MARKS: 200

These marking guidelines consist of 15 pages.
QUESTION 1: CONSTRUCTION, SAFETY AND MATERIAL

1.1  1.1.1  B ✓  
     1.1.2  E ✓  
     1.1.3  A ✓  
     1.1.4  D ✓  
     1.1.5  F ✓  
     1.1.6  C ✓  
     1.1.7  H ✓  
     1.1.8  I ✓  
     1.1.9  G ✓  
     1.1.10 J ✓  

1.2  1.2.1  A – To protect your feet against falling objects. ✓  
     1.2.2  B – To protect your feet when working with wet material. ✓  

1.3  The paint conceals defects ✓  

1.4  • Excavations must be fenced off. ✓  
     • Red warning lights should be placed at intervals to warn the public. ✓  
     • All excavations must take place under supervision.  
     • The contractor must test the stability of the terrain before commencement of excavations.  
     • Shoring should be cross braced.  
     • Bracing should be strong enough to support the shoring.  
     • No tools or materials other than those in use are allowed inside the trench when excavations are in progress.  
     • Access to the excavation should be safe e.g. ladders can be used.  
     • A responsible person must inspect and investigate underground electricity and water supply.  
     • The sides should be braced and protected if deeper than 1,5 meters.  
     ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER  

1.5  • Baseplate ✓  
     • Mould/Cube ✓  
     • Tamping rod ✓  
     • Plaster trowel/straight edge/shovel  
     ANY THREE OF THE ABOVE
1.6 • Water makes the fresh concrete workable. ✓
• Water acts as a lubricant.
• Water is also needed for the hydration process.
ANY ONE OF THE ABOVE (1)

1.7 1.7.1 To prevent moisture from getting into the building. ✓ (1)
1.7.2 To prevent moisture from moving up in the walls. ✓ (1)

1.8 • Preservatives with a base of water-soluble salts. ✓
• Varnish
ANY ONE OF THE ABOVE (1)

1.9 Roof tiles/Clay tiles/Concrete tiles ✓ (1)

1.10 Ridge capping ✓ (1)

1.11 Gang nails/plate connectors ✓ (1)

1.12

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARK</th>
<th>CANDIDATES MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>One brick wall</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Half brick wall (T-junction)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Three-quarter bricks</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

(5) [30]
QUESTION 2: ADVANCED CONSTRUCTION AND EQUIPMENT

ANSWER THIS QUESTION ON A NEW PAGE.

2.1 2.1.1 C ✓ (1)  
2.1.2 D ✓ (1)  
2.1.3 A ✓ (1)  
2.1.4 B ✓ (1)  
2.1.5 A ✓ (1)  
2.2 2.2.1 Portable electric generator ✓ – It is used to generate electricity ✓ (2)  
2.2.2 Portable electric circular saw ✓ – It is used for cross cutting and ripping of timber. ✓ (2)  
2.3 Chalk line ✓ (1)  
2.4 • Flat steel square ✓  
• Tape measure  
ANY ONE OF THE ABOVE (1)  
2.5 • Rough arch will be built with common bricks ✓  
• Gauge arch will be built with face bricks ✓ (2)  
2.6 2.6.1 Driven in-situ pile ✓ (1)  
2.6.2 • Low bearing capacity of soil ✓  
• Subsoil – subjected to movement ✓  
• Subsoil – subjected to high moisture content.  
• Recently placed filling materials that is not sufficiently compacted  
• Unstable soil structure  
• High water table  
ANY TWO OF THE ABOVE (2)  
2.6.3 Steel reinforcement ✓ (1)  
2.7 2.7.1 Twisted square bar ✓ (1)  
2.7.2 Round bar (mild steel) ✓ (1)  
2.8 A – Landing ✓  
B – Rise ✓  
C – Tread ✓ (3)
2.9  
- Blow holes ✓
- Uneven colour/discoloration ✓
- Honey comb effect/Leaking of grout

ANY TWO OF THE ABOVE (2)

2.10  
2.10.1  Cavity wall ✓

2.10.2  
- A – Wall tie ✓
  - Keeps the two skins of the wall securely together. ✓
  - It strengthens the wall

ANY TWO OF THE ABOVE (2)

2.10.3  
- B – Weak concrete mixture ✓
  - Concrete mixture

ANY ONE OF THE ABOVE (1)

2.10.4  
- To strengthen the wall below the DPC (damp proof course) ✓
  - To close the cavity below the damp proof course

ANY ONE OF THE ABOVE (1)

2.10.5  
C – Damp-proof membrane ✓

2.10.6  
50 mm ✓ (Unit must be part of the answer) (1)

2.11  
2.11.1  A – Cladding (or any cladding material) ✓
  
B –
  - Timber floor board ✓
  - Base plate
  - Base board

ANY ONE OF THE ABOVE FOR B (2)

