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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

CIVIL TECHNOLOGY: CONSTRUCTION

NOVEMBER 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 one-word 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.
- 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 drawn.

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 3 m ✓ (1)
- 1.1.2 3 m ✓ (1)
- 1.1.3 Fire-fighting measures ✓ (1)
- 1.1.4 ensure that the ladder does not protrude excessively ✓ (1)
- 1.1.5 Powder coating ✓ (1)
- 1.1.6 the thickness of under size parts can be increased ✓ (1)
- 1.1.7 head and pin ✓ (1)
- 1.1.8 preventing backing off ✓ (1)
- 1.1.9 wood preservatives ✓ (1)
- 1.1.10 spiral ✓ (1)
- 1.2 B ✓ (1)
- 1.3 Diameter of thread/Size of Rawl bolt ✓ (1)
- 1.4 Properties and advantages of cured concrete:
- 1.4.1 • Improves the protection of the steel reinforcement ✓
 • Improves the protection against rust
 ANY ONE OF THE ABOVE (1)
- 1.4.2 Cured concrete can carry more weight. ✓ (1)
- 1.5 A multi-detector can be used:
- to detect materials in or behind a wall/carpentry/plumbing/construction surface. ✓
 - to determine distances to and from an object.
- ANY ONE OF THE ABOVE**
- A laser level can be used:
- to indicate horizontal and/or vertical levels/heights/slopes. ✓ (2)



1.6 Uses of dumpy level:

- Determine differences between levels and vertical heights ✓
- Determine levels ✓
- Determine slopes
- Determine horizontal angles/angles
- Setting out of buildings
- Transferring levels and heights
- Determine the distance from the dumpy level to an object/telescopic staff

ANY TWO OF THE ABOVE

(2)

1.7 Caring for the telescopic staff:

- The staff must always be folded when it is transported ✓
- Keep it in a bag to prevent damage/scratching of the graduation during transportation ✓
- Ensure that the plastic or metal clips are in working order to keep the sections in position
- Clean after use
- Store in a safe dry place

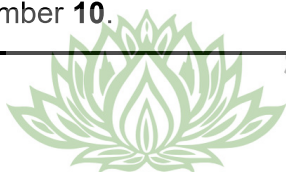
ANY TWO OF THE ABOVE

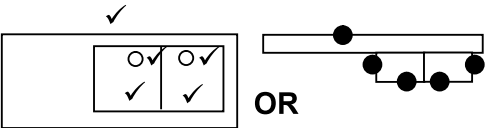
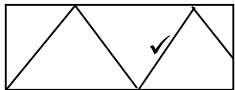
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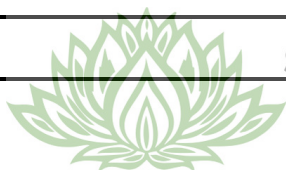
[20]

QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

| NO. | QUESTIONS | ANSWERS | MARKS |
|-----|---|--|-------|
| 1. | What is the measurement of the dwelling facing Hibiscus Street? | 12 000 mm/12 m ✓ | 1 |
| 2. | Identify number 1. | Manhole/MH ✓ | 1 |
| 3. | Identify the number indicating the building line. | 4 ✓ | 1 |
| 4. | Identify number 2. | Boundary line ✓ | 1 |
| 5. | Identify number 3. | Driveway/Entrance/Exit ✓ | 1 |
| 6. | Write down the abbreviation for number 5. | RE ✓ | 1 |
| 7. | Explain the purpose of number 6. | Garage door: To enter/close/secure the garage ✓ | 1 |
| 8. | How many fluorescent tubes are used in number 7? | 1 x 40W /1/One ✓ | 1 |
| 9. | How many one-way switch single-pole switches are in the dwelling? | 4/Four ✓ | 1 |
| 10. | How many built-in cupboards are in the dwelling? | 2/Two ✓ | 1 |
| 11. | What is omitted in terms of electrical installation in the bedrooms? | Switch socket outlets/Socket outlets/Wall plugs ✓ | 1 |
| 12. | Name TWO access points into the dwelling. | Access points: • Sliding door/Lounge door/Door at Number 8/Number 8 ✓ • Garage doors/Rollup door/Door at Number 6/Number 6 ✓ | 2 |
| 13. | How do you know in which direction the door at number 8 will open? | By the direction of an arrow ✓ | 1 |
| 14. | Name ONE other fixture that can be installed in the bathroom indicated by number 9. | Bath/Bidet/Urinal/Vanity/Bathroom cabinet/Wash hand basin/Basin/Extractor fan/Heated towel rail ✓ (Abbreviations is NOT accepted) | 1 |
| 15. | Identify number 10. | Hot-water cylinder ✓ | 1 |



