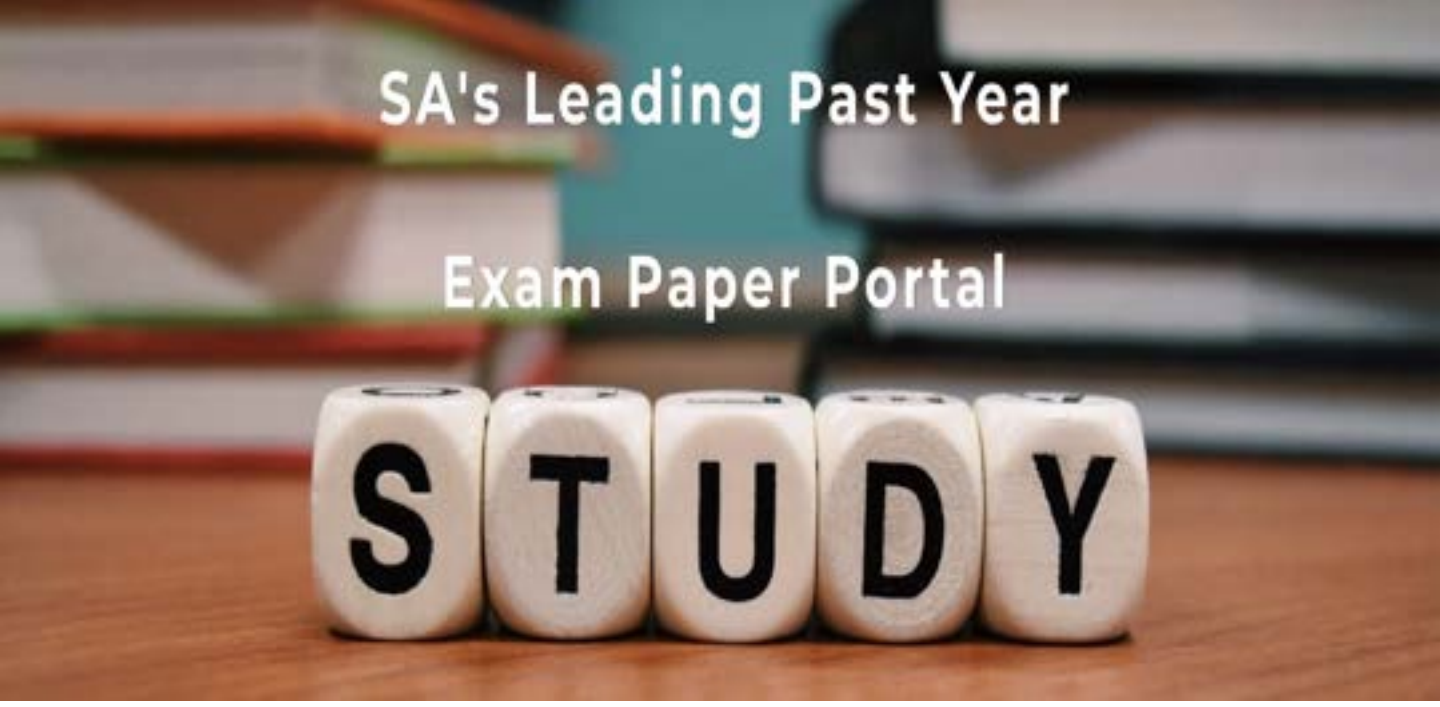

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GRADE 12

CIVIL TECHNOLOGY: CONSTRUCTION

NOVEMBER 2022

MARKING GUIDELINES

MARKS: 200

These marking guidelines consist of 20 pages.

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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.

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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 Oil or water-based paint ✓ (1)

1.1.2 Increases 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
- 50º/50 degrees ✓
- 38°/38 degrees
- 42°/42 degrees

ANY ONE OF THE ABOVE (1)

1.2.2
- Ensures stair rails/handrails/railings and or balustrades are in place ✓
- Keep treads free of dangerous obstacles
- Keep treads free of protruding nails
- Post warning signs
- Ensure there is sufficient lighting
- Ensure the surface is not slippery

ANY ONE OF THE ABOVE (1)

1.2.3
- To keep concrete in position ✓
- To enable the filling of concrete
- To act as formwork
- To shape the treads

ANY ONE OF THE ABOVE (1)

1.3 When transporting/carrying long ladders:
- Ensure that it does not protrude excessively ✓
- Tie a red or orange flag/warning signs to the end of the ladder ✓
- Ensure that the ladder is firmly secured to the vehicle
- Protect the ladder during transportation or while carrying it
- Two people should carry the ladder
- It should be carried horizontally and on the same side

ANY TWO OF THE ABOVE (2)

1.4
- Safety net/Net ✓
- Catch platform

ANY ONE OF THE ABOVE (1)