2.11.2  
- Steel ✓
  - Metal
  - Aluminium

ANY ONE OF THE ABOVE (1)

2.11.3  
- There is no wet material ✓
  - There is no heavy material to carry ✓
  - Dry walls are light in weight.
  - Dry walls are easier to install
  - Dry walls are easy to remove if required

ANY TWO OF THE ABOVE (2)

2.12  
2.12.1  Rib and Block floor ✓

2.12.2  
- A – Rib ✓
  - B – Hollow block/Block ✓
  - C – Reinforcing steel/Steel rod/Reinforcement ✓

[40]
QUESTION 3: CIVIL SERVICES

3.1 3.1.1 P-trap ✓

3.1.2 Washbasin/Urinal/Shower/Sink ✓

ANY ONE

3.2 3.2.1 A-Is the inlet pipe for cold water ✓
B-Is the outlet pipe for warm water ✓

(2)

3.2.2 To shut down water supply during maintenance. ✓

ANY OTHER ACCEPTABLE ANSWER

(1)

3.2.3 • To prevent water from leaking through the ceiling ✓

• It is compulsory to install a drip tray

ANY ONE OF THE ABOVE

(1)

3.3 3.3.1 Storm water is hail, snow, rain that falls to the earth in large quantities. ✓

ANY OTHER ACCEPTABLE ANSWER

(1)

3.3.2 Storm water is guided into the channels where after the water is guided to storm water pipes and catchment areas. ✓

ANY OTHER ACCEPTABLE ANSWER

(1)

3.4 Water in shallow wells is:
• Easily dug out ✓
• Cheap
• Relatively reliable

ANY ONE OF THE ABOVE

(1)

3.5 Wind pump ✓

(1)
### ASSESSMENT CRITERIA

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mark</th>
<th>Candidate's Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 way light switch</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Socket outlet</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Electrical wire</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8</strong></td>
<td></td>
</tr>
</tbody>
</table>

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CIVIL TECHNOLOGY

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3.7 **ANSWER SHEET 3.7**

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARK</th>
<th>CANDIDATE'S MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodding eye</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Gully</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Vent pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Main sewerage pipes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Inspection eyes</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Manhole</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Any TWO abbreviations for the sanitary fixtures</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12</strong></td>
<td></td>
</tr>
</tbody>
</table>

(12)

[30]
QUESTION 4: QUANTITIES, MATERIALS AND JOINING

4.1 4.1.1 • Gang nail ✓
USE:
• Gang nails are used to join the members of roof trusses. ✓
• Extend the length of a timber board/beam.
ANY ONE OF THE ABOVE USES (1)

4.1.2 • Bolt and nut ✓
USE:
• Bolts and nuts are used to join the members of roof trusses. ✓
• Join material to brackets
• To fix truss hangers to rafters
ANY ONE OF THE ABOVE USES (1)

4.1.3 • Dry wall screw ✓
USE:
• Drywall screws are used to fix dry wall materials. ✓
• Joining ceilings and battens to other members
• Joining timber to each other
ANY ONE OF THE ABOVE USES (1)

4.2 • Rawl bolt/Expansion anchor ✓
• Sleeve anchor
• Dina bolt
ANY ONE OF THE ABOVE (1)

4.3 • Compression joint ✓
• Capillary joint
ANY ONE OF THE ABOVE (1)

4.4 • Screws have greater holding power than nails ✓
• They can be fixed where vibration has to be avoided ✓
• Screws can easily be removed
• The appearance of screws is better in finishing than nails
ANY TWO OF THE ABOVE (2)

4.5 4.5.1 38 or 38 mm ✓
4.5.2 2 349 or 2 349 mm ✓
4.5.3 5 ✓
4.5.4 2 575 or 2 575 mm ✓
4.5.5 5 150 or 5 150 mm ✓
4.5.6 4 500 or 4 500 mm ✓
4.5.7 10 300 or 10 300 mm ✓
4.6

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inside measurement of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long walls = 6 500 – 2/220 ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 6 060 mm ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short walls = 3 800 – 2/220 ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 3 360 mm ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/</td>
<td>Inside floor area of the room is</td>
<td>2/</td>
</tr>
<tr>
<td></td>
<td>6,06</td>
<td>3,36 ✓</td>
<td>20,36 m² ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area of one ceiling board:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/</td>
<td>3,9</td>
<td>One board is 3 900 mm x 900 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0,9 ✓</td>
<td>3,51 m² ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of skirting:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 2(6 060 ✓ + 3 360 ✓) – 900 mm ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 17,94 m ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR 12 120 + 6 720 - 900</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>=17,94 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR 6 060 + 6 060 + 3 360 + 3 360 - 900</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>=17,94 m</td>
<td></td>
</tr>
</tbody>
</table>

