CIVIL TECHNOLOGY

MARKING GUIDELINES

Time: 3 hours

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.
QUESTION 1

1.1 1.1.1 Deeper than 1,5 m braced and shuttered
Bracing must be cross braced
Bracing strong enough to keep soil
Access and escape by ladder
Daily inspect
(Civil Technology Grade 12, page 38) (any three) (3)

1.1.2 Protruding ends covered
No paint or rust
Trained person must erect scaffold
Daily inspection
No moving of scaffold with people on
(Civil Technology Grade 12, page 183) (any three) (3)

1.1.3 Stacks bonded and interlocked
No stack more than three times higher than width of base
Strong flooring needed
Choose site with care and avoid projection
Should not obstruct fire fighting equipment, light or ventilation
No climbing or walking around on stacks
(Civil Technology Grade 12, page 39) (any three) (3)

1.2 1. I beam
2. Channel iron
3. H – beam (3)

1.3 1.3.1 Bolster – used for cutting bricks (1)
1.3.2 Scaffold – apparatus to achieve access to higher parts of building (1)
1.3.3 Profile board – Board used in setting out of building to mark trench widths and wall widths (1)
1.3.4 Brick force – shaped wire net to strengthen walls (1)
1.3.5 Cladding Material on wall for decoration, e.g. wood, metal (1)
1.3.6 Datum – All heights on site determined from this peg/block (1)

1.4 Strong not deflect Grout tight
Easy assemble and dismantle Accurate (any other correct answer) (4)
(WorkwCiv, page 48)

1.5 Rolled glass – glass in windows
Safety glass – shower doors, sliding doors
Pattern glass – windows (any two) (4)

1.6 Wear safety/surgical gloves
Pressure on wound
Elevate limb
Create pressure point if bleeding does not stop
Treat for shock
Phone for ambulance (surgical gloves and any other three) (4)

[30]
QUESTION 2

2.1 1. Tread
2. Rise
3. Newel post
4. Ballustrade
5. Landing
6. Handrail

2.2 2.2.1 Raking Shore

Flying shore

Part Elevation Through Two Buildings
With A Single Flying Timber Shore
2.2.3

2.2.4 stretcher

2.3 8 – number of bars in group
Y – high yield steel, type of metal
20 – diameter metal
01 – bar number on schedule
250 – spacing between centres

2.4

SECTION S-S
SCALE 1:5
2.5 Bolt diameter  Pitch  
Seam edge  Size of member  
Angle of member  \textbf{(any four)}  

2.6  

\begin{figure}[h]  
\centering  
\includegraphics[width=0.5\textwidth]{image}  
\caption{Diagram showing horizontal hair and stadia lines.}  
\end{figure}  

QUESTION 3  

3.1 \begin{tabular}{|c|c|c|}  
\hline  
\textbf{Correct} & 2 & 2  \\
\hline  
\textbf{Colour} & 1 & 1  \\
\hline  
\textbf{Line type} & 1 & 1  \\
\hline  
\textbf{Abbreviations} & 2 & 2  \\
\hline  
\textbf{Pipe details} & 2 & 2  \\
\hline  
\end{tabular}  

\begin{figure}[h]  
\centering  
\includegraphics[width=0.5\textwidth]{image}  
\caption{Diagram showing main connection and pipe details.}  
\end{figure}  

(8)
3.2  Hand wash basin = HWB (1)
    Toilet = WC (1)
    Sink – S – Bt (1)
    Shower – Sh (1)

3.3  • Drain min. depth 600 mm
    • Should be water tight
    • Inside clean and no loose objects
    • Constant gradient
    • Junctions not exceed 90 degrees
    (Work with Civil Technology, page 98) (5)

3.4  Watertight – pressure and water test
     Laid straight – mirror test
     No obstructions – ball test (3)

3.5  Water power
     Nuclear power
     Wind power (any two) (2)

3.6  3.6.1
     Economical in long run
     Energy efficient
     More hot water (any two) (2) [30]

3.6.2
     CYLINDER
     SOLAR
     GEYSER
     IN
     OUT
     (any two)
QUESTION 4

4.1 1. Cornice
2. Picture rail
3. Architrave
4. Dado rail
5. Skirting

4.2 \[8 + 11 + 2.4 + 2.4 + 4.5 = 28.3 \text{ m}\]
\[28.3 \times R45 = R \ 1273.50\]

4.3 \[0.675/0.033 = 20.4\] wheelbarrows total
\[4 + 3 +3 = 10\]
\[20.4 \div 10 = 2.04/\text{ratio}\]
Stone \[4 \times 2.04 = 8.16\] or 9 wheelbarrows stone needed.