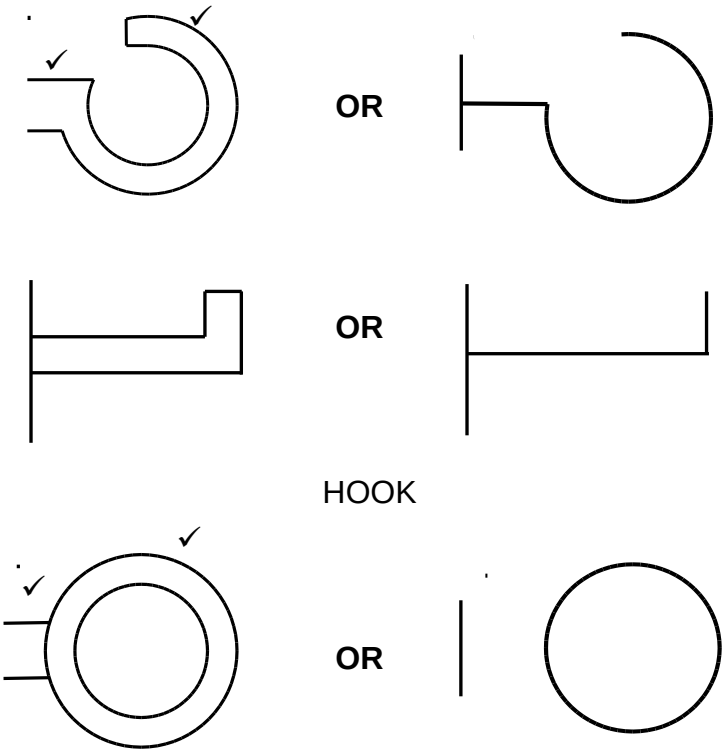
1.5 Brace/Strut ✓ (1)

1.6 If the scaffold planks protrude more than 230 mm beyond the last support:
- The scaffold planks might tilt if worker steps on it ✓
- The worker might fall from scaffold
- It might be hazardous to workers working around the scaffold

ANY ONE OF THE ABOVE (1)

1.7 3 m/3 000 mm ✓ (1)

1.8



(4)

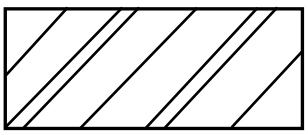
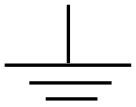
1.9 1.9.1 Multi-detector ✓ (1)

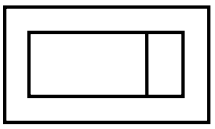
1.9.2 Laser level/Spirit level/Transparent pipe level ✓ (1)

[20]

QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

NO.	QUESTIONS	ANSWERS	MARKS
1	Name the FIGURE that represents the ground floor. Give ONE reason for your answer.	Ground floor: B/FIGURE B ✓ FIGURE B shows: No roofline/ Roofline in FIGURE A/ Garage/Arrows on the staircase/Ramp/Door at lounge/Entrance door/Garage door/ Balcony in FIGURE A ✓	2
2	Deduce the scale that was used to draw the floor plan of the house from the given building plan.	1:100 ✓	1
3	Identify number **1**.	Landing ✓	1
4	Identify number **4**.	Balcony/Cantilever ✓	1
5	Identify number **5**.	Shower ✓	1
6	Identify number **6**.	Wash hand basin/Wash basin/Basin/WHB ✓	1
7	Give the abbreviation for the symbol at number **7**.	WC ✓	1
8	Identify number **8**.	Ramp ✓	1
9	Identify number **9**.	Roll-up door/Garage door ✓	1
10	Identify number **10**.	Fluorescent light ✓	1
11	Identify the number that indicates the wall mounted light.	No 11/11 ✓	1
12	Give the abbreviations for the following: • Finished floor level • Natural ground level	FFL ✓ NGL ✓	2
13	Name a suitable material that can be used for constructing number **2**.	Concrete/Wood/Aluminium/Steel/ Masonry/Bricks/Glass ✓	1

14	Recommend ONE use for the area indicated by number **3**.	Coffee nook/Kitchen/Playroom/ Private lounge/Office/TV room/ Bar/Dining room/Storage space/Any use with utility value ✓	1
15	Recommend ONE permanent fixture for bedroom 1 that can be used for storage.	Built-in cupboard/BIC/Cupboard/ Closet/Bookshelf/Desk/ Drawer unit ✓	1
16	Who is the architect that was responsible for the drawing?	HB Nel ✓	1
17	Describe what is indicated by the arrows on the staircase in FIGURE **B**.	Direction of the rise of the stairs ✓	1
18	State what was done during revision 1 and revision 2 of the house plan.	Revision 1 – Drawing of sanitary fitments ✓ Revision 2 – Drawing of staircase ✓	2
19	Deduce the reference code from the building plan.	QP 6 – 2022 ✓	1
20	Who must be notified when a contractor sets out levels on a site and there are variances?	Architect/HB Nel ✓	1
21	Identify ONE important fixture that is omitted in the bathroom.	Ceiling light/Light/Light switch/ Switch/Fan light/Extractor fan/ Bath/Bidet/Socket outlet/Cabinet ✓	1
22	Draw the symbol for face brick.	 ✓✓	2
23	Draw the electrical symbol for earth.	 ✓✓	2

