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# **basic education**

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

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

**CIVIL TECHNOLOGY: CONSTRUCTION**

**2023**

**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 responses from 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 explain and (2) to describe.
  1. If a candidate is required to explain a process in a specific number of steps, only the first required number of responses should be considered.
  2. However, if for example a candidate is required to explain or describe a process, we need to consider 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 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 are 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 must 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 that was drawn. Do not consider labels for members that were provided with labels 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 two-dimensional drawing is required and a line diagram/pictorial/isometric drawing is drawn, members will be marked according to the assessment criteria and no marks will be awarded for the correctness of the drawing.
- If candidates draw/give more information than what is required, mark strictly according to the assessment criteria.
- The marks for the correctness of the drawing will only be awarded if the entire drawing with all members/parts is correctly drawn.

### **4. Incorrect numbering of questions:**

- If a candidate numbered an answer incorrectly, but the answer is in the correct position according to the sequence of the questions in the question paper, circle 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 incorrect 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.

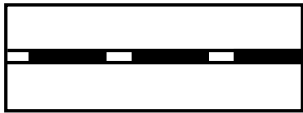
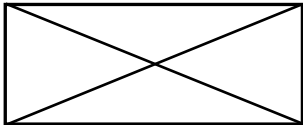
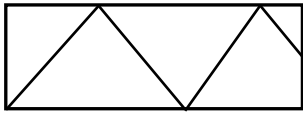
**QUESTION 1: OHSA, MATERIALS, TOOLS, EQUIPMENT AND JOINING (GENERIC)**

- 1.1      1.1.1      Safety features omitted from the scaffold are:
- Baseplate ✓
  - Soleplate ✓
  - Kickboard/Toe-board ✓
  - Guardrails
- ANY THREE OF THE ABOVE** (3)
- 1.1.2      Platform used as displayed:
- Vertical standards will sink into the ground ✓
  - Can cause the scaffold/platform to tilt over ✓
  - Can cause injuries to workers
  - Tools may fall from the scaffold on the workers below
  - Workers can fall from the scaffold
- ANY TWO OF THE ABOVE** (2)
- 1.2      1.2.1      Rust ✓ (1)
- 1.2.2      Zinc ✓ (1)
- 1.2.3      Keeping it moist ✓ (1)
- 1.2.4      Metal ✓ (1)
- 1.2.5      Plastic ✓ (1)
- 1.3      Height of guardrails (900 – 1 000 mm):
- To keep workers safe on the platform ✓
  - To prevent workers from falling over the guard rails
- ANY ONE OF THE ABOVE** (1)
- 1.4      Precautions when storing a ladder:
- Store a ladder in a dry place after use ✓
  - Never store material and equipment on a ladder
  - Hang the ladder vertically/horizontally on wall brackets
  - The ladder should be stored within easy reach
- ANY ONE OF THE ABOVE** (1)

- 1.5 The operator must check if:
- The builders hoist is not overloaded ✓
  - The gates are shut when the device is being used
  - Overhead protection is provided
  - Material is stacked firmly and correctly
  - Emergency brakes are installed/operational
  - Safety measures are displayed inside the cage
- ANY ONE OF THE ABOVE** (1)
- 1.6 Any person/Fire fighters will be able to identify exactly what specific type of fire extinguisher to use in case of a fire. ✓ (1)
- 1.7 A – Hexagonal nut ✓  
B – Square nut/Four sided nut ✓  
C – Wing nut/Butterfly nut ✓  
D – Domed top/Domed nut/Dome nut/Acorn nut/Cap nut ✓ (4)
- 1.8 1.8.1 Tool that can be used:
- Laser level ✓
  - Spirit level with straight edge
  - Transparent pipe level
  - Dumpy level
- ANY ONE OF THE ABOVE** (1)
- 1.8.2 Tool that can be used:
- Dumpy level ✓
  - Laser level
- ANY ONE OF THE ABOVE** (1)
- [20]**

