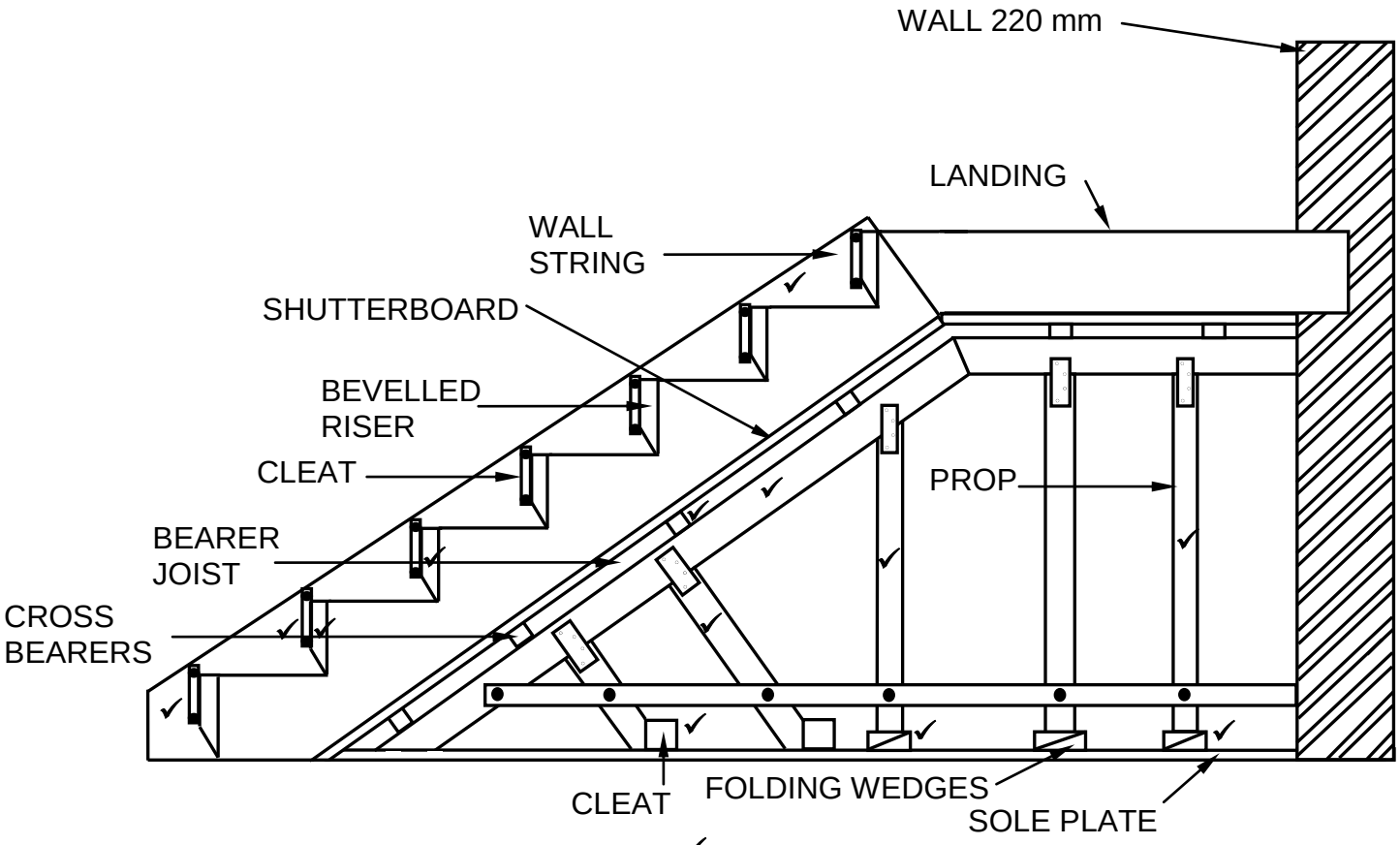
ANY ONE OF THE ABOVE (1)

4.12
- To keep the poling boards in place. ✓
- To keep the struts in place. ✓ (2)

4.13 One/Two ✓ (1)

4.14
- Poling boards for firm soil are spaced further apart. ✓
- Polling boards for loose soil are spaced closer together. ✓ (2)

4.15



CORRECTNESS OF DRAWING ✓

ASSESSMENT CRITERIA	MARK
Cross bearers	1
Bearer/Joist	1
Props	3
Folding wedges	2
Cleats to support props	1
Wall string	1
Bevelled riser	2
Cleats	2
Correctness of drawing	1
TOTAL:	**14**