<table>
<tr><td>24</td><td>Draw the symbol for a grease trap.</td><td>  ✓✓</td><td>2</td></tr>
<tr><td>25</td><td>Prove by means of a control test that the total vertical dimensions on the left and right of the plan in FIGURE B are equal.</td><td>Total vertical dimensions:
<table><tr><td>Control test left</td><td>Control test right</td></tr><tr><td>220 ✓</td><td>2 960 ✓</td></tr><tr><td>5 450 ✓</td><td>110 ✓</td></tr><tr><td>220 ✓</td><td>2 820 ✓</td></tr><tr><td>5 890</td><td>= 5 890 ✓</td></tr></table>OR
Left side:
220 + 5 450 + 220 = 5 890 mm
Right side:
2 960 + 110 + 2 820
= 5 890 mm
Note: If the alternative method is used, one mark should be allocated if both totals are the same.</td><td>7</td></tr>
<tr><td>26</td><td>Calculate the area of the first floor. Show ALL calculations. Give your answer in m².</td><td>= 5,89 ✓ m x 8,11✓ m
= 47,77 ✓m²
OR
= 5 890 mm x 8 110 mm
= 47,77 m²
(47,7679 m^2/47,8 m^2/48,0 m^2)</td><td>3</td></tr>
<tr><td></td><td></td><td>TOTAL:</td><td>40</td></tr>
</table>

QUESTION 3: ROOFS, STAIRCASES AND JOINING (SPECIFIC)

3.1 Fibre cement tiles/Thatch ✓ (1)

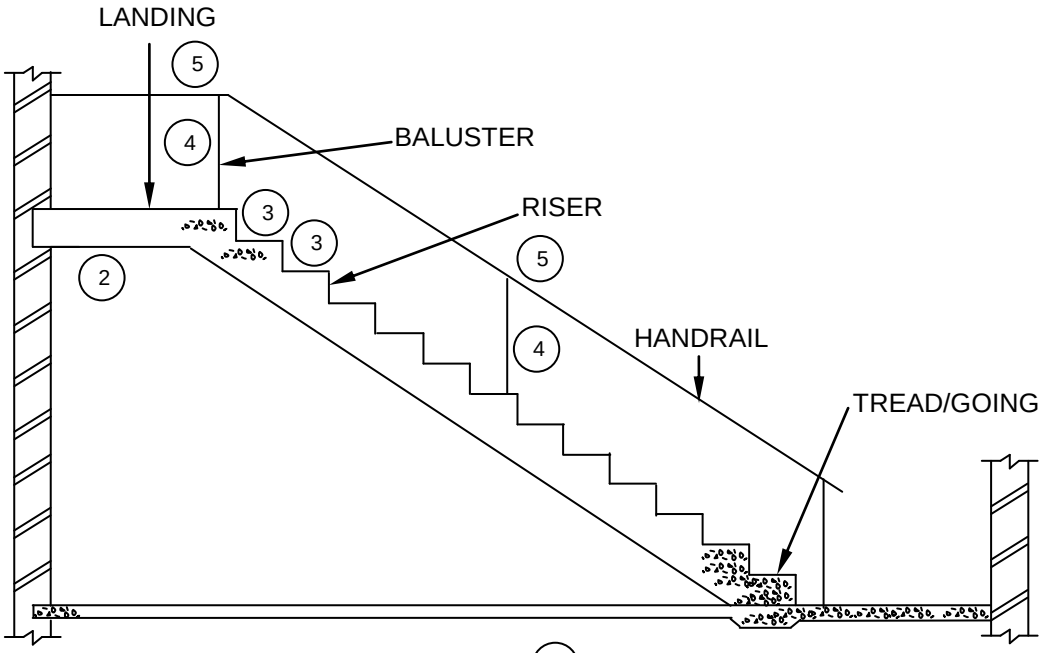
3.2 4 metres ✓ (1)

3.3 Securing a wall plate to a wall:
- Timber bolted/Rawl bolted to the top of the wall ✓
- Nailed to the wall ✓
- Screwed to the wall
- A galvanised strap/hoop iron nailed or built into a wall
- Tie with roof wire that is built into wall
- Secure with a tie/strap

ANY TWO OF THE ABOVE (2)

