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

1.1  1.1.1  • The person is using a table and chairs to reach the required height.  ✓  
       • The person is not using the appropriate safety equipment.  (1)

   ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.1.2  The person can use a ladder or scaffolding to reach the required height.  ✓  (1)

1.2  1.2.1  • When using a grinder the sparks can burn your face.  ✓  
       • When using a grinder the sparks can damage your eyes.  
       • When painting the paint can splash in your eyes.  
       • When cutting or chiselling wood the wood splinters can get into your face.  (1)

   ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.2.2  • When working with cement you will inhale the dust and it can cause lung problems.  ✓  
       • When sawing/sanding wood you will inhale the dust.  (1)

   ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.2.3  • You can get an injury when heavy objects fall on your feet.  ✓  
       • You can get an injury when stepping onto nails, screws or any other sharp object.  
       • You won't have the insulation protection when coming in contact with electricity.  (1)

   ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.3  • Ensure that workers maintain a safe distance from material that is moving overhead ✓  
     • Seek help to move material that is too heavy to handle alone.  ✓  
     • Ensure that there are enough workmen to carry heavy loads.  ✓  
     • The material must be secured firmly.  
     • When material is being moved by a hoist a qualified person must operate the hoist.  (3)

   ANY THREE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER
1.4 Quarter round/Quadrant/  Skirting (2)

1.5 1.5.1 Channel-iron (1)

1.5.2 • The steel profile is grey √
• Prone to rust
• A good conductor of heat
• Malleable
• Doesn't bend easily
• Welds well
• Can easily be joined

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.6 • Stone is used to add bulk to the concrete. √
• Stone makes the mix more economical. √
• Using stone in concrete reduces the paste content and therefore makes the concrete more stable. √
• The quantity of stone also determines the strength of the concrete.
• Stone also reduces shrinkage and deformations.

ANY THREE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.7 • Beneath concrete floors. √
• Under window sills. √
• At roofs/under roof covering. √
• Under the wall of the super structure.

ANY THREE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.8 Damp proof course is used to prevent damp/moisture to enter a building. (1)

1.9 1.9.1 Stretcher bond (1)

1.9.2 END VIEW

A
1.9.3

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>MARK</th>
<th>CANDIDATE'S MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stretcher course of main wall</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Stretcher course of T-junction</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

(4)

1.10
- Clay/Slate tiles ✓
- Galvanised corrugated iron sheets ✓
- Galvanised IBR roof sheeting
- Thatch roof
- Cement fibre sheet

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

(2)

1.11
- Timber frames need regular maintenance. ✓
- Timber is expensive since imported hardwood is scarce. ✓
- Timber cannot be effectively burglar-proofed.
- Timber is prone to attacks by insects and fungi.
- Timber is not fire resistant.

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

[30]
QUESTION 2: ADVANCED CONSTRUCTION AND EQUIPMENT

2.1 2.1.1 Portable electric planer √ (1)

2.1.2 This machine is mainly used to plane:
- edges. √
- ends. √
- bevels.
- rebates.
- chamfers.

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

2.1.3 • It can remove more than 2 mm of wood at once. √
• It planes more accurately.
• It planes much faster than a hand plane. (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.1.4 By using a generator on site this machine can still be used. √ (1)

2.2 2.2.1 • Measuring of heights √
• Measuring of distances √
• Measuring of angles (2)

2.2.2 • The telescopic level/dumpy level √
• The tripod √
• Telescopic staff √ (3)

2.3

ANY ONE OF THE ABOVE (1)

2.4 When you build cavity walls. √ (1)

2.5 2.5.1 Pre-stressed concrete ribs/Concrete ribs/Ribs. √ (1)

2.5.2 • Ribbed bar √
• Twisted rib bar
• Square twisted bar
• Round bar (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER
2.5.3 • It acts as additional reinforcement. ✓
• The steel mesh can be tied to the triangular reinforcing of the rib with binding wire.
• Ensure effective binding between concrete and rib. (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.5.4 At rib and block floors. ✓ (1)

2.5.5 • Spraying with water
• A patent sealer can be used
• Concrete can be covered with wet sand
• Concrete can be covered with hessian
• Concrete can be covered with canvas
• Concrete can be covered with other protective covering (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.5.6 • Flathead prop ✓
• Drop head prop
• Multi prop
• Prop (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.6 • Shutter boards should be cleaned after use. ✓
• All rests/residue of concrete should be removed. ✓
• All holes should be plugged.
• Release agents or emulsion oil should be applied to the shutter boards. (2)