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

NO.	QUESTIONS	ANSWERS	MARK
1	Name the FIGURE that represents the first floor. Give ONE reason for your answer.	First floor: A/FIGURE A ✓ • Garage in FIGURE B ✓ • No arrows indicated in the staircase in FIGURE A • No ramp in FIGURE A • Balcony in FIGURE A • Staircase <b>ANY ONE OF THE ABOVE ANSWER AND REASON OR ANY OTHER ACCEPTABLE ANSWER</b>	2
2	Deduce from the building plan the number of windows in the building.	10 ✓	1
3	Identify number 1.	Balcony ✓	1
4	Identify number 2.	Shower ✓	1
5	Identify number 6.	One way switch – double pole ✓	1
6	Identify number 8.	Ramp ✓	1
7	Identify number 9.	Wall mounted light ✓	1
8	Identify number 10.	Wash tub ✓	1
9	Identify the number that indicates the garage door.	7 ✓	1
10	Deduce from the building plan the omitted dimension of number 11.	110 mm/110 ✓	1
11	Deduce from the building plan the material that must be used for number 5.	Concrete ✓	1

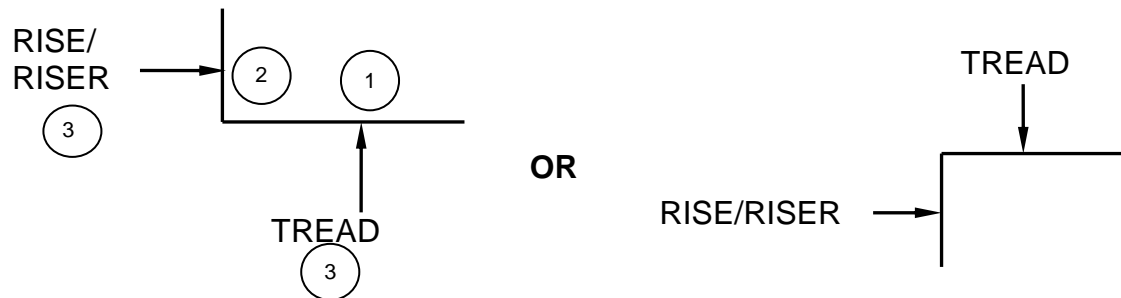
12	Give the abbreviations for the following: <ul style="list-style-type: none"> <li>Number 3</li> <li>Number 4</li> </ul>	Number 3: WC ✓ Number 4: WB/WHB ✓	2
13	Describe the purpose of a two-way switch.	Two-way switch: <ul style="list-style-type: none"> <li>Used to switch the same light on or off ✓</li> <li>From TWO different positions ✓</li> </ul>	2
14	Recommend an appropriate floor covering for the kitchen.	Tiles/Novilon/Concrete/Vinyl/ Painted floors/Laminated timber flooring/Timber floors ✓ <b>ANY ONE OF THE ABOVE</b>	1
15	Who was responsible for the checking of the drawing?	P Kriel ✓	1
16	Deduce ONE fault in the bathroom in FIGURE A.	No switch/electrical connection/wiring/light/door/door opening/bath/bidet ✓ <b>ANY ONE OF THE ABOVE</b>	1
17	Name an alternative light source that can be used during load shedding for a dwelling.	Rechargeable bulb/Candle/Paraffin lamp/Gas lamp/Battery powered lights/Torch/Solar/Cell phone ✓ <b>ANY ONE OF THE ABOVE</b>	1
18	State what was done during revision 1 and revision 2 of the house plan.	Revision 1: Drawing of Staircase ✓ Revision 2: Drawing of light fittings ✓	2
19	Name the finish for the ramp as prescribed by the architect.	Paving ✓	1
20	Draw the symbol for a damp-proof membrane.	 ✓✓	2
21	Draw the symbol for finished wood.	 ✓✓	2
22	Draw the symbol for hardcore filling.	 ✓✓	2