3.4 A - Pre-drilled hole filled with grout/Baluster fixing onto the tread ✓
B - Bolts/Rawl bolts/Plastic plugs with screws/Screws used to secure baluster/Baluster fixed onto the side of the string ✓ (2)

3.5

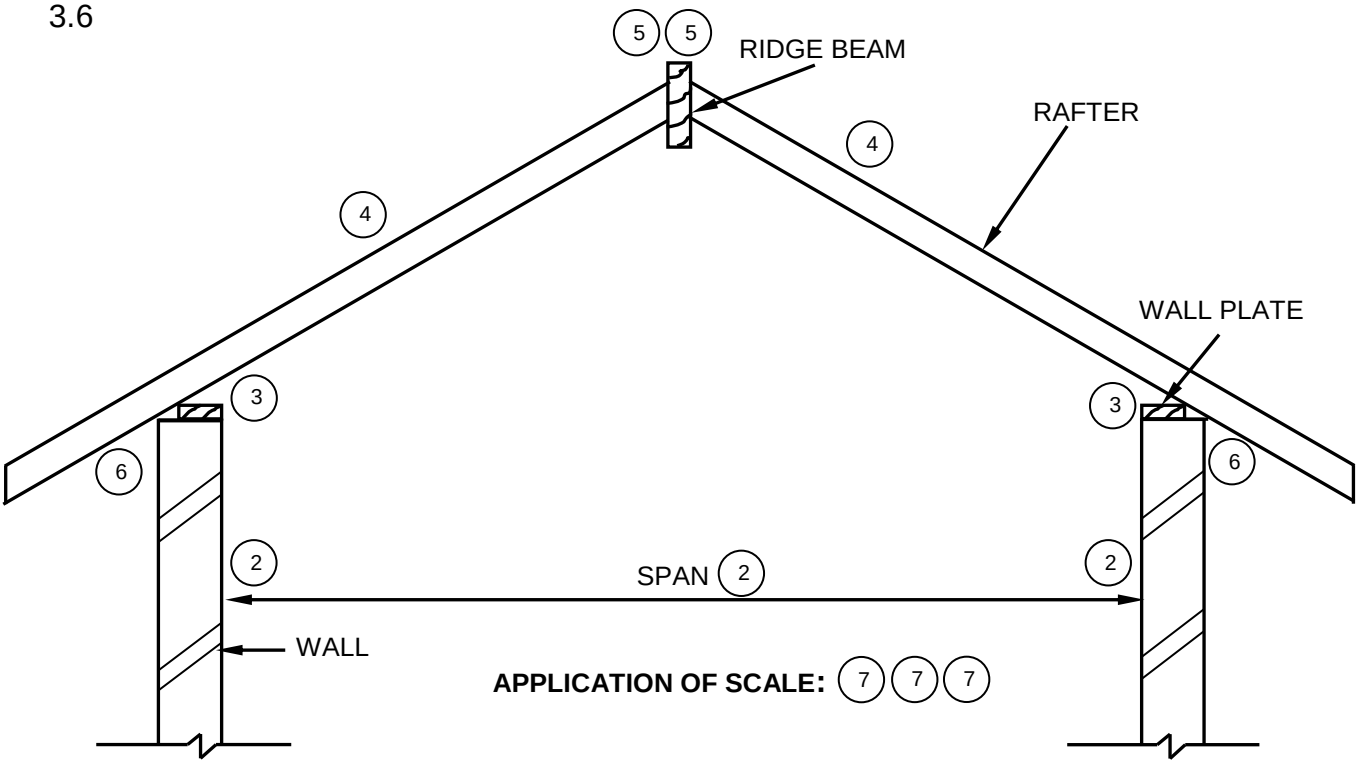


CORRECTNESS OF STAIRCASE: 1

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of staircase	1
2	Landing	1
3	Flight of stairs (steps)	2
4	Balusters	2
5	Handrail	2
	TOTAL:	**8**

(8)

3.6



APPLICATION OF SCALE: 7 7 7

CORRECTNESS OF ROOF TRUSS: 1 1

USE A MASK TO MARK THIS QUESTION

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of roof truss	2
2	Walls and span	3
3	Wall plates	2
4	Rafters	2
5	Ridge beam	2
6	Overhang	2
7	Application of scale: ONE or TWO incorrect = 3 THREE or FOUR incorrect = 2 More than FIVE incorrect = 1	3
	TOTAL:	**16**

(16)
[30]

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

4.1 4.1.1 A ✓ (1)

4.1.2 C ✓ (1)

4.1.3 E ✓ (1)

4.1.4 G ✓ (1)

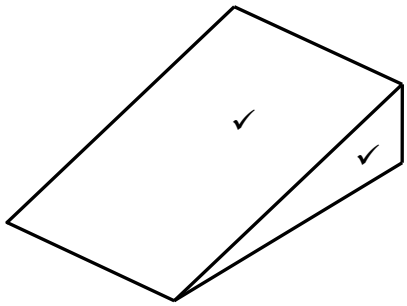
4.1.5 D ✓ (1)