| | | | |
|-----|---|--|-----------|
| 16. | Which plot is on the eastern side of plot number 23? | Plot number 27/Number 27/27 ✓ | 1 |
| 17. | How many inside doors are in the building? | 4/Four ✓ | 1 |
| 18. | How many 2 600 mm x 1 400 mm windows are in the building? | 3/Three ✓ | 1 |
| 19. | Who checked the drawing of the new dwelling? | P Bot ✓ | 1 |
| 20. | Why will it be difficult to enter the dwelling at number 8 if the NGL is 300 mm lower than the FFL? | No step ✓ No porch/stoep No ramp The door is at a higher level | 1 |
| 21. | Who was responsible for the printing of the building plan? | Frog printers ✓ | 1 |
| 22. | Deduce from the notes column the date that revision 1 took place. | 14/04/2024 ✓ | 1 |
| 23. | In which town will the new dwelling be erected? | Malubu ✓ | 1 |
| 24. | Draw the symbol for a sink unit – double. |  | 5 |
| 25. | Draw the symbol for hardcore filling. |  | 2 |
| 26. | Calculate the metres of clear-view fencing that would be needed to fence plot number 23, excluding the driveway. Give your answer in metres and show ALL calculations. | $25\ 000\ \checkmark + 25\ 000\ \checkmark + 30\ 000\ \checkmark + 30\ 000\ \checkmark - 4\ 000\ \text{mm}\ \checkmark$ $= 106\ 000\ \text{mm} = 106\ \checkmark\ \text{m}$ OR $25 + 25 + 30 + 30 - 4 = 106\ \text{m}$ | 6 |
| 27. | The internal area of the garage is 39,6 m ² . Calculate the internal length of number 11. Give your answer in mm and show ALL calculations. | $\underline{39,6\ \text{m}^2}\ \checkmark = 6,6\ \text{m}$ $6\ \text{m}\ \checkmark$ $= 6\ 600\ \text{mm}\ \checkmark$ OR $\underline{39\ 600\ 000\ \text{mm}^2}$ $6\ 000\ \text{mm}$ $= 6\ 600\ \text{mm}$ | 3 |
| | | TOTAL: | 40 |