23	Prove, by means of a control test, that the total horizontal dimensions on the top and bottom of the plan in FIGURE A are the same.	<table><tr><th colspan="2">Total horizontal dimensions</th></tr><tr><th>Control test top</th><th>Control test bottom</th></tr><tr><td>220 ✓</td><td>220 ✓</td></tr><tr><td>4 110 ✓</td><td>4 820 ✓</td></tr><tr><td>3 510 ✓</td><td>3 020 ✓</td></tr><tr><td>220 ✓</td><td></td></tr><tr><td>= 8 060</td><td>= 8 060 ✓</td></tr></table> <p style="text-align: center;"><b>OR</b></p> <p>Top: 220 + 4 110 + 3 510 + 220 mm = 8 060 mm</p> <p>Bottom: 220 + 4 820 + 3 020 = 8 060 mm</p> <p><b>Note: If the alternative method is used, one mark should be allocated if both totals are the same.</b></p>	Total horizontal dimensions		Control test top	Control test bottom	220 ✓	220 ✓	4 110 ✓	4 820 ✓	3 510 ✓	3 020 ✓	220 ✓		= 8 060	= 8 060 ✓	8
Total horizontal dimensions																	
Control test top	Control test bottom																
220 ✓	220 ✓																
4 110 ✓	4 820 ✓																
3 510 ✓	3 020 ✓																
220 ✓																	
= 8 060	= 8 060 ✓																
24	Calculate the area of the floor plan in FIGURE B. Show ALL the calculations. Give your answer in m². Round your answers to TWO decimal places.	<p>= 8,06 ✓ m x 6,05 ✓ m = 48,76 ✓ m²</p> <p><b>OR</b></p> <p>= 8 060 mm x 6 050 mm = 48,76 m²</p>	3														
		<b>TOTAL:</b>	<b>40</b>														

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

3.1

**NOTE: ISOMETRIC/OBLIQUE DRAWINGS ALSO ACCEPTABLE**

NO.	ASSESSMENT CRITERIA	MARK
1	Tread	1
2	Rise/Riser	1
3	Labels	2
<b>TOTAL:</b>		<b>4</b>

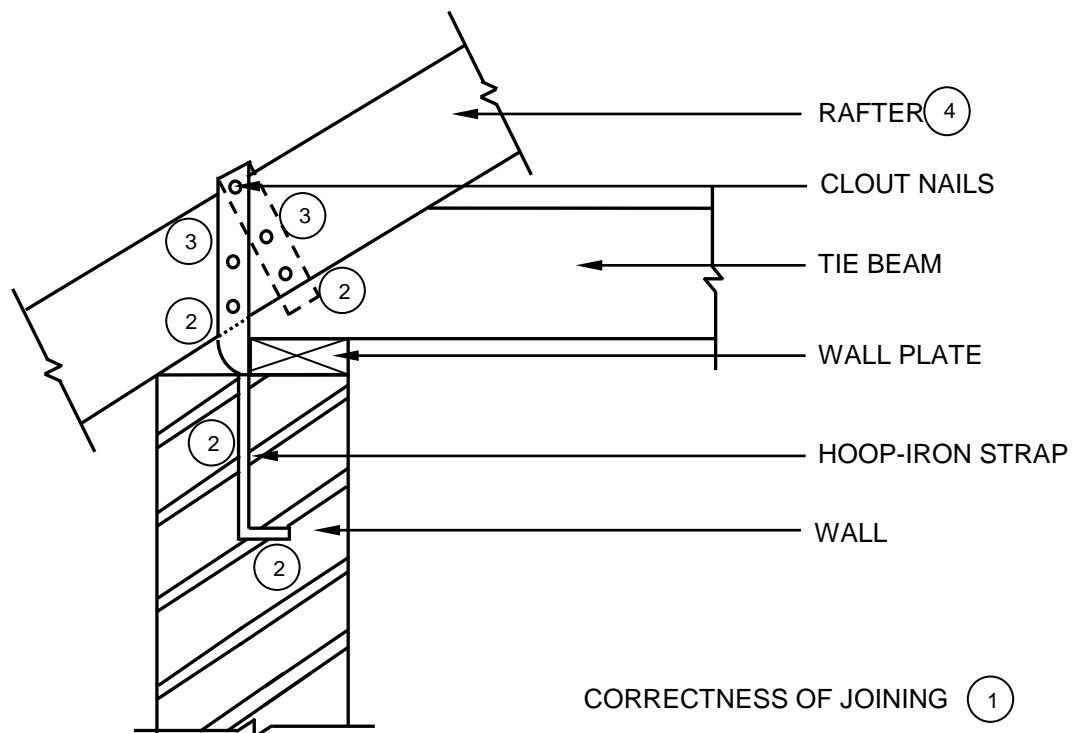
(4)

3.2

Collar-tie roof truss ✓  
Couple roof truss ✓

(2)