4.1.6 J ✓ (1)

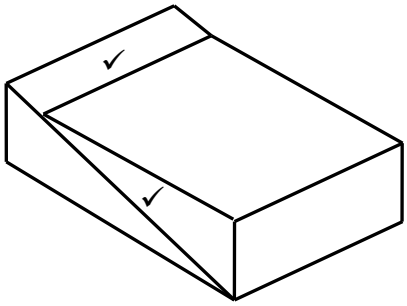
4.1.7 B ✓ (1)

4.1.8 F ✓ (1)

4.2



WEDGE ✓



FOLDING WEDGES ✓

(6)

4.3.1 Apparatus for the slump test:
- Open cone/Cone/Mould ✓
- Square base/Base plate ✓
- Tamping rod/Rod
- Ruler
- Tape measure
- Spirit level/Straight edge
- Shovel/Scoop/Trowel

ANY TWO OF THE ABOVE (2)

4.3.2

COLLAPSED SLUMP (2)

4.3.3 Collapsed slump:
- Too much water is added to the mixture ✓
- Concrete not mixed well

ANY ONE OF THE ABOVE (1)

4.4.1 Power trowel float/Power float/Power trowel ✓ (1)

4.4.2 Taking care of the machine:
- Maintain all the machinery ✓
- Lubricate/Oil and adjust to manufacturer's instructions ✓
- Store in a safe dry place
- Repair or replace damage parts
- Service the machine regularly
- Clean the machine after use

ANY TWO OF THE ABOVE (2)

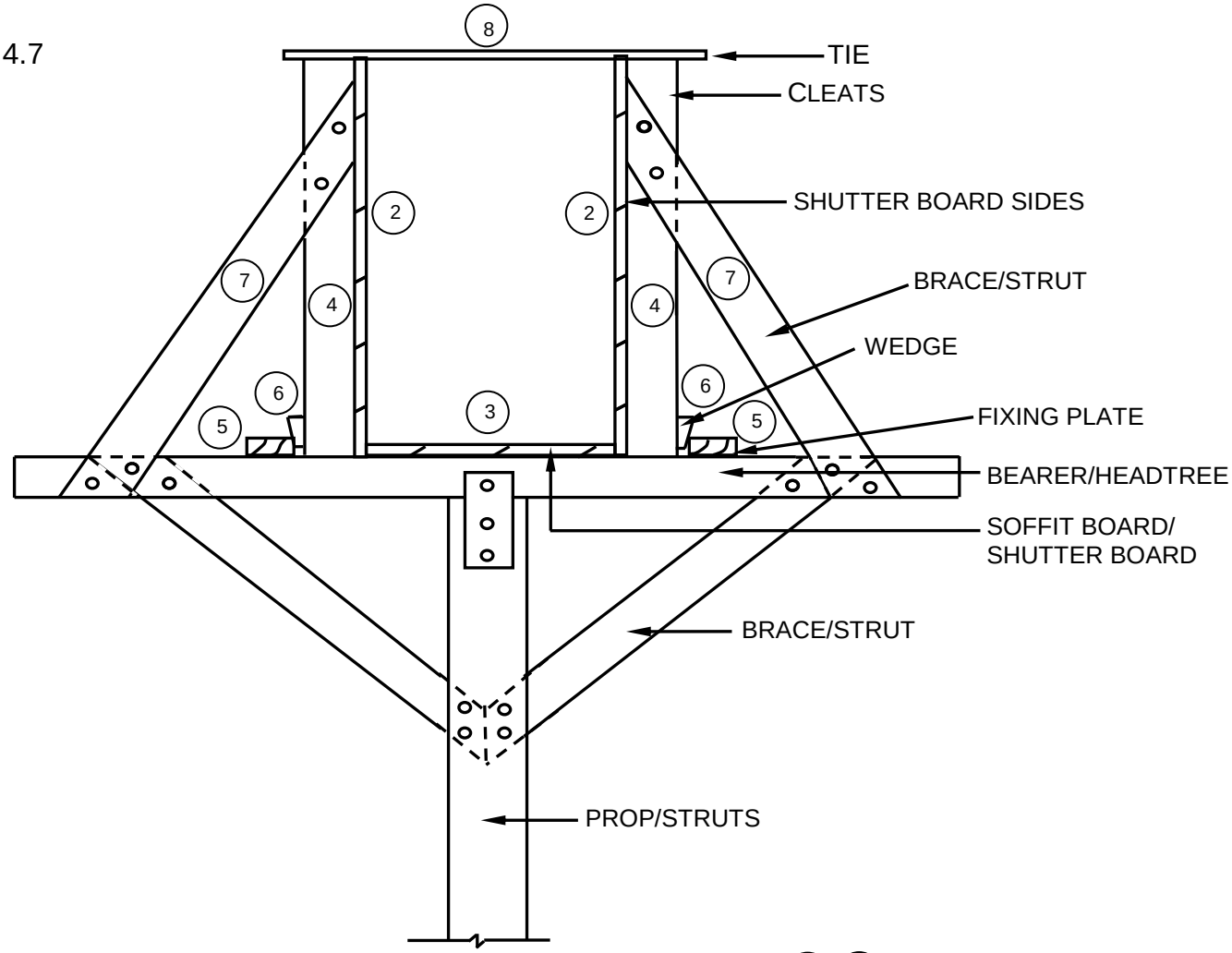
4.4.3 Safety aspects of the machine:
- Operate with care ✓
- Wear appropriate PPE ✓
- Never use a defective machine
- Do not place your hands and feet near moving parts
- Avoid making any adjustments while the machine is moving
- Use both hands to operate the machine
- Ensure a well-balanced stance

