



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**CIVIL TECHNOLOGY: CONSTRUCTION**

**MAY/JUNE 2024**

**MARKING GUIDELINES**

**MARKS: 200**

**These marking guidelines consist of 18 pages.**

## INSTRUCTIONS FOR 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.
  1. If a candidate is required to explain e.g., a process in 4 steps, only the first 4 responses should be considered.
  2. However, if for example candidate is required to explain or describe a process, we need to consider that that candidates may write a long description, not necessarily well organised. 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.
- Mark what the candidate wrote and do not interpret or predict responses.
- 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 or similar questions.
- Accept incorrect spelling in answers unless the spelling changes the meaning of the answer.
- If a learner writes two or more answers separated by a slash (/) mark only the first response, unless the additional answer/s are different names for the same item e.g., Yale lock/Night latch. In this case, the answer for the response should be awarded and the slash (/) should NOT be considered as an additional answer.

### 2. For calculations:

- A mark is only awarded if the correct unit is written next to the answer. If the question states that the answer must be in a specific unit, a mark will ONLY be awarded if the answer has the correct unit as indicated in the question.
- Marks will only be allocated for the correct values if the candidates add instead of multiply. NO marks will be awarded for the calculations and the answer.
- Where an incorrect answer is correctly carried over, the marker must recalculate the values, using the incorrect answer from the first calculation. If correctly used, the candidate should receive the full marks for subsequent calculations.
- Alternative methods of calculations must be considered, provided that the correct answer is obtained.
- For the calculation of quantities marks will be awarded for the correct use of the dimension paper.

**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. Do not consider labels for members of which the labels were provided on the answer sheet.
- Scale drawings should always be marked using an appropriate mask.
- If the incorrect/wrong drawing was drawn, the candidate can be awarded for only what was provided for on the marking guideline.
- If a line diagram or an orthographic view instead of a pictorial drawing (isometric/oblique/perspective) is drawn, the first assessment criteria for each member will be marked wrong, but marks will be awarded for the subsequent members if TWO or more marks are awarded for the same member.
- If candidates draw/give more information than what is required, mark strictly according to the assessment criteria.

**4. Incorrect numbering of questions:**

- If a candidate numbered an incorrectly, but the answer is in the correct position according to the sequence of the questions in the question paper, circle then the incorrect numbering and mark the response.
- If questions were answered randomly not following the same sequence as in the question paper and the learner numbered incorrectly, the response should NOT be marked.

**5. Duplication of responses and questions answered in the correct place:**

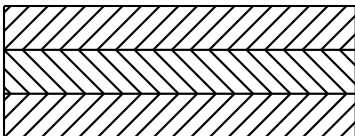
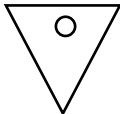
- If a question is answered twice, mark the first response.
- If a question should be answered on an answer sheet and the candidate answered it on both the answer sheet and in the answer book, mark the response on the answer sheet and cancel the response in the answer book.
- If the question was answered in the answer book instead of on the answer sheet, mark the response in the answer book according to the assessment criteria on the marking guideline.

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

1.1	1.1.1	D ✓	(1)
	1.1.2	D ✓	(1)
	1.1.3	B ✓	(1)
	1.1.4	C ✓	(1)
	1.1.5	B ✓	(1)
	1.1.6	B ✓	(1)
	1.1.7	A ✓	(1)
	1.1.8	D ✓	(1)
	1.1.9	C ✓	(1)
	1.1.10	A ✓	(1)
	1.1.11	B ✓	(1)
	1.1.12	A ✓	(1)
1.2.	1.2.1	Rawl plugs/Plastic plugs with screws/Coach screws/Lag bolts ✓	(1)
	1.2.2	Rawl plugs/Plastic plugs with screws/Coach screws/Lag bolts: <ul style="list-style-type: none"> <li>• Are strong fasteners ✓</li> <li>• Resist pull out failure ✓</li> <li>• Have excellent carrying capacity</li> <li>• Easy to install</li> <li>• Are cost effective</li> </ul> <b>ANY TWO OF THE ABOVE</b>	(2)
	1.2.3	<ul style="list-style-type: none"> <li>• Drill holes/Drill holes and remove the debris ✓</li> <li>• Position the cabinet and insert the rawl plugs/plastic plugs into the holes through the cabinet ✓ OR Insert plastic plugs into the holes, position the cabinet and insert the joining fixtures into the holes through the cabinet</li> <li>• Tighten the screws/Insert the screws into the holes and tighten the screws ✓</li> </ul>	(3)
1.3.	1.3.1	Multi detector ✓	(1)
	1.3.2	Laser level/Spirit level ✓	(1)
			<b>[20]</b>