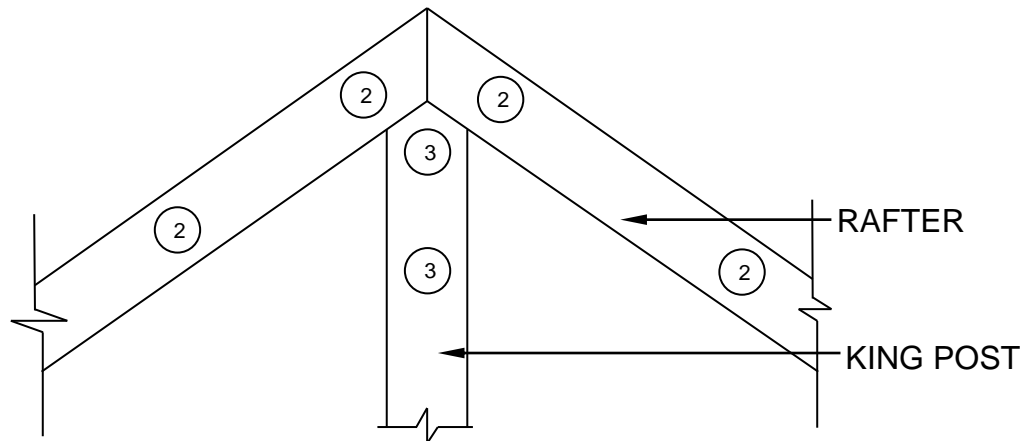
3.3



NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of joining	1
2	Hoop-iron strap	4
3	Clout nails	2
4	Any ONE label	1
<b>TOTAL:</b>		<b>8</b>

(8)

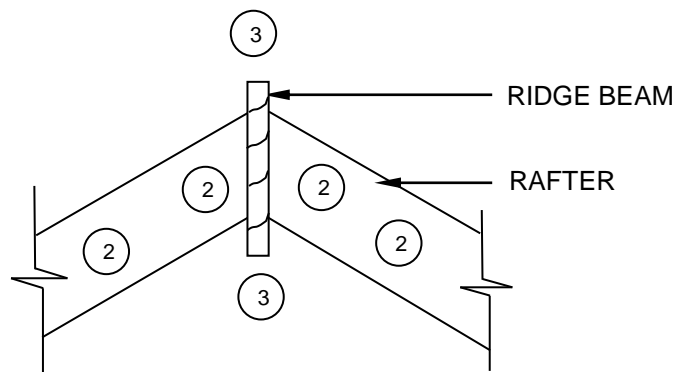
3.4



CORRECTNESS OF RIDGE OF ROOF TRUSS (1)  
APPLICATION OF SCALE (4)

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of ridge	1
2	Rafters	4
3	King post	2
4	Application of scale	1
TOTAL:		8

**DRAWING NOT TO SCALE:  
USE A MASK TO MARK THIS  
DRAWING**



CORRECTNESS OF RIDGE OF ROOF TRUSS (1)  
APPLICATION OF SCALE (4)

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of ridge	1
2	Rafters	4
3	Ridge beam	2
4	Application of scale	1
TOTAL:		8

**DRAWING NOT TO SCALE:  
USE A MASK TO MARK THIS  
DRAWING**

(16)  
[30]