ANY TWO OF THE ABOVE (2)

4.5 28 days ✓ (1)

4.6 Perspex ✓ (1)

4.7



CORRECTNESS OF FORMWORK: (1) (1)

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of formwork	2
2	Shutter board sides	2
3	Soffit board	1
4	Cleats	2
5	Fixing plates	2
6	Wedges	2
7	Brace/Struts	2
8	Tie	1
	TOTAL:	**14**

(14)
[40]

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

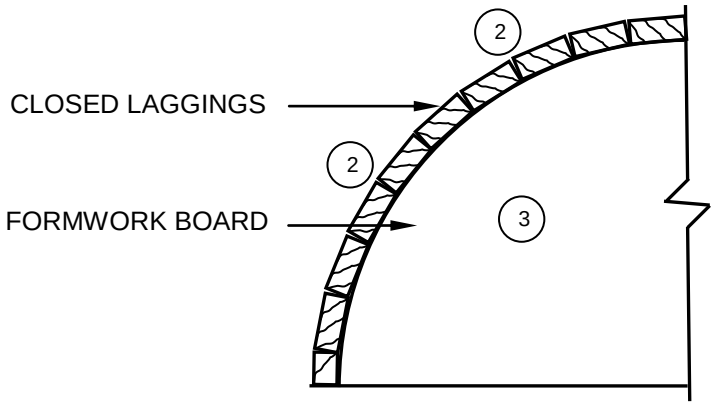
5.1 Tyrolean machine ✓ (1)

5.2 5.2.1 A- Straight edge/Straight plank ✓
B- Clamp ✓
C- Brick/Wall ✓ (3)