(14)
[40]

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

5.1 5.1.1 Splatter finish/Splatter dash finish/Roughcast finish ✓ (1)

5.1.2 Bagging finish ✓ (1)

5.2 Purpose of screed:
- To provide a smooth/level/neat/flat surface. ✓
- To increase the structural depth and strength of the base slab. ✓
- To prepare floor for floor covering. (2)

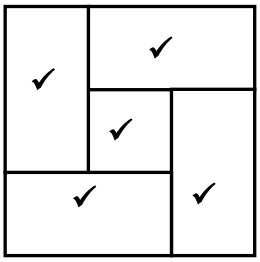
5.3 Preparing a smooth concrete floor to receive the screed:
- Chip the surface with a sharp tool to remove the surface skin and expose the hard, clean concrete. ✓
- Wet the surface.

ANY ONE OF THE ABOVE (1)

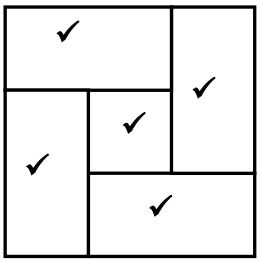
5.4 Builders' lime ✓ (1)

5.5 Rough arch - the mortar joint will be wedge shaped/triangular shaped. ✓
Gauged arch - the mortar joint will be uniform/rectangular shape. ✓ (2)

5.6



FIRST COURSE

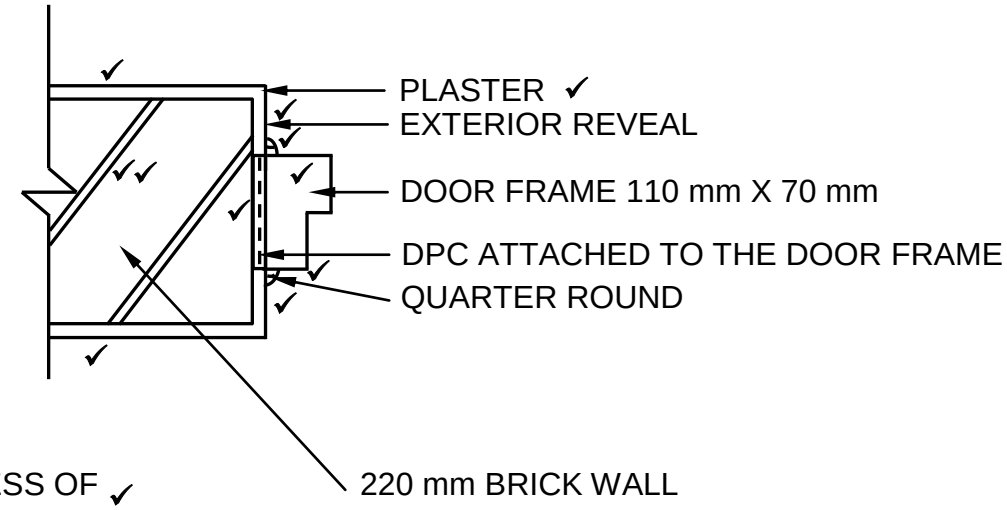


SECOND COURSE

ASSESSMENT CRITERIA	MARK
Stretcher bond - first course	5
Stretcher bond - second course	5
TOTAL:	**10**

(10)

5.7



CORRECTNESS OF DRAWING ✓

(USE A MASK TO MARK THIS QUESTION)

ASSESSMENT CRITERIA	MARK
Wall 220 mm	2
Plaster 12 mm	2
Exterior reveal	1
Door frame 110 mm x 70 mm	2
DPC attached to door frame	1
Quarter rounds	2
Any ONE label	1
Correctness of drawing	1
TOTAL:	**12**

(12)
[30]

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

6.1 6.1.1 A ✓ (1)

6.1.2 C ✓ (1)

6.1.3 B ✓ (1)

6.1.4 D ✓ (1)

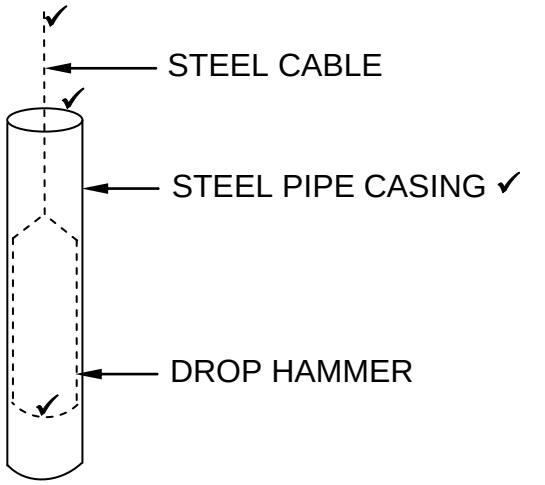
6.1.5 D ✓ (1)