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.7 • Shuttering (formwork) should be strong enough to carry the load of the wet concrete. ✓
• It should be able to bear the mass of people and equipment working on it. ✓
• Formwork material should be made of a material, which can easily be repaired in situ. ✓
• It should be constructed in such a manner that it can be easily removed and erected.
• It must be assembled accurately.
• It must be sealed off to prevent unnecessary loss of concrete, which may lead to honeycombing.
• It must be clean from dirt such as sawdust and excessive release agent. (3)

ANY THREE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER
2.8 2.8.1 A – Shear bar ✓
B – Stirrup/binders ✓
C – Anchor bar ✓
D – Main bar ✓ (4)

2.8.2 Spacers cover depth blocks/cover depth stand, are used to keep the bars away from shuttering boards (formwork). ✓ (1)

2.9
• Soleplates are used to create a level surface onto which the scaffold can be erected. ✓
• It is used to prevent the scaffolding from sinking into the ground.
• It spreads the load of the scaffold, materials and workmen evenly onto the ground. ✓ (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.10 2.10.1 The weep-hole must be inserted above the horizontal damp-proof course of the external part of the wall. ✓ (1)

2.10.2 Allow water penetrating the outside wall to drain out of the building. ✓ (1)

2.10.3 • The cavity ensures that no water will penetrate the inner wall. ✓
• The cavity provides insulation against heat. ✓
• The cavity provides insulation against cold.
• The cavity provides insulation against sound. (2)

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

2.10.4 Weak concrete mixture ✓ (1)

2.10.5 110 + 50 + 110 = 270 ✓ (2)

2.11 Waterproof gypsum board/fibre cement board/marine plywood ✓ (1)

2.12 Normal/Strip foundations are used. ✓ (1)

2.13 Centre ✓ (1)

2.14 Intrados ✓ (1)
QUESTION 3: CIVIL SERVICES

3.1  
3.1.1 B √ (1)  
3.1.2 E √ (1)  
3.1.3 D √ (1)  
3.1.4 C √ (1)  
3.1.5 A √ (1)  

3.2  
• PVC pipe √  
• Copper pipe √  
• Galvanized pipe √ (3)  

3.3  
3.3.1 It is to provide water to the tap. √ (1)  
3.3.2 Cap B is removable to provide access to the inside of the pipe. √ (1)  
3.3.3 Waste water pipe/PVC pipe/Galvanized pipe √ (1)  
3.3.4 40 mm/50 mm √ (1)  
3.3.5 It is used to anchor the pipe to the wall. √ (1)  
3.3.6 It is used to guide the wastewater directly into the gully. √ (1)  
3.3.7 100 mm interior/110 mm exterior √ (1)  
3.3.8  
• The purpose is to form a water seal/water trap/water lock. √  
• To prevent bad odours and gasses from the sewer entering back into the building. (1)  

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

3.3.9 P – trap √ (1)  

3.4  
3.4.1 Wash tub √ (1)  
3.4.2 Sewer line/drain pipes √ (1)  
3.4.3 Safety valve √ (1)  
3.4.4 Storm water drain pipes √ (1)  

3.5  
• It contains chemicals that are poisonous to the bacteria in the tank. √  
• The tank will fill up quickly and block the system. √ (2)  

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3.6

A – Stopcock ✓

B – Pressure control valve ✓

C – Vacuum breaker ✓

D – Drain cock/Cold water inlet ✓

E – Drip tray ✓

F – Safety valve/Hot water outlet ✓

G – Hot water cylinder/Geyser ✓
QUESTION 4: QUANTITIES, MATERIALS AND JOINING

4.1  4.1.1  1 130 mm ✓  (1)
     4.1.2  150 mm ✓  (1)
     4.1.3  114 mm ✓  (1)
     4.1.4  Window stile ✓  (1)
     4.1.5  44 mm ✓  (1)
     4.1.6  54 mm ✓  (1)
     4.1.7  4 ✓  (1)

4.2  4.2.1  B ✓  (1)
     4.2.2  A ✓  (1)
     4.2.3  D ✓  (1)
     4.2.4  C ✓  (1)
     4.2.5  D ✓  (1)