5.2.2 Reveals are exposed to more movement and rough handling. ✓ (1)

5.2.3 Trowel/External corner trowel/Corner trowel ✓ (1)

5.3



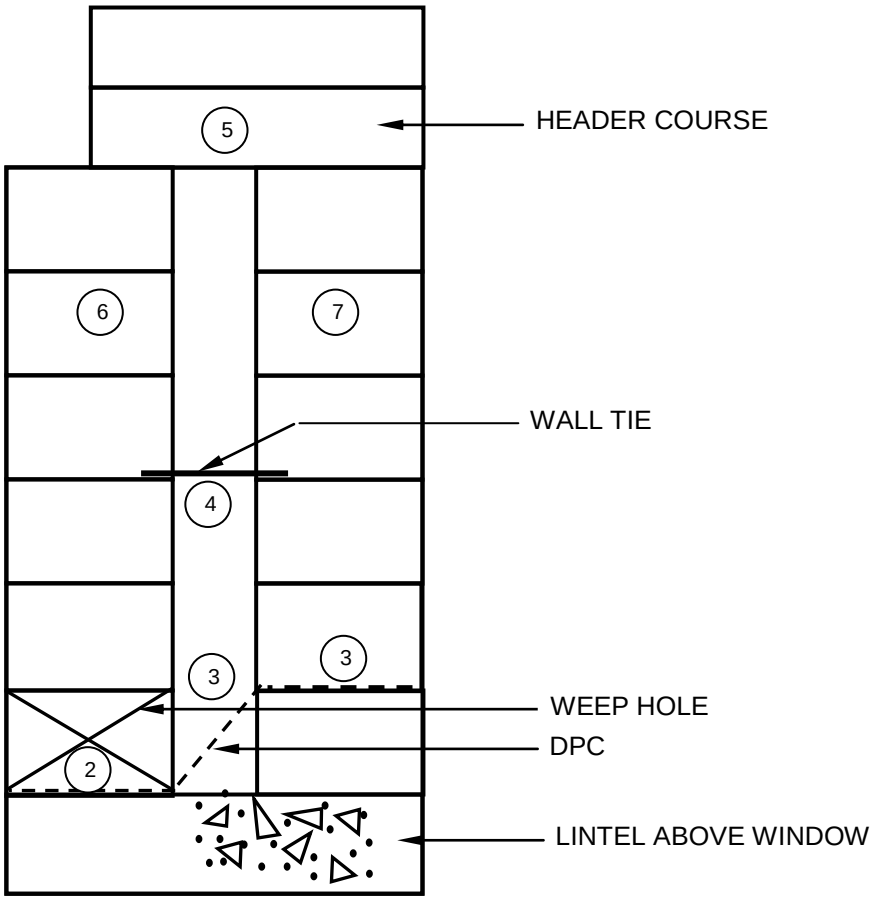
NOTE:
RIBS CAN ALSO BE DRAWN INSTEAD OF FORMWORK BOARD

CORRECTNESS OF WOODEN TURNING PIECE/CENTRE: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of wooden turning piece/centre	1
2	Closed laggings (No space between laggings)	2
3	Formwork board	1
	TOTAL:	**4**

(4)

5.4



APPLICATION OF SCALE: (8) (8)

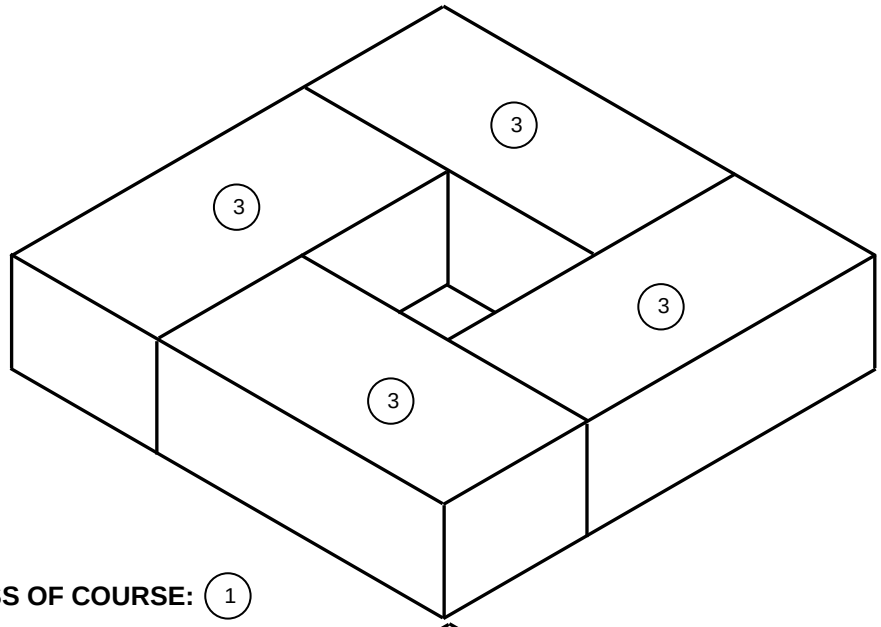
CORRECTNESS OF CAVITY WALL: (1)

USE A MASK TO MARK THIS QUESTION

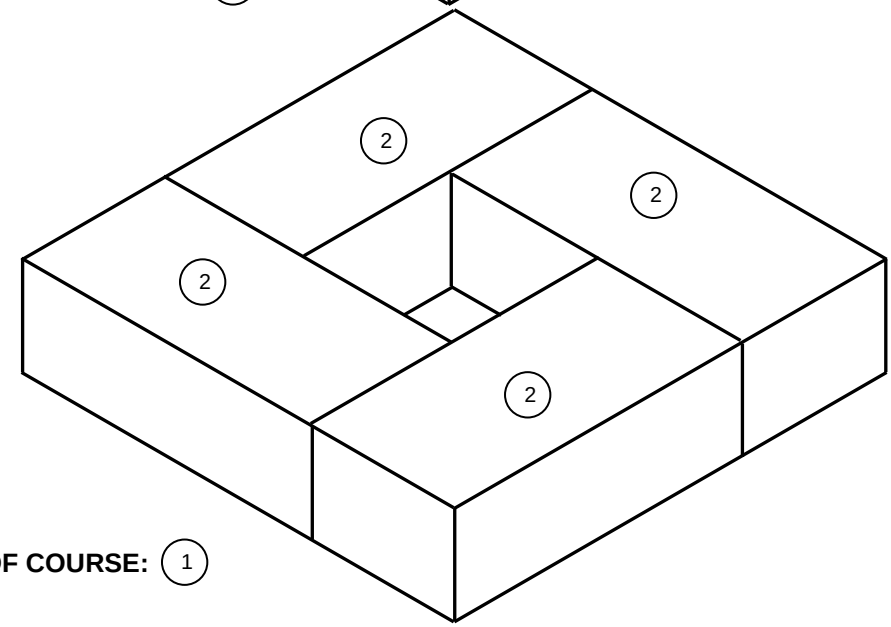
NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of cavity wall	1
2	Weep hole	1
3	DPC	2
4	Wall tie	1
5	Header course	1
6	Outer wall	1
7	Inner wall	1
8	Application of scale: ONE or TWO incorrect = 2 THREE or FOUR incorrect = 1 More than FIVE incorrect = 0	2
	TOTAL:	**10**