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

NO.	QUESTIONS	ANSWERS	MARKS
1.	Name the type of building that is illustrated by FIGURE A.	Multi-storey building/ Three-storey building ✓	1
2.	Deduce from the building plan the elevation on which the sink is located.	North elevation/North ✓	1
3.	Identify number 1.	Ridge capping/Ridge/Roof/ Roof covering/Hipped end ✓	1
4.	Why are balusters installed at number 2?	To prevent people from falling off ✓	1
5.	What type of material was specified for number 3?	Laminated safety glass/Safety glass ✓	1
6.	Recommend ONE suitable material for number 4.	Timber/Fibre cement ✓	1
7.	Who is the owner of the proposed dwelling?	Mr P Xhosa ✓	1
8.	Identify the number that indicates the downpipe.	5 ✓	1
9.	Name ONE other sanitary fixture, besides a washbasin, that can be installed in the bathroom.	Shower/Bath/Bidet/Urinal ✓	1
10.	Identify number 7.	Distribution board/DB ✓	1
11.	Describe the purpose of number 8.	To access the garage with a vehicle ✓	1
12.	How many fluorescent tubes are indicated in the building?	1 ✓	1
13.	Name the street in which the new building will be erected.	Protea Street ✓	1

14.	What type of finish was specified for the walls?	Stone cladding ✓	1
15.	Deduce from the building plan why it was revised.	Drawing of balustrades/Balustrades were not drawn ✓	1
16.	What must be installed to gain access to the first and second floor?	Stairs ✓	1
17.	Deduce from the building plan who must sign off the building plan.	Architect ✓ and Client ✓	2
18.	What are the prescribed dimensions for the balusters?	40 mm x 40 mm x 1 200 mm ✓	1
19.	How many hinged window openings are indicated on window 2 in the window schedule?	1 ✓	1
20.	Provide a reason for installing solar panels on the roof.	<ul style="list-style-type: none"> <li>To have electricity during load shedding ✓</li> <li>To save on electricity cost</li> <li>To be independent from electricity providers</li> <li>To ensure exposure to sun light</li> </ul>	1
21.	The interior door frames are covered with plywood. Draw the symbol for plywood.	 ✓✓	2
22.	Draw the symbol for a wall mounted urinal.	 ✓✓	2
23.	Describe the top end shape of the baluster.	Square ✓	1

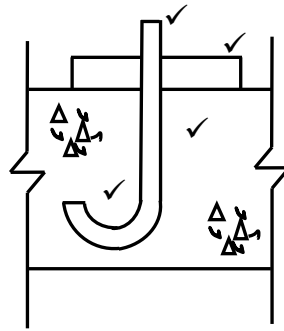
24.	Calculate the total height of the building from the finished floor level up to the top of the roof. Give your answer in m.	$2,6 \checkmark + 0,17 \checkmark + 2,6 \checkmark + 0,17 \checkmark + 2,6 \checkmark + 1,8 \text{ m} \checkmark$ $= 9,94 \checkmark \text{ m}$ <p style="text-align: center;"><b>OR</b></p> $2\,600 + 170 + 2\,600 + 170 + 2\,600 + 1\,800 \text{ mm}$ $= 9\,940 \text{ mm}$ $= 9,94 \text{ m}$	7
25.	Calculate the area of the external wall of the second floor from the top of the floor up to roof height in the west elevation in FIGURE A. Show ALL calculations Give your answer in m <sup>2</sup> .	$= (2,6 \checkmark \times 12 \checkmark) - (2,1 \checkmark \times 1,8 \checkmark)$ $= 31,2 \checkmark - 3,78 \text{ m}^2 \checkmark$ $= 27,42 \checkmark \text{ m}^2$ <p style="text-align: center;"><b>OR</b></p> $= (2\,600 \times 12\,000) - (2\,100 \times 1\,800)$ $= 31\,200\,000 - 3\,780\,000 \text{ mm}^2$ $= 27\,420\,000 \text{ mm}^2$ $= 27,42 \text{ m}^2$	7
		<b>TOTAL:</b>	<b>40</b>