6.2 Reasons for the installation of pile foundations:

- Poor soil conditions ✓
- Soft soil ✓
- Unstable soil
- Loose soil
- Non-cohesive soil
- Where there is soil movement.
- Constantly wet areas.
- Ground conditions are not stable enough to support ordinary, shallow foundations.
- Foundation piles distribute the load to more stable ground and can be used as underground or underwater supports.
- Piles provide stability when a raft or floating foundation is used.
- When structures are subjected to horizontal forces, pile foundations resist bending stress while still lending vertical support, e.g., multi storey buildings.
- Where soils are prone to swelling and shrinking according to the moisture content, e.g., for clay soil, shallow foundations cannot be used.
- When the superstructure is exposed to uplifting forces, e.g., offshore platforms.
- Where soil erosion is possible, piles should be used to carry the load of the superstructure, e.g., for bridges and piers.

ANY TWO OF THE ABOVE (2)

6.3



CORRECTNESS OF DRAWING ✓

ASSESSMENT CRITERIA	MARK
Steel cable	1
Steel pipe-casing	1
Drop hammer	1
Any ONE label	1
Correctness of drawing	1
TOTAL:	**5**

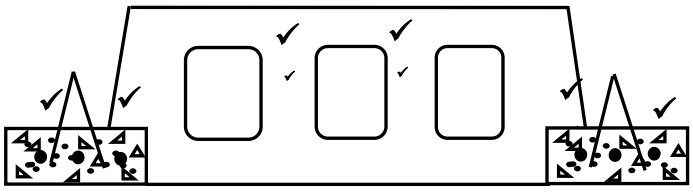
(5)

6.4.1 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 is no holes in it.
- Service pipes may not be able to be laid.

ANY TWO OF THE ABOVE (2)

6.4.2

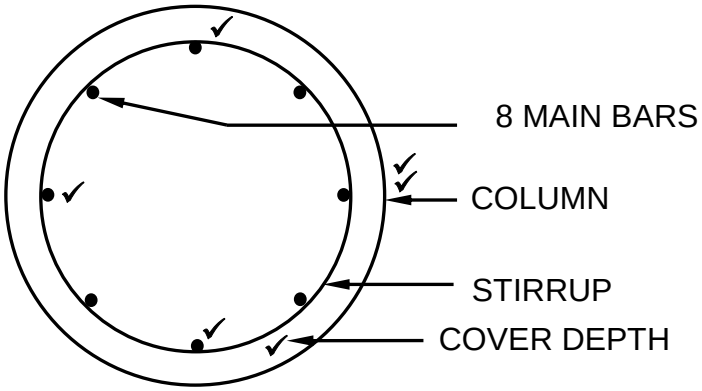


ASSESSMENT CRITERIA	MARK
Hollow block	2
Rebates in block	2
Reinforcement in ribs	2
TOTAL:	**6**

(6)

6.4.3 220 mm ✓ (1)

6.5



CORRECTNESS OF DRAWING ✓

ASSESSMENT CRITERIA	MARK
Column	2
Stirrup	1
Main bars	2
Cover depth indicated	1
Correctness of drawing	1
TOTAL:	**7**

(7)

6.6

A	B	C	D
			Internal measurement of floor:
			4 500 – 440 = 4 060 (4,06 m) ✓
			6 500 – 440 = 6 060 (6,06 m) ✓
			Area of floor:
1/	4,06 ✓		
	6,06 ✓	24,6 m^2 ✓	
			Volume of concrete for the floor:
	24,6		
	0,075✓	1,85 m^3 ✓	
	OR		
	4,06		
	6,06		
	0,075	1,85 m^3	
			Number of tiles to cover the floor:
1/	0,35 ✓		One tile is 350 mm x 350 mm
	0,35 ✓	0,12 m^2✓	Area of one tile = 0,12 m²
			24,6 m² ✓
			0,12 m²
			= 205 tiles ✓

(5)

(2)

(5)

[40]

TOTAL: 200