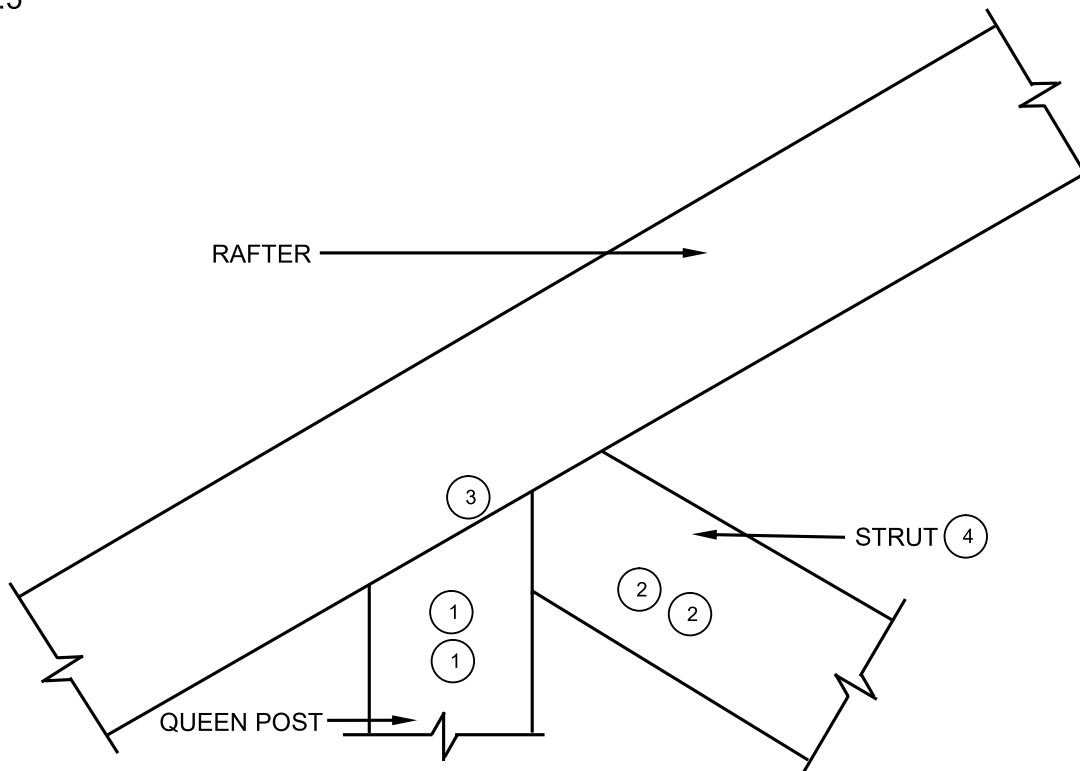


QUESTION 3: ROOFS, STAIRCASES AND JOINING (SPECIFIC)

- 3.1 3.1.1 • An imaginary line that connects the nosing of the treads in a flight of stairs. ✓
 • The slope/angle of the flight of stairs.
 ANY ONE OF THE ABOVE (1)
- 3.1.2 A combination of balusters/vertical posts ✓ that holds up the handrail. ✓ (2)
- 3.1.3 The horizontal distance covered by the stairs. ✓ (1)
- 3.2 3.2.1 Anchor a roof truss to a brick wall with a:
 • Hoop iron ✓
 • Strap/Galvanised steel strap
 • Galvanised steel wire
 ANY ONE OF THE ABOVE (1)
- 3.2.2 Gang nail/Nail plate/Bolt and nut/Nails ✓ (1)
- 3.3 650 mm ✓ (1)
- 3.4 Roof covering:
 • Corrugated iron sheets ✓
 • Galvanised sheet metal
 • IBR sheets
 • Transparent sheets
 • Corrugated fibre-cement sheets
 • Polycarbonate sheets
 • Plastic sheets
 ANY ONE OF THE ABOVE (1)



