MARKS:  200

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

1.1  
1.1.1 B ✓ (1)
1.1.2 E ✓ (1)
1.1.3 A ✓ (1)
1.1.4 D ✓ (1)
1.1.5 F ✓ (1)
1.1.6 C ✓ (1)
1.1.7 H ✓ (1)
1.1.8 I ✓ (1)
1.1.9 G ✓ (1)
1.1.10 J ✓ (1)

1.2  
1.2.1 A – To protect your feet against falling objects. ✓ (1)
1.2.2 B – To protect your feet when working with wet material. ✓ (1)

1.3  
The paint conceals defects ✓ (1)

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 (2)

1.5  
• Baseplate ✓
• Mould/Cube ✓
• Tamping rod ✓
• Plaster trowel/straight edge/shovel

ANY THREE OF THE ABOVE (3)
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**

1.7  
1.7.1  To prevent moisture from getting into the building. ✓

1.7.2  To prevent moisture from moving up in the walls. ✓

1.8  
- Preservatives with a base of water-soluble salts. ✓
- Varnish

**ANY ONE OF THE ABOVE**

1.9  
- Roof tiles/Clay tiles/Concrete tiles ✓

1.10  Ridge capping ✓

1.11  Gang nails/plate connectors ✓

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><strong>TOTAL</strong></td>
<td><strong>5</strong></td>
<td></td>
</tr>
</tbody>
</table>

[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/discholoration ✓
- 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 ✓ (3)

[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

3.2.3 • To prevent water from leaking through the ceiling ✓
   • It is compulsory to install a drip tray
   ANY ONE OF THE ABOVE

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

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

3.4 Water in shallow wells is:
   • Easily dug out ✓
   • Cheap
   • Relatively reliable
   ANY ONE OF THE ABOVE

3.5 Wind pump ✓
3.6

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARK</th>
<th>CANDIDATE’S MARK</th>
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</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>
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3.7 ANSWER SHEET 3.7

<table>
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<th>ASSESSMENT CRITERIA</th>
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<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>
</tbody>
</table>

TOTAL 12

(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

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

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

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

4.3 • Compression joint ✓
• Capillary joint
ANY ONE OF THE ABOVE

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

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><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>C</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>Inside measurement of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long walls  = 6 500 – 2/220 ✓</td>
<td></td>
<td></td>
<td>= 6 060 mm ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short walls  = 3 800 – 2/220 ✓</td>
<td></td>
<td></td>
<td>= 3 360 mm ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/</td>
<td>6,06</td>
<td>Inside floor area of the room is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,36 ✓</td>
<td>20,36 m² ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2)</td>
</tr>
<tr>
<td>Area of one ceiling board:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/</td>
<td>3,9</td>
<td>One board is 3 900 mm x 900 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0,9 ✓</td>
<td>3,51 m² ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3)</td>
</tr>
<tr>
<td>Length of skirting:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= 2(6 060 ✓ + 3 360 ✓) – 900 mm ✓</td>
<td></td>
<td></td>
<td>= 17,94 m ✓</td>
</tr>
<tr>
<td>OR 12 120 + 6 720 - 900</td>
<td></td>
<td></td>
<td>=17,94 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4)</td>
</tr>
<tr>
<td>OR 6 060 + 6 060 + 3 360 + 3 360 - 900</td>
<td></td>
<td></td>
<td>=17,94 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(13)</td>
</tr>
</tbody>
</table>

[30]
QUESTION 5: APPLIED MECHANICS

5.1 5.1.1 \[(A1 \times d) + (A2 \times d)\]

Total area

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

\[= 64000 \text{ mm}^3 + 54000 \text{ mm}^3\]

\[= 118000 \text{ mm}^3\]

\[= 28.78 \text{ mm}\]

OR

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Part} & \text{Area (A)} & \text{Y} & \text{AY} \\
\hline
1 & 3200 \text{ mm}^2 & 20 \text{ mm} & 3200 \times 20 = 64000 \text{ mm}^3 \\
2 & 900 \text{ mm}^2 & 60 \text{ mm} & 900 \times 60 = 54000 \text{ mm}^3 \\
\hline
\text{\textsum} & 4100 \text{ mm}^2 & & 118000 \text{ mm}^3 \\
\hline
\end{array}
\]

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

\[= 118000 \text{ mm}^3\]

\[= 28.78 \text{ mm}\]
5.2.1

MEMBER | NATURE | MAGNITUDE
---|---|---
FG | Tie | 23 N
BF | Strut | 50 N

Tolerance of 1 N to either side

**NOT TO SCALE DUE TO ELECTRONIC TRANSFER**
**USE A MASK TO MARK THIS QUESTION**
5.3 5.3.1 40 Nm ✓ (1)
5.3.2 7 m ✓ (1)
5.3.3 3 m ✓ (1)

5.3.4

![Bending Moment Diagram]

RL = 66 N  RR = 44 N

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="" alt="Roof 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.

[40] 200

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