4.4 4.4.1 Truncated cone
Tamping rod
Steel ruler

4.4.2 Collapse slump
Shear Slump

Types of slump
<table>
<thead>
<tr>
<th>Item</th>
<th>Measurement</th>
<th>Result</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre line</td>
<td>$10 \times 2 = 20 \text{ m}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$6 \times 2 = 12 \text{ m}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$= 32 \text{ m}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less $4 \times 0.220 = 0.880 \text{ m}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$31.12 \text{ m}$</td>
<td><strong>Total = 31.12 m</strong></td>
<td></td>
</tr>
<tr>
<td>Total bricks Superstructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$2/ \ 31.12 \times 2.8$</td>
<td>$= 87.14 \text{ m}^2$</td>
<td>$= 87.136 \text{ m}^2$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$87.14 \times 52 \times 2$</td>
<td>$= 9062.56$</td>
<td>$= 9063 \text{ total bricks}$</td>
</tr>
<tr>
<td>Total openings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$6/ \ 1 \times 1.5$</td>
<td>$= 1.5 \times 6$</td>
<td>$= 9 \text{ m}^2$</td>
<td>$9 \text{ m}^2$</td>
</tr>
<tr>
<td>Doors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1/ \ 2 \times 0.900$</td>
<td>$= 1.8 \text{ m}$</td>
<td></td>
<td>$1.8 \text{ m}^2$</td>
</tr>
<tr>
<td>Total area = $10.8 \text{ m}^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total bricks openings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$2/ \ 10.8 \times 52 \times 2$</td>
<td>$= 1123.2$</td>
<td>$= 1124 \text{ total bricks openings}$</td>
<td></td>
</tr>
<tr>
<td>Total bricks Superstructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$9063 \ - 1124$</td>
<td>$= 9063 \text{ less 1124}$</td>
<td>$= 7939$</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION 5

5.1  5.1.1 Weight = Gravitational force of earth on an object = kg x 9.8 ms\(^{-1}\) or 10 ms\(^{-1}\) \(\text{(1)}\)

5.1.2 Dynamic load = Load that moves on an object, moving load. \(\text{(1)}\)

5.1.3 Resultant = One force that has same effect as two or more forces. \(\text{(1)}\)

5.2  5.2.1 \(P \times 10 = 35 \times 2 + 30 \times 5 + 50 \times 8\)
\[
= 70 + 150 + 400 = 620/10 = 62 \text{ kN (Test)}
\]

\(Q \times 10 = 50 \times 2 + 30 \times 5 + 35 \times 8\)
\[
= 100 + 150 + 280 = 530/10 = 53 \text{ kN}\]

\(BmB = 62 \times 2 = 124 \text{ kN}\)

\(BmC = 62 \times 5 - \left[15 \times 1.5 + 50 \times 3\right]\)
\[
= 310 - \left[22.5 + 150\right] = 310 - 172.5 = 137.5 \text{ kN}\]

\(BmD = 53 \times 2 = 106 \text{ kN}\) \(\text{(3)}\)

5.2.2 \(SfB- = 62 - 50 = 12 \text{ kN}\)

\(SfC- = 12 - 15 = -3 \text{ kN}\)

\(SfD- = -18 - 35 = -53 \text{ kN}\) \(\text{(3)}\)

5.3  5.3.1 Force diagram

\[
\begin{align*}
\text{MEMBER} & \quad \text{MAGNITUDE} & \quad \text{NATURE} \\
BF & \quad 14 \text{ N} & \quad \text{Strut} \\
DE & \quad 17 \text{ N} & \quad \text{Tie} \\
FG & \quad 10.4 \text{ N} & \quad \text{Strut} \\
\end{align*}
\]

5.4 Stress = Load/Area
\[
\begin{align*}
\text{Area} &= \text{lx}b \\
\text{Area} &= 50000/0.0001 = 0.01 \times 0.01 \\
\text{or} 1 \times 10^{-4} \text{m}^2 \\
\end{align*}
\]

\(= 500 \text{ 000 000 N/m or Pa}\) \(= 0.0001 \text{ m}^2\) \(\text{(4)}\)

\[30\]
QUESTION 6.1.1

SECTIONAL A-A

SCALE 1: 50
QUESTION 6.1.2

WEST ELEVATION

SCALE 1: 50

(25)

[40]

Total: 200 marks