3.5



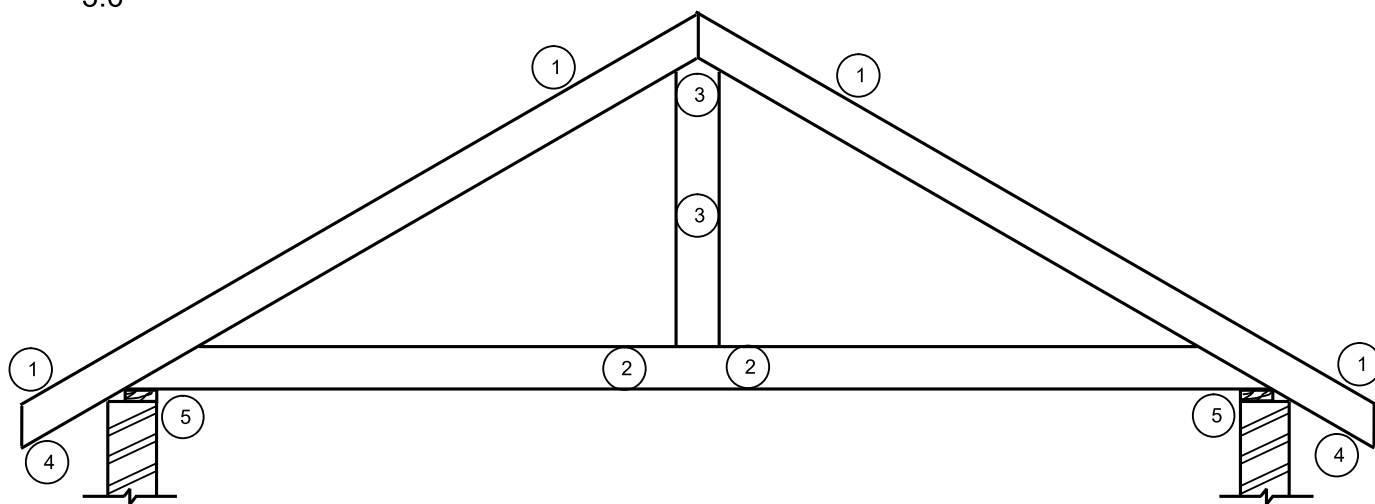
APPLICATION OF SCALE (5) (5)
USE A MASK TO MARK THIS QUESTION

| NO. | ASSESSMENT CRITERIA | MARK |
|---------------|---|----------|
| 1 | Queen post | 2 |
| 2 | Strut | 2 |
| 3 | Connection of parts | 1 |
| 4 | Any ONE label | 1 |
| 5 | Application of scale: All correct = 2 ONE incorrect = 1 TWO and more incorrect = 0 | 2 |
| TOTAL: | | 8 |

(8)



3.6



APPLICATION OF SCALE
USE A MASK TO MARK THIS QUESTION

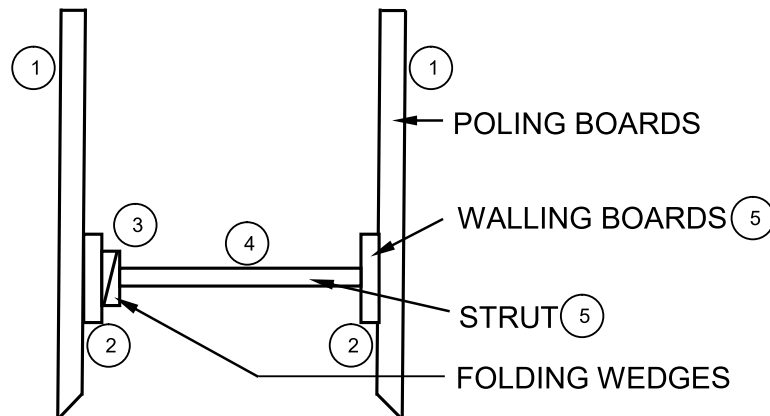
| NO. | ASSESSMENT CRITERIA | MARK |
|-----|--|-----------|
| 1 | Rafters | 4 |
| 2 | Tie beam | 2 |
| 3 | King post | 2 |
| 4 | Overhang | 2 |
| 5 | Wall plates | 2 |
| 6 | Application of scale: All correct = 2 ONE or TWO incorrect = 1 THREE and more incorrect = 0 | 2 |
| | TOTAL: | 14 |

(14)
[30]



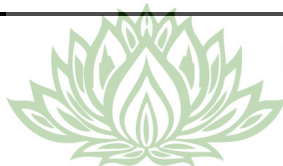
QUESTION 4: EXCAVATIONS, FORMWORK, TOOLS, EQUIPMENT AND MATERIALS (SPECIFIC)