4.3  • Galvanising hoop iron is used to tie down or attach roof trusses to the brickwork. ✓
     • To fix wall plates to walls.
     • For cross bracing of roof trusses.
     • To secure timber frames to brick work.
     • To join existing brickwork to new brickwork  (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

4.4  Steel nails ✓  (1)

4.5  • Rawl bolts ✓
     • Chemical fasteners in conjunction with threaded rods and nuts
     • Sleeve anchors can be used.  (1)

ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER
### 4.6

#### 4.6.1

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal measurement of:</td>
<td>Long walls = 10 040 / 2/220</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 9 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short walls = 5 240 / 2/220</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 4 800</td>
<td></td>
<td></td>
</tr>
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</table>

#### 4.6.2

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<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/</td>
<td>9, 6</td>
<td>46, 08 m²</td>
<td>Inside length = 9 600 mm</td>
</tr>
<tr>
<td>x 4, 8</td>
<td>46, 08 m²</td>
<td>Inside width = 4 800 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area is 46,08 m²</td>
<td></td>
</tr>
</tbody>
</table>

#### 4.6.3

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/</td>
<td>0,6</td>
<td>0, 36 m²</td>
<td>Size of one tile = 600 mm x 600 mm</td>
</tr>
<tr>
<td>x 0,6</td>
<td>0, 36 m²</td>
<td>Area is 0, 36 m²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total no. of tiles = ( \frac{\text{Internal area of room}}{\text{Area of one tile}} )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>= ( \frac{46,08}{0,36} )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 128 tiles are needed</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION 5: APPLIED MECHANICS

5.1  
5.1.1  $90 \text{ mm} \times 30 \text{ mm} = 2700 \text{ mm}^2$  

5.1.2  $60 \text{ mm} \times 60 \text{ mm} = 3600 \text{ mm}^2 \text{ OR } 3150 \text{ mm}^2$  

5.1.3  $15 \text{ mm} \times 30 \text{ mm} = 450 \text{ mm}^2$  

5.1.4  $2700 \text{ mm} + 3600 \text{ mm} - 450 \text{ mm} = 5850 \text{ mm}^2$  

5.1.5  $55 \text{ mm}$  

5.1.6  $45 \text{ mm}$  

5.1.7  $40 \text{ mm}$  

5.1.8  $45 \text{ mm}$
5.2

SPACE DIAGRAM

5.2.1

VECTOR DIAGRAM

5.2.2

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>NATURE</th>
<th>MAGNITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Strut</td>
<td>95.2 N</td>
</tr>
<tr>
<td>DE</td>
<td>Tie</td>
<td>47.6 N</td>
</tr>
</tbody>
</table>

NOT ACCORDING TO SCALE

USE A MASK TO MARK THIS QUESTION
Tolerance of 1 N to either side
5.3.1

[Space Diagram]

LR = 13 N

RR = 14 N

5.3.2

[Shear Force Diagram]

NB: 14 – 3 = +11

[5]

[30]
# 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>Identify the type of eave construction used in the drawing.</td>
<td>Open/exposed eave</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>State the minimum pitch (slope) of number 1.</td>
<td>10°</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>State the standard dimension of number 2.</td>
<td>114 mm x 38 mm</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Draw the drawing symbol for number 3.</td>
<td>![symbol]</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Name the colour coding for number 3.</td>
<td>Red</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Explain the purpose of number 4.</td>
<td>It is used to spread the load of the roof evenly onto the supporting walls of the building.</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>State the standard dimension of number 5.</td>
<td>50 mm x 76 mm</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>State the centre-to-centre spacing for number 5.</td>
<td>900 mm to 1 200 mm</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>As a draughtsman, recommend a suitable roof truss for a building with a span of 4 metres.</td>
<td>King post roof truss, SA (Howe) roof truss, W-roof truss, Couple roof</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>State the width of the wall indicated by number 6.</td>
<td>110 mm</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Draw the top view of the layout of a gable roof for the proposed building indicated in the answer column.</td>
<td>![diagram]</td>
<td>5</td>
</tr>
</tbody>
</table>

**TOTAL** 15
QUESTION 6: GRAPHICS AND COMMUNICATION

ANSWER SHEET 6.2

NOT TO SCALE: USE A MASK TO MARK THIS QUESTION

West elevation

Scale 1: 50

Application of scale

[40]

TOTAL: 200