MARKS: 200

This memorandum consists of 16 pages.
QUESTION 1: CONSTRUCTION, SAFETY AND MATERIAL

1.1.1 The worker should have ensured that:

- the grinder and grinding blade/disc were inspected for defects before use. √
- the angle grinder is used for the intended purpose only. √
- correct blade is correctly fitted for the purpose.
- he/she is trained to use the machine correctly.
- do not force the tool.

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER (2)

1.1.2
- Hard hat/safety helmet √
- Safety goggles/goggles √
- Overall
- Safety gloves/gloves

ANY TWO OF THE ABOVE (2)

1.1.3 The machine makes a loud noise √ that will damage your hearing. √
It is the rule or regulation on a building site to protect the hearing of workers.

ANY OF THE ABOVE (2)

1.1.4
- dust mask
- face shield
- ear protection/ear plugs/ear muffs
- safety shoes √

ANY ONE OF THE ABOVE (1)

1.2 1.2.1
- Water √
- Patent sealer
- Wet sand
- Hessian
- Canvas or protective covering
- Plastic sheeting
- Straw
- Waterproof paper

ANY ONE OF THE ABOVE (1)

1.2.2 7 to 28 days √ (1)
1.3

[Diagram showing roof covering, purlin 50 x 75, rafter 114 x 38, beam filling, wall plate 114 x 38, and any two labels.]

**ASSESSMENT CRITERIA** | **MARK** | **CANDIDATE’S MARK**
--- | --- | ---
Roof covering correctly drawn | 1 | 
Beam filling correctly drawn | 2 | 
Wall plate correctly drawn | 1 | 
Any TWO labels | 2 | 
**TOTAL** | **6** | 

Single line for roof covering is acceptable. Wall plate in good proportion acceptable.

1.4
- More battens are used √
- More roof trusses are used to carry weight of tiles √
- Clay/concrete tile more expensive than corrugated iron sheeting
- More labour intensive
- Needs roof underlay

ANY TWO OF THE ABOVE (2)

1.5
- Tiles /cladding √
- Paint

ANY ONE OF THE ABOVE (1)

1.6
- Tiles last longer/easy to clean/ water resistant √
- Paint does not last as long as tiles, easy to clean.
- Tiles/paint gives attractive/decorative appearance.
- Protect plaster.

ANY ONE OF THE ABOVE (1)
1.7 1.7.1 Channel-iron/U beam ✓

1.7.2 Exposed steel is prone to rust if not treated. ✓

1.7.3 • Paint the metal. ✓
• Can be galvanised.
• Powder coating/ epoxy coating.
• Can be covered with oil.

ANY ONE OF THE ABOVE

1.7.4 • Channel iron is used for bracing or as joists. ✓
• Frame of steel structures/struts/roof structures

OR ANY OTHER ACCEPTABLE ANSWER
1.8

1.8.1

• Three quarter bat/brick
• 165 mm x 110 mm. √

ANY ONE OF THE ABOVE

1.8.2

ASSESSMENT CRITERIA | MARK | CANDIDATE'S MARK
---------------------|------|------------------
Stretcher course     | 2    |                  
Header course        | 1    |                  
Correctness of T-junction | 1 |                  
TOTAL                | 4    | (4)

1.9

• Cement fibre ceiling boards √
• Match board ceiling boards
• Steel ceilings
• Gypsum boards
• Knotty pine ceilings
• PVC/plastic/polystyrene ceilings

ANY ONE OF THE ABOVE

1.10

• To allow excess water or damp to escape √
• keeping the inner wall dry
• Ventilation

ANY ONE OF THE ABOVE

[30]
QUESTION 2: ADVANCED CONSTRUCTION AND EQUIPMENT

2.1  2.1.1  D √  (1)
  2.1.2  L √  (1)
  2.1.3  J √  (1)
  2.1.4  H √  (1)
  2.1.5  K √  (1)
  2.1.6  A √  (1)
  2.1.7  M √  (1)
  2.1.8  I √  (1)
  2.1.9  G √  (1)
  2.1.10 B √  (1)

2.2  2.2.1  Chalk line √
  USE
  • To draw a straight line on a surface, by snapping the line. √
  • Lay out walls on foundation.
  • Some types can be used as a plumb bobs.
  • Draw long lines on floors.

2.2.2  Try square √
  USE
  • Marking lines perpendicular to surfaces of materials. √
  • Testing squareness, straightness.
  • Calibrated blade can be used for measuring.
  • As a straight edge to test whether small surfaces are flat and straight.

2.2.3  Mitre square √
  USE
  • The mitre can be used to check/end marks 45° angles. √
  • Test squareness of corners.
  • Test mitre angles/and mark them.
  • Marking lines perpendicular to surfaces are flat and straight.
  • Testing squareness, straightness of surfaces.
  • Calibrated blade can be used for measuring.
  • As a straight edge to test whether surfaces of materials.

ANY TWO OF THE ABOVE

ANY TWO OF THE ABOVE

(2)
2.2.4 Sliding bevel √
**USE**
- The blade is adjustable for setting out and testing of any angles. √
- Draw inclined or oblique lines as well as for the testing of angles.
- Draw angles other than 90°
- Copying angles from one surface to another.