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

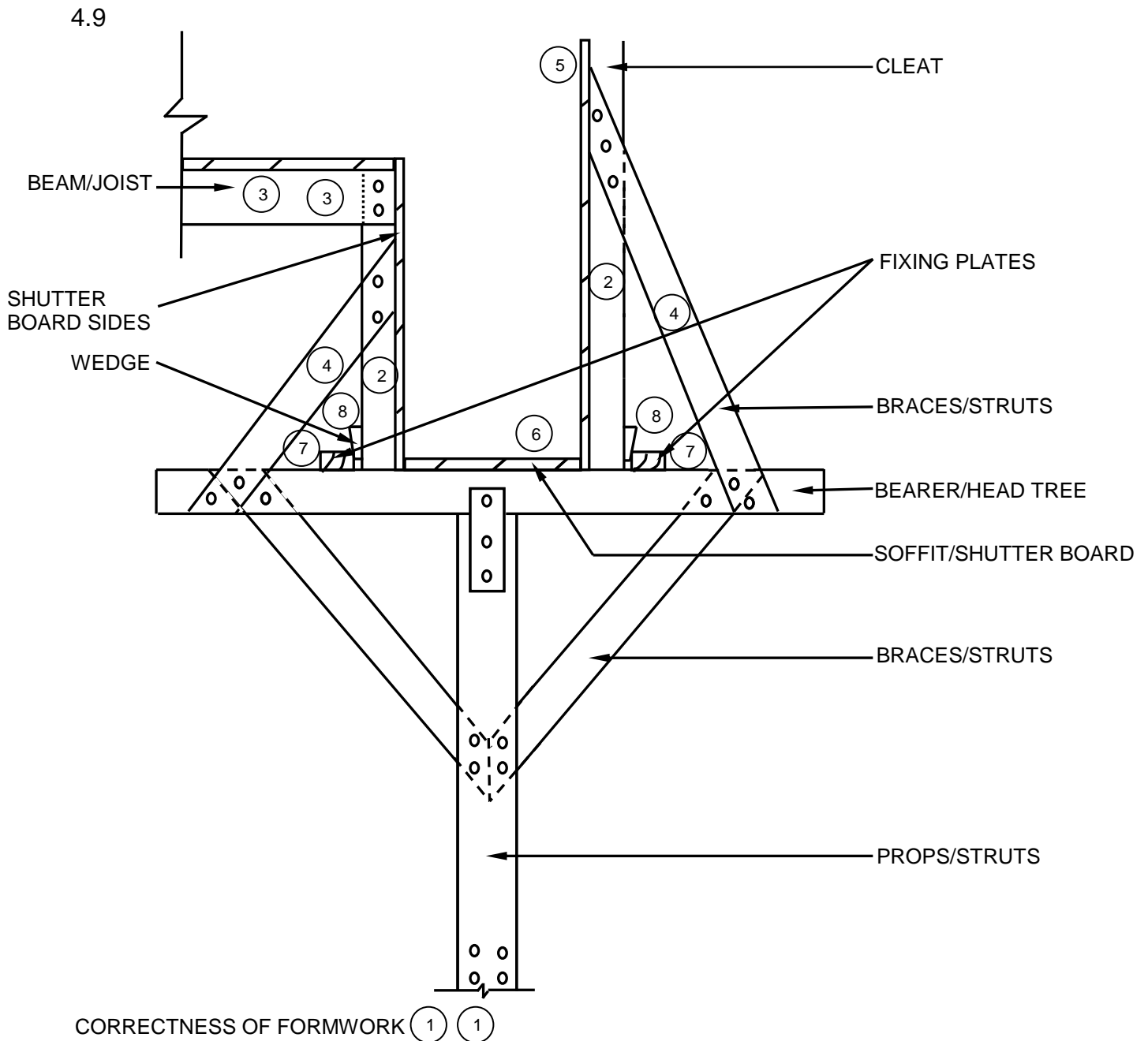
- |       |  |     |     |
|-------|--|-----|-----|
| 4.1   | 4.1.1  | K ✓ | (1) |
|       | 4.1.2  | C ✓ | (1) |
|       | 4.1.3  | I ✓ | (1) |
|       | 4.1.4  | G ✓ | (1) |
|       | 4.1.5  | F ✓ | (1) |
|       | 4.1.6  | A ✓ | (1) |
|       | 4.1.7  | D ✓ | (1) |
|       | 4.1.8  | B ✓ | (1) |
| 4.2.1 | Properties of galvanised sheet metal: <ul style="list-style-type: none"> <li>• Protects metal against corrosion ✓</li> <li>• Shiny bluish-white in colour</li> <li>• Metal dipped in molten zinc</li> <li>• Low in corrosion but is prone to corrode when galvanised layer is damaged</li> <li>• Acids found in pot-clay soil may also reduce galvanised protection</li> </ul> <b>ANY ONE OF THE ABOVE</b> |     | (1) |
| 4.2.2 | Properties of low carbon steel: <ul style="list-style-type: none"> <li>• Fine smooth appearance ✓</li> <li>• Can be bent</li> <li>• Ideally suited for forging</li> <li>• Can be rolled out or flattened</li> <li>• Fairly tough and strong</li> <li>• Easy to weld</li> <li>• Prone to rust if not treated</li> </ul> <b>ANY ONE OF THE ABOVE</b>   |     | (1) |