**QUESTION 3: ROOFS, STAIRCASES AND JOINING (SPECIFIC)**

3.1 3.1.1 Baluster:  
The vertical posts that holds up the handrail.✓ (1)

3.1.2 Run:  
The horizontal distance covered by the stairs.✓ (1)

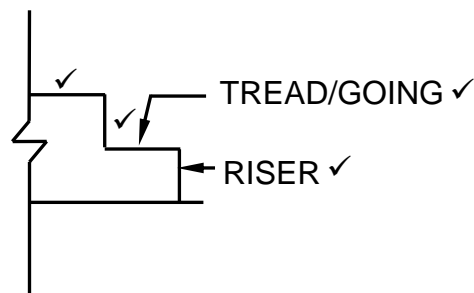
3.2



J-BOLT CAST-IN ANCHOR

(4)

3.3



(4)

3.4 Purpose of roof underlay:

- Reduce the risk of the wind lifting the tiles ✓
- Reduce load on concrete roof tiles when a difference in pressure occurs on the inside space and external surface ✓
- Prevents condensation run off
- Has UV- and heat-resistance properties
- Help reduce wind noise in the roof
- Have excellent thermal properties
- Acts as waterproofing and dust resistant membrane
- Delays the spread of fire in thatched roofs

**ANY TWO OF THE ABOVE** (2)



3.5



38 mm x 38 mm ✓

OR



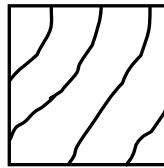
38 mm x 50 mm

BATTEN- FOR CONCRETE TILES ✓



50 mm x 76 mm ✓

OR

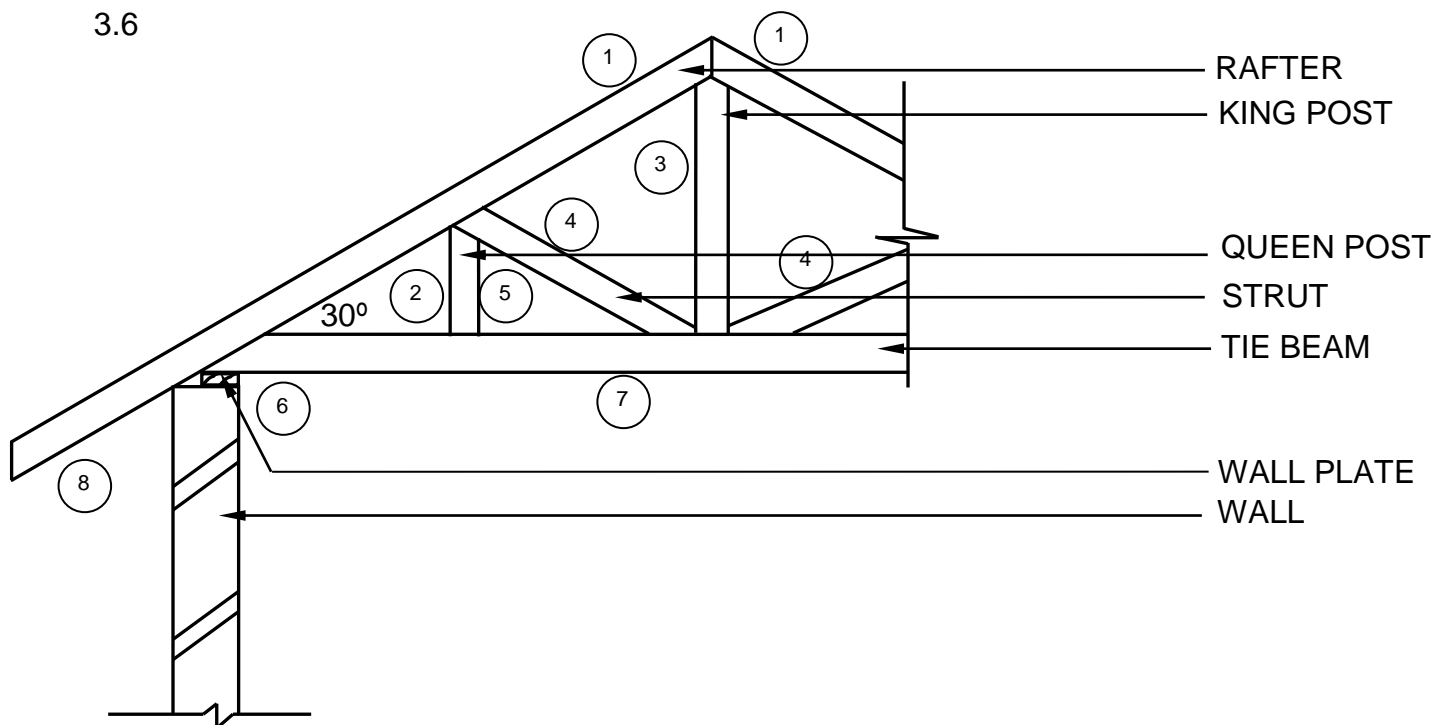


76 mm x 76 mm

PURLIN- FOR IRON ROOF SHEETING ✓

(6)

3.6



APPLICATION OF SCALE



NOT TO SCALE: USE A MASK TO MARK THIS QUESTION

NO.	ASSESSMENT CRITERIA	MARK
1	Rafters	2
2	Pitch at 30°	1
3	King post	1
4	Struts	2
5	Queen post	1
6	Wall plate	1
7	Tie beam	1
8	Overhang	1
9	Application of scale:	2
	All correct = 2	
	ONE incorrect = 1	
	TWO and more incorrect = 0	
TOTAL:		12

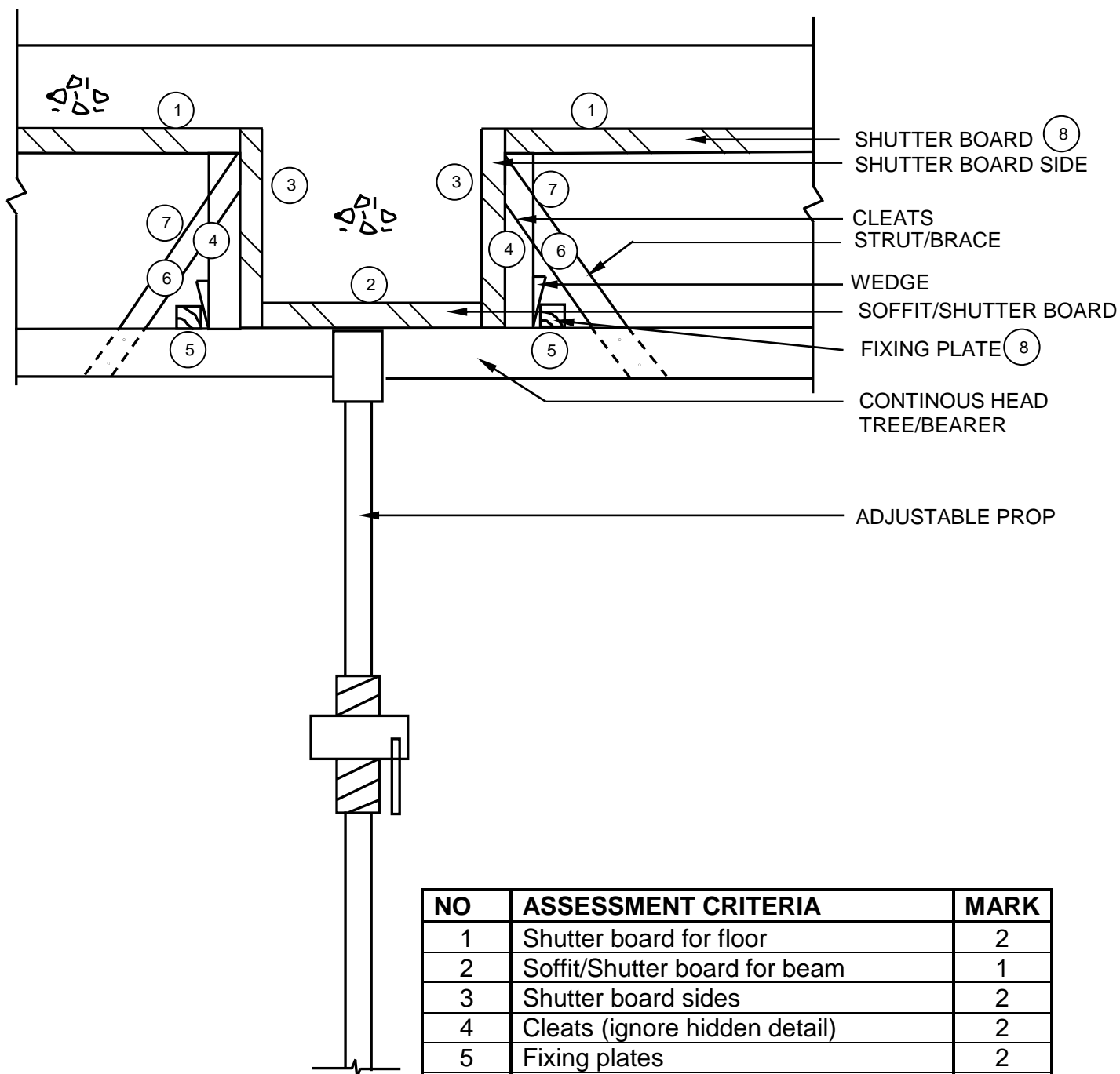
(12)  
[30]