- 4.1 4.1.1 Boom ✓ (1)
- 4.1.2 Ready-mix ✓ (1)
- 4.1.3 Workability ✓ (1)
- 4.1.4 30 MPa ✓ (1)
- 4.1.5 Water ✓ (1)
- 4.2 4.2.1 D ✓ (1)
- 4.2.2 C ✓ (1)
- 4.2.3 A ✓ (1)
- 4.2.4 D ✓ (1)
- 4.2.5 B ✓ (1)
- 4.3 The excavation will/may collapse ✓ (1)
- 4.4



| NO. | ASSESSMENT CRITERIA | MARK |
|---------------|---------------------|----------|
| 1 | Poling boards | 2 |
| 2 | Walling boards | 2 |
| 3 | Folding wedges | 1 |
| 4 | Strut | 1 |
| 5 | Any TWO labels | 2 |
| TOTAL: | | 8 |

(8)



- 4.5 4.5.1 Concrete vibrator is used:
- to get rid of air pockets/voids in the concrete. ✓
 - to bind concrete together properly.
 - to ensure that concrete flows into the corners.
 - to compact concrete.
- ANY ONE OF THE ABOVE** (1)
- 4.5.2 Portable concrete vibrator/Concrete vibrator/Vibrator ✓ (1)
- 4.6 Power trowel float/Power float ✓ (1)
- 4.7 4.7.1 Purpose of the cube test:
- To determine the compression strength of cured concrete ✓
 - To test if concrete complies with the requirements of the project specifications ✓
 - To test the ability of concrete to resist the load
 - To determine the quality of the concrete
- ANY TWO OF THE ABOVE** (2)
- 4.7.2 Tamping rod ✓ (1)
- 4.7.3 Procedure of conducting a cube test:
- Apply oil to the mould and baseplate after it was cleaned ✓
 - Fill the cube with 50 mm layers of concrete at a time until it is filled to the top ✓
 - Compact each layer ✓
 - Stroke each layer at least 25 times ✓
 - Cure the moulds for 24 hours and immerse the cubes in water for 28 days and test ✓ /Compression strength tests must be carried out at 7, 14 and 28 days (5)
- 4.8 A. Shuttering board side ✓
- B. Shutter board floor ✓
- C. Fixing plate ✓
- D. Cleat ✓
- E. Beam/Joist ✓
- F. Wedge ✓
- G. Soffit-/Shutter board ✓
- H. Bearer/Head tree ✓
- I. Brace/Strut ✓
- J. Prop/Strut ✓

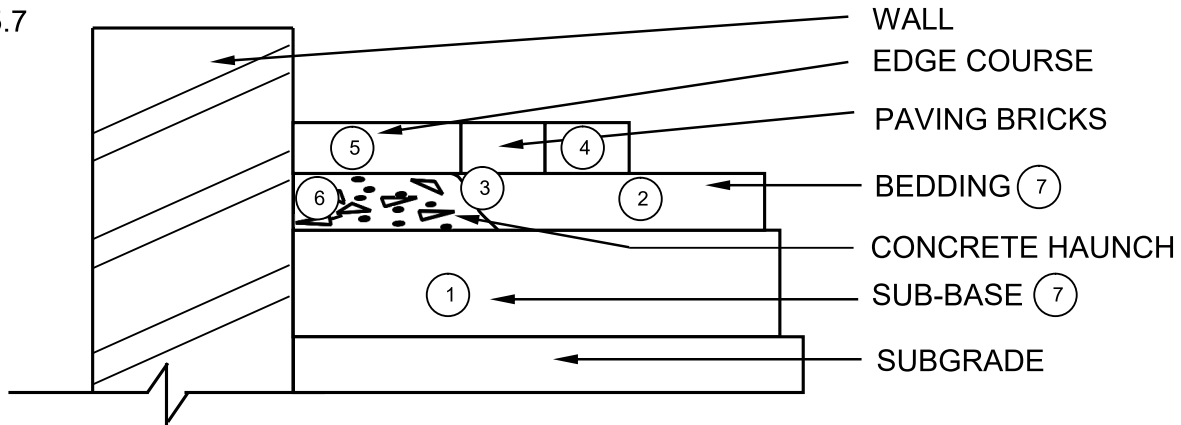
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[40]