- 4.2.3 Properties of high carbon steel:
- Reduced welding ability ✓
  - Ductile
  - Impact toughness
  - Increased strength and hardness
  - Grey in colour
  - Malleable
  - Corrodes easy
  - Good conductor of heat and electricity
  - Durable
- ANY ONE OF THE ABOVE** (1)
- 4.3 Methods of fixing cladding to a wall:
- Adhesive fixing ✓
  - Face fixing ✓
  - Proprietary fixing ✓
- (3)
- 4.4 4.4.1 Slump test ✓ (1)
- 4.4.2 True slump ✓ (1)
- 4.4.3 True slump profile:
- Correct amount of water was used ✓
  - Correct mixing proportions was used
- (1)
- 4.5 Services that need to be located:
- Electrical cables ✓
  - Water pipes ✓
  - Gas lines ✓
  - Communication lines
  - Storm water systems
  - Sewer lines
- ANY THREE OF THE ABOVE** (3)
- 4.6 Heavy rains during excavations can cause:
- Excavation can collapse/Mudslides can occur ✓
  - Excavation can fill up with water ✓
  - Conditions inside the trench can become slippery
  - Delays may occur
- ANY TWO OF THE ABOVE** (2)
- 4.7 Workers may not work alone in an excavation because:
- It is a safety risk ✓
  - No one will be able to help the worker in case of an emergency
  - No one will be aware that the worker is in danger
- ANY ONE OF THE ABOVE** (1)
- 4.8 4.8.1 Plate compacter (1)

- 4.8.2 Operating machine safely:
- Operate with care ✓
  - Wear appropriate personal protective equipment (PPE) ✓
  - Do not place hands or feet near moving parts
  - Use both hands to operate this machine
  - Do not make any adjustments while the machine is in motion
  - Ensure a firm and well-balanced stance

**ANY TWO OF THE ABOVE**

(2)



NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of formwork	2
2	Cleats	2
3	Beam/Joist (under floor)	2
4	Braces/Struts	2
5	Shutter board side (right)	1
6	Soffit board	1
7	Fixing plates	2
8	Wedges	2
<b>TOTAL:</b>		<b>14</b>

(14)  
[40]



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

5.1 Ratio:

- 1 ✓:3 ✓/1:6/1:5
- 1 Bag cement:3 Wheelbarrows sand/
- 1 Bag cement:2½ Wheelbarrows sand

**ANY ONE OF THE ABOVE**

(2)

5.2 Preparation of floors to receive screed:

- Chip the surface ✓
- Remove all debris and dust ✓
- Test the absorption ability of the concrete ✓

(3)

5.3 A monolithic screed is a screed that is laid over fresh concrete.

(1)

5.4 Plastering the stop-end of a wall, in chronological order:

- Clamped straight edges to stop-end of the wall ✓
- Apply the plaster and allow to dry ✓
- Cut the access plaster to the level of the straight edges ✓
- Finish off the sharp edges after removing the straight-edges ✓

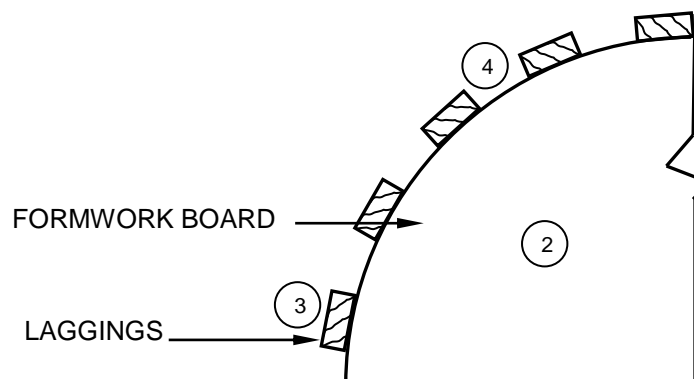
(4)

5.5 Advantages of a gauge arch:

- Looks neat and aesthetic ✓
- Do not need plastering ✓

(2)