[30]
QUESTION 5: APPLIED MECHANICS

5.1 5.1.1

\[(A1 \times d) + (A2 \times d)\]

\[
\text{Total area} \quad \checkmark \quad \checkmark \quad \checkmark \quad \checkmark
\]

\[
= (3\,200 \times 20) + (900 \times 60)
\]

\[
4\,100 \checkmark
\]

\[
= 64\,000\,\text{mm}^3 + 54\,000\,\text{mm}^3
\]

\[
4\,100
\]

\[
= 118\,000\,\text{mm}^3 \checkmark
\]

\[
4\,100\,\text{mm}^2
\]

\[
= 28.78 \checkmark \text{mm} \checkmark
\]

OR

<table>
<thead>
<tr>
<th>Part</th>
<th>Area (A)</th>
<th>Y</th>
<th>AY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3,200 mm² ✓</td>
<td>20 mm ✓</td>
<td>3,200 mm² × 20 = 64,000 mm³ ✓</td>
</tr>
<tr>
<td>2</td>
<td>900 ✓ mm²</td>
<td>60 mm ✓</td>
<td>900 mm × 60 mm = 54,000 mm³ ✓</td>
</tr>
<tr>
<td>∑</td>
<td>4,100 mm² ✓</td>
<td></td>
<td>118,000 mm³</td>
</tr>
</tbody>
</table>

\[
Y = \frac{\sum Ay}{\sum A}
\]

\[
= \frac{118\,000\,\text{mm}^3}{4\,100\,\text{mm}^2}
\]

\[
= 28.78 \checkmark \text{mm} \checkmark
\]

(10)
5.2.1

**Diagram Description:**
- Points A, B, C, D, E, F, G form a triangle with forces acting at various points.
- Forces 60 N, 40 N, and 23 N are shown.
- Tolerances of 1 N to either side are indicated.

5.2.2

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>NATURE</th>
<th>MAGNITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG</td>
<td>Tie</td>
<td>23 N ✓</td>
</tr>
<tr>
<td>BF</td>
<td>Strut</td>
<td>50 N  ✓</td>
</tr>
</tbody>
</table>

Tolerance of 1 N to either side

**Instructions:**
- Use a mask to mark this question.
- Diagram not to scale due to electronic transfer.

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Please turn over
5.3 5.3.1 40 Nm ✓ (1)
5.3.2 7 m ✓ (1)
5.3.3 3 m ✓ (1)

5.3.4

SCALE 1 mm = 2 Nm

NOT TO SCALE DUE TO ELECTRONIC TRANSFER
USE A MASK TO MARK THIS QUESTION
If the bending moment diagram is not to scale, deduct 1 mark.
Marks are allocated for each line between A to F.
If the lines between B and D are straight lines no marks will be awarded for these lines.
## ANSWER SHEET 6.1

<table>
<thead>
<tr>
<th>NO.</th>
<th>QUESTIONS</th>
<th>ANSWERS</th>
<th>MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name the scale used for the West elevation.</td>
<td>1:100 ✓</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Identify number 1.</td>
<td>Barge board ✓</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Identify number 2.</td>
<td>Window/window pane/glass casement ✓</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Identify number 3.</td>
<td>Door/door opening ✓</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Identify number 4.</td>
<td>FFL/Finished floor level ✓</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Identify number 5.</td>
<td>Step ✓</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Identify number 6.</td>
<td>NGL/Natural ground level ✓</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Identify number 7.</td>
<td>Window sill ✓</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Name the material that can be used for the soffit board at a closed eave?</td>
<td>Fibre cement ✓</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Recommend a suitable exterior finish for the wall.</td>
<td>Paint/plaster/face brick/cladding ✓</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Deduce on which elevations will the gutters be placed in this house?</td>
<td>North elevation ✓ and South elevation ✓</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Draw the roof lines for the roof of the building shown in FIGURE 6.1 in the column alongside.</td>
<td><img src="image" alt="Roof lines diagram" /></td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL**: 15
QUESTION 6: GRAPHICS AND COMMUNICATION
ANSWER SHEET 6.2

SECTION B–B
SCALE 1:20

NOT TO SCALE: USE A MASK TO MARK THIS QUESTION

Correctness of drawing ✓ ✓ ✓ All parts of the drawing must be correctly drawn to receive a mark.
✓ ✓ ✓ If the section is drawn the wrong way around deduct 1 mark.

ASSESSMENT CRITERIA MARKS LM
Correctness of drawing 3
External wall 1
Symbol for wall 1
Plaster 2
Wall plate 1
Tie beam 1
Rafter 2
King post 1
Brandering 1
Ceiling board 1
Cornice 1
Fascia board 1
Print title and scale 2
Any FOUR labels 4
Application of scale:
One or two incorrect = 3
Three or four incorrect = 2
More than five incorrect = 1
No measurement correct = 0
TOTAL 25

[40] 200

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