(10)

5.5



CORRECTNESS OF COURSE: (1)



CORRECTNESS OF COURSE: (1)

NO.	ASSESSMENT CRITERIA	MARK
1	Correctness of courses	2
2	First course	4
3	Second course	4
	TOTAL:	**10**

(10)
[30]

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

6.1 6.1.1 B ✓ (1)

6.1.2 C ✓ (1)

6.1.3 B ✓ (1)

6.1.4 D ✓ (1)

6.1.5 D ✓ (1)

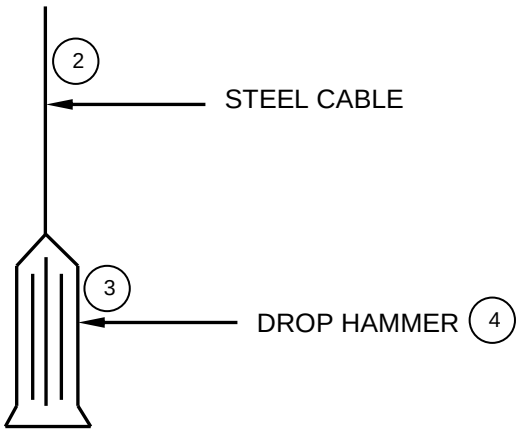
6.2 6.2.1 Three mistakes:

- There should be holes in the block ✓
- The rib has no reinforcing ✓
- There is no reinforcing mesh ✓
- The block is not resting more than halfway on the wall
- The outer skin of the wall should be higher
- Members are too far from one another

ANY THREE OF THE ABOVE (3)

6.2.2 Prop/Post/Pole ✓ (1)

6.3



CORRECTNESS OF TOOL: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of tool	1
2	Steel cable	1
3	Drop hammer	1
4	Any ONE label	1
	TOTAL:	**4**

(4)

6.4 6.4.1 Pile foundation ✓ (1)

6.4.2 Strip foundation ✓ (1)

6.5 6.5.1 A - Stirrup ✓
B - Concrete/Concrete symbol✓ (2)

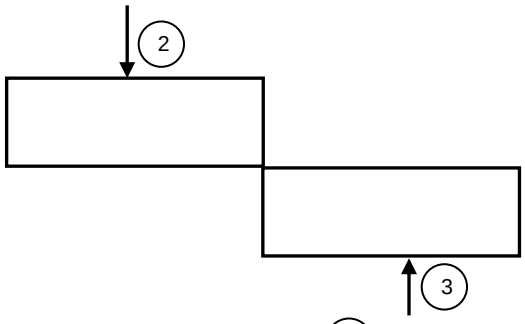
6.5.2 40 mm ✓ (1)

6.5.3 Methods of joining steel bars:
- Crosswise method ✓
- Hair knot method ✓
- Crown method

ANY TWO OF THE ABOVE (2)

6.5.4 Ribbed bars ensure better bonding with the concrete (1)

6.5.5



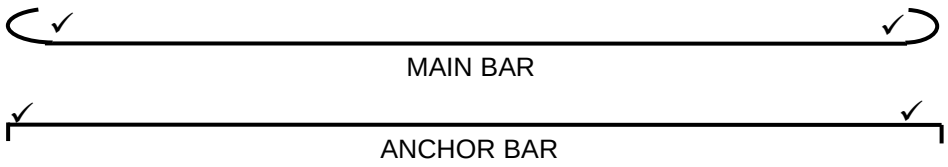
CORRECTNESS OF SHEAR FORCE: (1)

SHEAR FORCE THAT ACTS ON A STRUCTURE

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of shear force	1
2	Downward force	1
3	Upward force	1
	TOTAL:	**3**

(3)

6.5.6



(4)

6.6 6.6.1 Shear bar ✓ (1)

6.6.2 Helps to counteract shear force/This is where the shear force is exerted the most ✓ (1)

6.7 **Correct use of dimension paper** ✓ (1)

A	B	C	D
			Centre line of external wall:
			2/9 000 ✓ = 18 000 mm ✓
			2/5 000 ✓ = 10 000 mm ✓
			Total = 28 000 mm ✓
			Minus 4/220 ✓ = 880 mm ✓
			Total centre line = 27 120 ✓ mm ✓
			OR
			= 27,12 m

(9)

[40]

TOTAL: 200

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