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

- |     |       |   |     |
|-----|-------|---|-----|
| 4.1 | 4.1.1 | workability ✓   | (1) |
|     | 4.1.2 | 24 ✓  | (1) |
|     | 4.1.3 | saves ✓   | (1) |
|     | 4.1.4 | moist ✓   | (1) |
|     | 4.1.5 | white ✓   | (1) |
| 4.2 | 4.2.1 | <p>Factors that can cause excavations to collapse:</p> <ul style="list-style-type: none"> <li>• Heavy rains ✓</li> <li>• Poor soil compaction ✓</li> <li>• Sides not dug at correct angle</li> <li>• Improper use of formwork or shoring to support the walls</li> <li>• Vibration by machinery or heavy vehicles near the excavation</li> <li>• Water seeping into the excavated area</li> <li>• Contact with underground services</li> <li>• Access to and exit from the excavation</li> </ul> <p><b>ANY TWO OF THE ABOVE</b></p> | (2) |
|     | 4.2.2 | <p>Factors to consider when excavating to clear a site:</p> <ul style="list-style-type: none"> <li>• All trees and vegetation must be removed from the site ✓</li> <li>• When excavations take place near a building, an area of 2 metres must be cleared around the building ✓</li> <li>• Any pests, like termite nests must be terminated before building starts</li> <li>• If the site is in a rocky area a specialist must determine how to remove the rocks</li> </ul> <p><b>ANY TWO OF THE ABOVE</b></p>                      | (2) |
|     | 4.2.3 | <p>Trenches must be inspected:</p> <ul style="list-style-type: none"> <li>• At the start of each shift ✓</li> <li>• After a rain storm or any other water intrusion, or any other occurrence that could have changed the conditions in the trench</li> </ul> <p><b>ANY ONE OF THE ABOVE</b></p>   | (1) |
|     | 4.2.4 | To prevent the sides of the excavation to collapse. ✓   | (1) |

- 4.3      4.3.1      • Tamping rammer ✓  
                         • Plate compacter ✓ (2)
- 4.3.2      Workers are exposed to:  
                         • Heavy vibrations ✓  
                         • High noise levels ✓  
                         • Dust  
                         **ANY TWO OF THE ABOVE** (2)
- 4.3.3      • The area should be cordoned off. ✓  
                         • Warning signs must be posted. ✓  
                         • Warning signs must be clearly visible.  
                         **ANY TWO OF THE ABOVE** (2)
- 4.4      Portable concrete vibrator with a petrol engine should not be laid on its side because:  
                         • The petrol may leak out ✓  
                         • The carburettor may be flooded with petrol  
                         • Leaked petrol may cause a fire hazard  
                         • You may struggle to start the machine  
                         **ANY ONE OF THE ABOVE** (1)
- 4.5      Cleaning of machine after use:  
                         • Defects are hidden on a dirty machine ✓  
                         • Dirt on a machine may affect the proper mechanical working of the machine ✓  
                         • Cleaning the machine will protect it against corrosion and unnecessary wear of bearings, bushes and gears.  
                         **ANY TWO OF THE ABOVE** (2)
- 4.6      Metal sheet cladding can be installed:  
                         • Vertically ✓  
                         • Horizontally ✓  
                         • Diagonally  
                         • On curved surfaces  
                         **ANY TWO OF THE ABOVE** (2)
- 4.7      When cladding needs to be fixed to a metal structure ✓, secret fixing clips with a levelling bolt are used to fix cladding. ✓ (2)
- 4.8      Ductile cast iron ✓ (1)