5.6

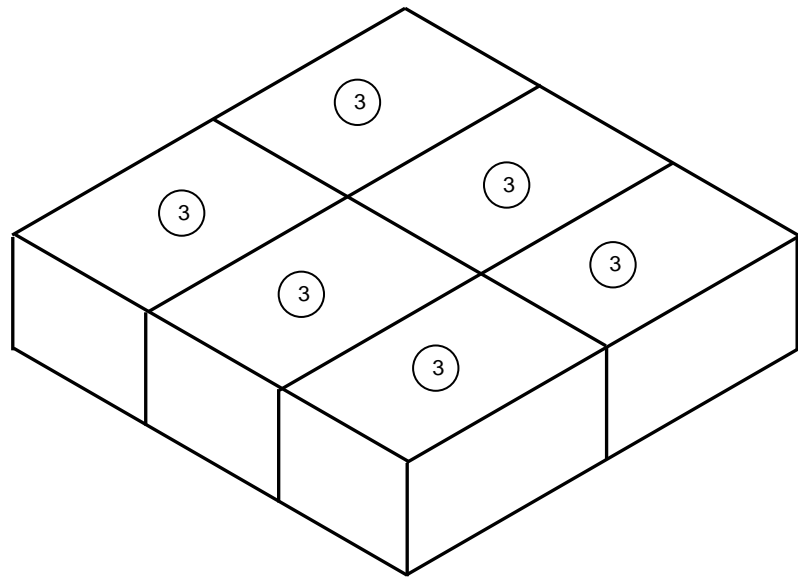


CORRECTNESS OF TURNING PIECE (1)

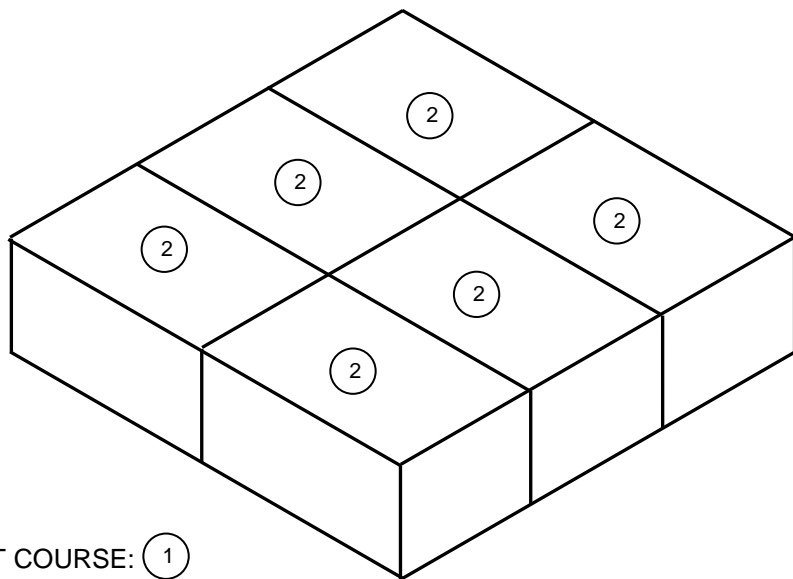
NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of turning piece	1
2	Formwork board	1
3	Laggings	1
4	Space between laggings (open laggings)	1
	<b>TOTAL:</b>	<b>4</b>

(4)

5.7



CORRECTNESS OF SECOND COURSE: ①



CORRECTNESS OF FIRST COURSE: ①

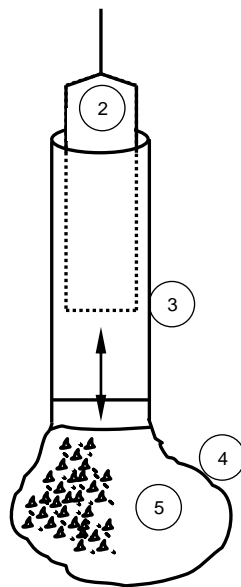
NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of courses	2
2	First course	6
3	Second course	6
	<b>TOTAL:</b>	<b>14</b>

(14)  
[30]

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

- 6.1      6.1.1      B ✓ (1)
- 6.1.2      D ✓ (1)
- 6.1.3      A ✓ (1)
- 6.1.4      C ✓ (1)
- 6.1.5      B ✓ (1)

6.2



CORRECTNESS OF ENLARGED BASE HAMMERED IN (1)