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

- 5.1 5.1.1 The mixing ratio is 1: 1,5 :3 ✓ (cement, sand and water) (1)
- 5.1.2 Roughcast finish ✓ (1)
- 5.1.3 Mortar is forcefully splattered onto the wall with a block brush/trowel. ✓ (1)
- 5.2 5.2.1 Purpose of skimming of plaster:
- A high quality, smooth surface ✓
 - High quality surface
 - Smooth surface
- ANY ONE OF THE ABOVE** (1)
- 5.2.2 Rubber trowel/Steel trowel/Wooden float ✓ (1)
- 5.3 Dry screed:
Dry screed is placed on a concrete floor that has already cured ✓ so there is no direct bonding between the two layers. ✓ (2)
- 5.4 Materials for dry screed:
- Sand ✓
 - Cement ✓
- (2)
- 5.5 Advantages of beam filling:
- Prevent wind/dust/rain from blowing in under the roof ✓
 - Prevent birds/other living creatures from nesting/perching in the roof ✓
 - Improve the stability of the roofing rafters
 - Provide good insulation
- ANY TWO OF THE ABOVE** (2)
- 5.6 Gauged arches:
- Bricks are wedge-shaped ✓
 - Joints are rectangular shaped ✓
- (2)



5.7

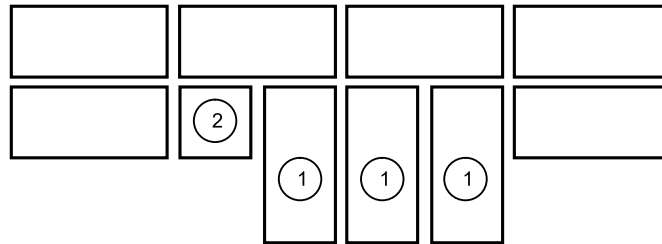
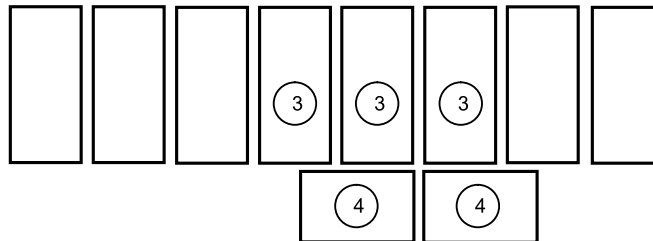


| NO. | ASSESSMENT CRITERIA | MARK |
|---------------|---------------------|----------|
| 1 | Sub-base | 1 |
| 2 | Bedding | 1 |
| 3 | Concrete haunch | 1 |
| 4 | Paving bricks | 1 |
| 5 | Edge course | 1 |
| 6 | Concrete symbol | 1 |
| 7 | Any TWO labels | 2 |
| TOTAL: | | 8 |

(8)



5.8

FIRST COURSE**SECOND COURSE**

| NO. | ASSESSMENT CRITERIA | MARK |
|-----|------------------------------|----------|
| 1 | First course bricks of pier | 3 |
| 2 | Half brick-first course | 1 |
| 3 | Second course bricks of pier | 3 |
| 4 | $\frac{3}{4}$ bricks | 2 |
| | TOTAL: | 9 |