**ANY TWO OF THE ABOVE**

2.3 2.3.1 • The tensile strength of the concrete is compromised. √
- Weakens the structure/ structure will break easily/ collapse. √
- Will not be able to resist heavy loads.

**ANY TWO OF THE ABOVE**

2.3.2 To strengthen the concrete where it is the weakest against tensile strength. √

2.3.3 Stirrups strengthen concrete against shear forces. √
Shear forces are the greatest next to the support, Stirrups resist shear stress.

2.4 2.4.1 Slump test √

2.4.2 This test is used to test the workability of concrete/ consistency of the concrete √

2.4.3 For every new/fresh batch of concrete that is mixed √

2.5 • Cavity walls are to prevent the penetration of water into the wall as they have better water proofing qualities. √
- Cavity walls help to protect the inner wall of a house against moisture. √
- Cavity walls provide insulation against extreme temperatures and noise.
- Avoid expensive external rendering.
- Enable the use of cheaper or alternative materials for the inner construction.

**ANY TWO OF THE ABOVE**

2.6 2.6.1 A – Compression force/pushing forces √
B – Tensile force/bending forces √
C – Lateral force √

2.7 2.7.1 Round/circular/cylindrical column formwork √

2.7.2 Hardboard/plywood/pvc/galvanised/metal sheets √

2.7.3 Bolt and nut/threaded rods with nuts/clamp √
2.7.4 Apply form oil/emulsion oil/releasing agents to formwork √

(1)

2.8
• A rib and block floor is very quick to install √
• quicker than in situ concrete floor

ANY ONE OF THE ABOVE

(1)

2.9

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARK</th>
<th>CANDIDATE’S MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribs</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Block</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Reinforcing on top of or in the rib</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hollow in block</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

(5)
[40]
QUESTION 3: CIVIL SERVICES

3.1

- P-trap
  - Labelling not required
- S-trap

3.2

40/50 mm

3.3

3.3.1 A Ventilation pipe/breather pipe/gas escape pipe
- B Inlet pipe/Inflow pipe/Influent
- C Settling chamber/Chamber 1
- D Discharge chamber/Chamber 2
- E Manhole cover/Manhole lid/Cover
- F Outlet pipe/Effluent

3.3.2 The raw sewerage will be broken down by anaerobic/bacterial action.

3.3.3
- G allows the liquids to flow from chamber C to chamber D.
- Will also balance the liquid levels.

ANY ONE OF THE ABOVE

3.3.4 The liquids in D will flow out through F to a French drain.

3.3.5 The level of the liquids will be the same.

3.3.6
- The water coming from the bath or sink contains soap (chemicals) that is poisonous to the bacteria and will hinder the anaerobic/bacterial process.
- It will fill up quicker if the french drain gets saturated.

ANY ONE OF THE ABOVE

3.4 Storm water systems are used to carry storm water to rivers or low-lying dams.

3.5 If you direct storm water into a sewerage system:
- the water will flood the reticulation plant.
- raw sewerage will overflow into rivers and pollute water sources.
- it is illegal to direct rain or storm water into a sewerage system.

ANY TWO OF THE ABOVE
3.6 Pressure control valves (pressure-reducing valves) are used to ensure that:
- a constant pressure is maintained in the water installation ▌
- prevent pipes from bursting
- the pressure rating is in accordance with the pressure rating of the geyser.

**ANY ONE OF THE ABOVE**  

3.7
- An elbow will be used to change the direction of a pipe ▌
- A T-coupler will be used to split the water supply into two different flow directions/ to combine two different flow directions into one (shower). ▌

**ANY TWO OF THE ABOVE**  

3.8 Thermostat ▌  

3.9 Gravity geyser/Low pressure geyser ▌  

3.10 Black ▌  
Absorbs the most heat ▌
3.11

A: Wall light ✓
B: Power point/Socket outlet/Switch Socket outlet/Plug ✓

ASSESSMENT CRITERIA

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARK</th>
<th>CANDIDATE'S MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming cable to meter box</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Incoming cable to DB</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Meter box</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Distribution board</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>4</strong></td>
<td></td>
</tr>
</tbody>
</table>

ANY OTHER WAY OF INDICATING CONDUIT PIPES

[30]
QUESTION 4: QUANTITIES, MATERIALS AND JOINING

4.1  4.1.1  Door stile $J$  (1)
     4.1.2  50 mm/50 $J$  (1)
     4.1.3  600 $J$  (1)
     4.1.4  3 $J$  (1)
     4.1.5  693 mm/693 $J$  (1)
     4.1.6  1 907 mm/1 907 OR 1 904 mm/1 904 $J$  (1)
     4.1.7  20 mm/20 $J$  (1)

4.2  4.2.1  B $J$  (1)
     4.2.2  A $J$  (1)
     4.2.3  D $J$  (1)
     4.2.4  D $J$  (1)
     4.2.5  A $J$  (1)
     4.2.6  D $J$  (1)
     4.2.7  C $J$  (1)
### 4.3.1