4.9



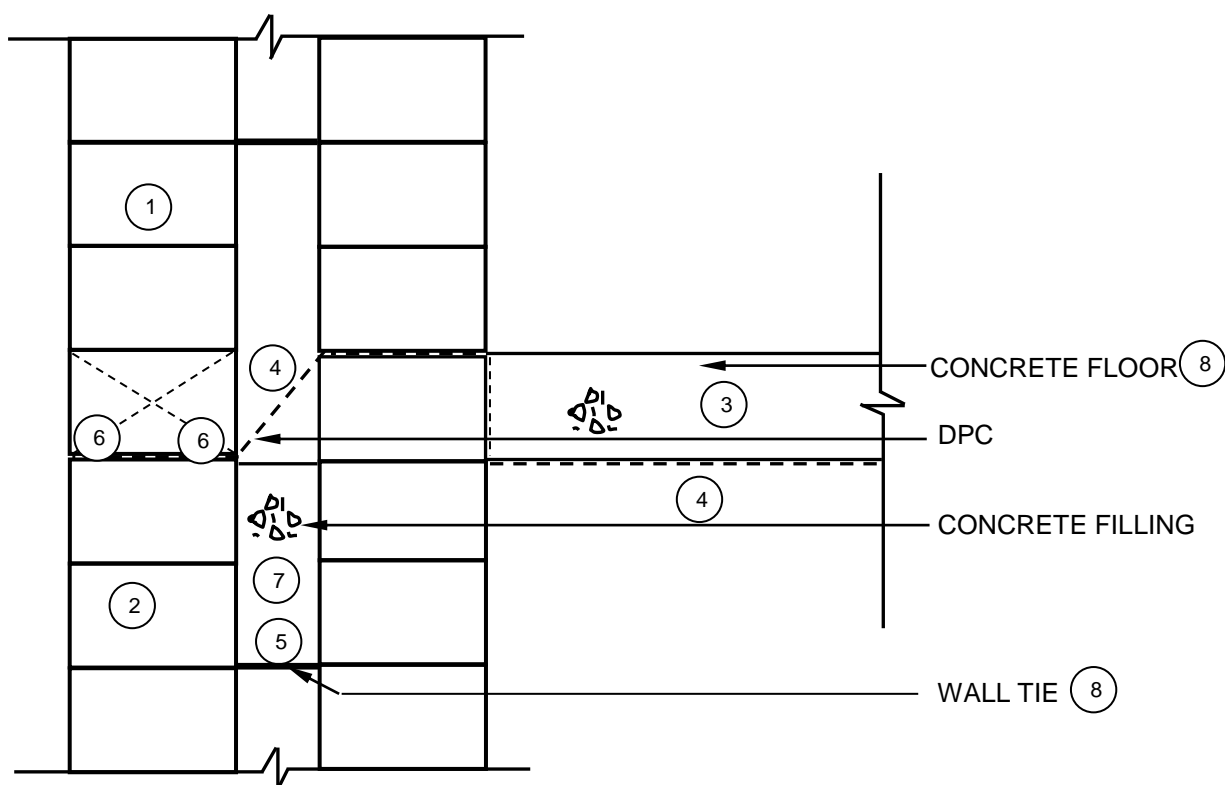
NO	ASSESSMENT CRITERIA	MARK
1	Shutter board for floor	2
2	Soffit/Shutter board for beam	1
3	Shutter board sides	2
4	Cleats (ignore hidden detail)	2
5	Fixing plates	2
6	Wedges (in position)	2
7	Struts (supporting top parts of sides)	2
8	Any TWO labels	2
<b>TOTAL:</b>		<b>15</b>

(15)  
[40]