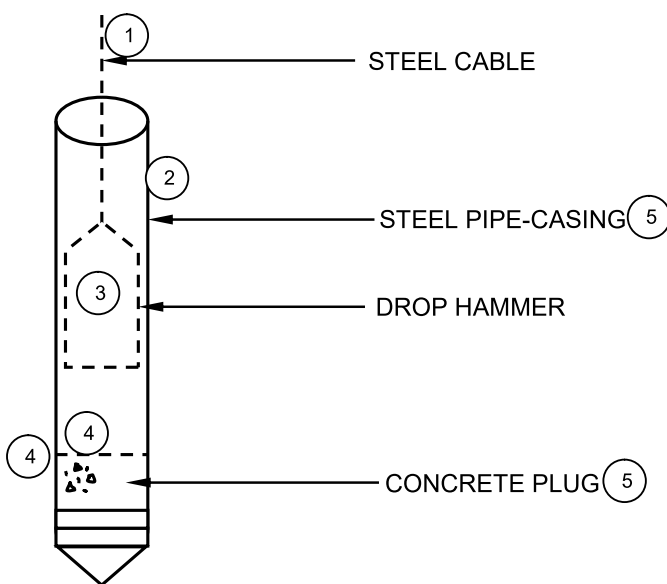
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[30]

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

- | | | | |
|-----|-------|---|-----|
| 6.1 | 6.1.1 | D ✓ | (1) |
| | 6.1.2 | G ✓ | (1) |
| | 6.1.3 | A ✓ | (1) |
| | 6.1.4 | H ✓ | (1) |
| | 6.1.5 | B ✓ | (1) |
| 6.2 | 6.2.1 | A – Cantilever beam ✓ B – Supported beam ✓ | (2) |
| | 6.2.2 | Advantage of reinforcement: <ul style="list-style-type: none"> • The beam can handle heavier loads ✓ • Less concrete can be used to achieve the same strength • Increases the strength of concrete ANY ONE OF THE ABOVE | (1) |
| | 6.2.3 | Disadvantages of reinforcement: <ul style="list-style-type: none"> • Is more expensive ✓ • Is time consuming ✓ | (2) |
| | 6.2.4 | Purposes of using spacers: <ul style="list-style-type: none"> • To keep steel in position ✓ • To ensure the correct cover depth is obtained (minimum concrete cover) ✓ | (2) |



6.3 6.3.1



| NO. | ASSESSMENT CRITERIA | MARK |
|-----|--------------------------|----------|
| 1 | Steel cable | 1 |
| 2 | Steel pipe casing | 1 |
| 3 | Drop hammer | 1 |
| 4 | Concrete plug and symbol | 2 |
| 5 | Any TWO labels | 2 |
| | TOTAL: | 7 |

(7)

6.3.2 Pile foundation is not needed when/where:

- Ground is stable/solid enough ✓
- There is no underground water ✓
- There is no soil erosion

ANY TWO OF THE ABOVE

(2)

6.4 6.4.1 110 mm ✓

(1)

6.4.2 Safety factors after installation for rib-and-block floor:

- Ensure curing at least for 7 days ✓
- Allow for 28 days for setting of the concrete slab ✓
- Only remove the props after a compressive strength of 17 MPa is reached
- Adhere to normal formwork striking times
- Ensure minimum movement after casting
- Normal activities can only continue after the concrete has set properly

ANY TWO OF THE ABOVE

(2)



| 6.5 | A | B | C | D | |
|-------|------|-----------|------------------------|--|-------------|
| 6.5.1 | 1/ ✓ | 34,12 ✓ | | Area of walls for superstructure before deductions | |
| | | 2,7 ✓ | | | |
| 6.5.2 | | | 92,12 m ² ✓ | | (4) |
| | 1/ ✓ | 2 ✓ | | Area of door | |
| | | 0,9 ✓ | | | |
| | | | 1,8 m ² ✓ | | (4) |
| 6.5.3 | | | | | |
| | | | | Total area of wall after deductions | |
| | | | | = 92,12 m ² ✓ – 1,8 m ² ✓ = 90,32 m ² ✓ | (3) |
| 6.5.4 | | | | | |
| | 2/ ✓ | 90,32 ✓ | | | |
| | | 50 ✓ | 9 032 ✓ | Bricks needed | (4) |
| | | OR | | | |
| | 1/ | 90,32 | | | |
| | | 100 | 9 032 | Bricks needed | |
| | | | | | |
| | | | | Correct use of dimension paper ✓ | (1) |
| | | | | | [40] |

TOTAL: 200