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Area to be plastered:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of ONE short wall:</td>
<td>= 4 000 mm - 2(220 mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>= 3 560 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of ONE long wall</td>
<td>= 8 000 mm - 2(220 mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>= 7 560 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total length of one short and one long wall</td>
<td>= 3 560 mm + 7 560 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>= 11 120 mm</td>
</tr>
<tr>
<td>2/</td>
<td>11,12</td>
<td>Area of internal walls before deductions:</td>
<td>2,7 √ 60,05 m²</td>
</tr>
<tr>
<td>1/</td>
<td>1,2</td>
<td>Area of window opening:</td>
<td>0,9 √ 1,08 m²</td>
</tr>
<tr>
<td>1/</td>
<td>2,1</td>
<td>Area of door opening:</td>
<td>0,9 √ 1,89 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total wall area to be plastered</td>
<td>√ 60,05 m² - 1,08 m² - 1,89 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>= 57,08 m² need to be plastered</td>
</tr>
</tbody>
</table>

### 4.3.2

<p>| | | | |</p>
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<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Volume of plaster:</td>
</tr>
<tr>
<td>1/</td>
<td></td>
<td>57,08 m²</td>
<td>0,012 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0,68 m³</td>
</tr>
</tbody>
</table>

If candidates did not use the dimension paper/sheet 2 marks should be deducted.
QUESTION 5: APPLIED MECHANICS

5.1

5.1.1  675 mm² √ (1)

5.1.2  4 800 mm² OR 4 400 mm² √ (1)

5.1.3  400 mm² √ (1)

5.1.4  5 075 mm² √ (1)

5.1.5  30 mm √ (1)

5.1.6  95 mm √ √ (2)

5.1.7  40 mm √ (1)

When the wrong unit were used the learner will be penalised with ONE mark.
5.2

DIAGRAM A: SPACE DIAGRAM

DIAGRAM B: VECTOR DIAGRAM/FORCE DIAGRAM

NOT ACCORDING TO SCALE

USE A MASK TO MARK THIS QUESTION

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>NATURE</th>
<th>MAGNITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC</td>
<td>Strut ✓</td>
<td>65 N ✓ (Size to be determined as per vector diagram) OR 0 OR no force</td>
</tr>
<tr>
<td>CD</td>
<td>Tie ✓</td>
<td>-----------</td>
</tr>
<tr>
<td>DA</td>
<td>Tie ✓</td>
<td>32 N ✓ (Size to be determined as per vector diagram)</td>
</tr>
<tr>
<td>BD</td>
<td>Strut ✓</td>
<td>-----------</td>
</tr>
</tbody>
</table>

Tolerance of 1 N to either side
5.3.1

\[ \text{BM}_d: = (28 \times 6) - (10 \times 4) - (20 \times 1) \]
\[ = 168 - 40 - 20 \]
\[ = 108 \text{ Nm} \]

OR

\[ \text{BM}_d: = (42 \times 4) - (20 \times 2) - (20 \times 1) \]
\[ = 168 - 40 - 20 \]
\[ = 108 \text{ Nm} \]

5.3.2

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARKS</th>
<th>CANDIDATE'S MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing correct</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Indicate all values of shear forces on drawing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Correct application of scale</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>7</td>
<td></td>
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</table>

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**ANSWER SHEET 6.1**

<table>
<thead>
<tr>
<th>NO.</th>
<th>QUESTIONS</th>
<th>ANSWERS</th>
<th>MARKS</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Name the scale used for the site plan.</td>
<td>1:200 √</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>State the colour that you will use to indicate the proposed dwelling on the site plan.</td>
<td>Red √</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Identify number 1?</td>
<td>Rodding eye √</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Identify the line at number 2?</td>
<td>Building line √</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Identify number 3</td>
<td>Sewer pipe/drainpipe √</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Determine the distance from the boundary line to the proposed dwelling on the right hand side of the building?</td>
<td>5 000 mm/5 m √</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Identify number 4</td>
<td>Manhole √</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Identify number 5</td>
<td>Municipal connection √</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Draw the roofline of a hipped roof for the building indicated in the next column</td>
<td><img src="image" alt="Diagram" /></td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Calculate the perimeter of the proposed dwelling.</td>
<td>64 000 mm/64 m √</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>What elevation will be closest to Long Street?</td>
<td>West elevation √</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
NOT TO SCALE: USE A MASK TO MARK THIS QUESTION
ONE MARK SHOULD BE DEDUCTED IF JUNCTIONS AT WALLS ARE CLOSED
ONE MARK SHOULD BE DEDUCTED IF INTERNAL DOORS HAVE A WALL BETWEEN THE OPENING

Application of scale

External Walls 4
Internal Walls 3
Windows 3
Doors 3
Wash basin 1
Water closet 1
Double bowl sink 1
Dimensions 4
Floor coverings 2
Application of scale
One or two incorrect = 3
Three or four incorrect = 2
More than five incorrect = 1
No measurement correct = 0

TOTAL 25