NO.	ASSESSMENT CRITERIA	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
<b>TOTAL:</b>		<b>5</b>

(5)

6.3 Components of a rib-and-block floor:

- Hollow core blocks ✓
- Precast ribs/Pre-stressed ribs ✓
- Steel mat/Steel mesh/Wire/Reinforcing mesh/Reinforcing steel ✓
- Spacers ✓
- In-situ cast concrete/Concrete

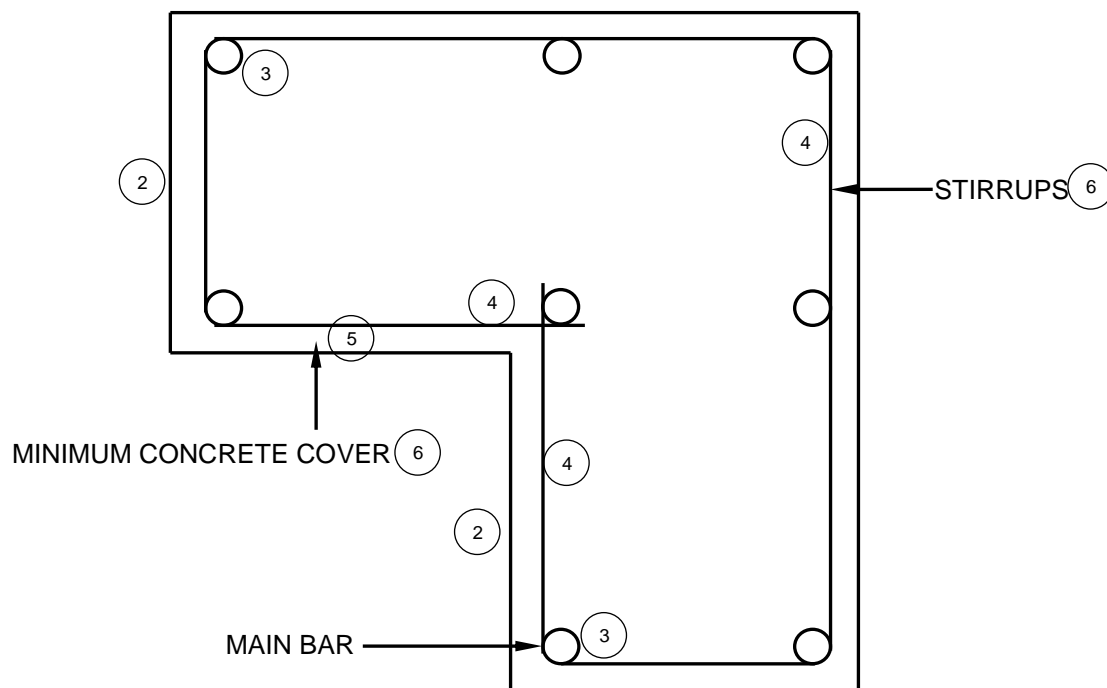
**ANY FOUR OF THE ABOVE**

(4)

6.4 The rib-and-block floor can collapse under the weight of the wet concrete. ✓ (1)

- 6.5      6.5.1      Number of bars in the group ✓ (1)
- 6.5.2      Diameter of the bar ✓ (1)
- 6.5.3      Center-to-center spacing/Heart spacing ✓ (1)

6.6



CORRECTNESS OF L-SHAPED COLUMN (1) (1)

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of L-shaped column	2
2	Completed column	2
3	8 main bars	
	Correct number of bars	1
	Correct placement of bars	1
4	Stirrups	3
5	Minimum concrete cover (indicated)	1
6	Any TWO labels	2
	<b>TOTAL:</b>	<b>12</b>

(12)

6.7

A	B	C	D
			Correct use of dimension paper
			Internal dimensions long walls:
			$7\,000 - 2/220 \checkmark = 6\,560 \text{ mm} \checkmark$
			Internal dimensions of the short walls:
			$6\,000 - 2/220 \checkmark = 5\,560 \text{ mm} \checkmark$
			Volume of blinding layer:
1/ $\checkmark$	6,56 $\checkmark$		
	5,56 $\checkmark$		
	<u>0,04</u> $\checkmark$	1,46 m <sup>3</sup> $\checkmark$	

(1)

(4)

(5)

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