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

- 5.1      5.1.1      Applying plaster to the wall/Busy plastering the wall ✓ (1)
- 5.1.2      • Hand hawk ✓  
• Plastering trowel ✓ (2)
- 5.1.3      Mix proportions:  
• 1 : 1½ ✓ ✓  
• 1 bag cement (50 kg) and 1½ wheel barrows of plastering sand (2)
- 5.2      1 bag/1 ✓ (1)
- 5.3      Screed is used to:  
• Provide a smooth, level and flat floor for a house ✓  
• Increase the structural depth and strength of the base slab  
**ANY ONE OF THE ABOVE** (1)
- 5.4      Factors to consider for ground preparation of paving small areas:  
• The area must be excavated to the depth of stable ground and remove all loose sand ✓  
• Excavate until soft soil is removed ✓  
• Remove all vegetation from the soil  
• Finish the area to the correct level and slope  
• Make sure there's no furrows to prevent the pooling of water  
• Soft or back filled areas must be compacted with hand stamper or plate compactor  
• If the area is too dry before compaction, add water to the area  
**ANY TWO OF THE ABOVE** (2)
- 5.5      5.5.1      Semi-circular gauged arch ✓ (1)
- 5.5.2      A - Abutment ✓  
B - Voussoir ✓  
C - Key brick ✓  
D - Springer ✓ (4)
- 5.5.3      English bond ✓ (1)
- 5.5.4      Disadvantages:  
• Takes long to build ✓  
• Bricks must be cut if prefabricated bricks are not used ✓  
• Profiles/Turning piece takes time to construct  
• Grooves must be cleaned regularly  
• Faulty construction is visible  
**ANY TWO OF THE ABOVE** (2)

5.6



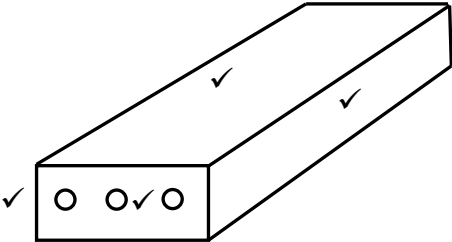
APPLICATION OF SCALE: (9) (9)

NOT TO SCALE: USE A MASK TO MARK THIS QUESTION.

NO.	ASSESSMENT CRITERIA	MARK
1	Three layers of brick above the floor (all 3 layers)	1
2	Three layers of brick below the floor (all 3 layers)	1
3	Concrete floor	1
4	DPC (1 x underneath floor + 1 x as indicated)	2
5	Wall tie (in layer above floor)	1
6	Weep hole (1 x correct position + 1 x symbol)	2
7	Concrete filling (indicated by a symbol)	1
8	Any TWO labels	2
9	Application of scale: All correct = 2 ONE incorrect = 1 TWO and more incorrect = 0	2
	<b>TOTAL:</b>	<b>13</b>

(13)  
[30]

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

- 6.1      6.1.1      H ✓ (1)
- 6.1.2      A ✓ (1)
- 6.1.3      E ✓ (1)
- 6.1.4      G ✓ (1)
- 6.1.5      B ✓ (1)
- 6.2      6.2.1      **A** – Plastic spacers ✓  
                     **B** – Concrete blocks ✓ (2)
- 6.2.2      To bind the reinforcement to the spacers. ✓ (1)
- 6.2.3      To ensure the required concrete cover depth is obtained. ✓ (1)
- 6.3      6.3.1      Rib and block floor ✓ (1)
- 6.3.2      Material to complete the rib and block floor:  
                     • Reinforcing mesh/Wire/Steel mesh/Wire mesh ✓  
                     • Spacer  
                     • In-situ cast concrete/Concrete  
                     **ANY ONE OF THE ABOVE** (1)
- 6.3.3      7 days ✓ (1)
- 6.3.4       (4)
- 6.4      6.4.1      Precast piling/Precast ✓ (1)
- 6.4.2      Drop hammer/Steel cable and drop hammer ✓ (1)
- 6.4.3      Drilling/Boring with auger ✓ (1)
- 6.4.4      Types of soil for precast piles:  
                     • Soft ✓  
                     • Unstable ✓  
                     • Loose  
                     • Non-cohesive  
                     • Soil movement  
                     • Constantly wet  
                     **ANY TWO OF THE ABOVE** (2)





6.6

6.6.1

A	B	C	D
			Reinforcement for floor:
1/	8,12 ✓		Long wall = $8\,560 - 2(220)$ ✓ = 8 120 mm ✓
	4,12 ✓		Short wall = $4\,560 - 2(220)$ ✓ = 4 120 mm ✓
		33,45 m <sup>2</sup> ✓	33,45 m <sup>2</sup> welded mesh is needed
6.6.2			Volume of screed needed:
1/	8,12 ✓		Internal dimensions of long wall = 8 120 mm
	4,12 ✓		Internal dimensions of short wall = 4 120 mm
	0,03 ✓	1,00 m <sup>3</sup> ✓	1,00 m <sup>3</sup> screed is needed
			Correct use of dimension paper. ✓

(7)

(4)

(1)

**[40]****TOTAL: 200**