higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEEL WORK DETAILING

(First paper)

NQF LEVEL 4

12 November 2024

This marking guideline consists of 4 pages.

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QUESTION 1

1.1 1.1.1

MOMENTS ABOUT RR

$$\sum ACM = \sum CM$$

$RL\ x\ 8 = 10\ x\ 6 + 4\ x\ 2$✓
$8RL = 68Kn$✓
$\frac{68}{8}$
$= 8.5N$✓

MOMENTS ABOUT RL

$$\sum ACM = \sum CM$$

$RR\ x\ 8 = 10\ x\ 2 + 4\ x\ 6$ ✓
$8RR = 44\ kN$ ✓
$\frac{44}{8}$
$= 5{,}5kN$✓ (6)

1.1.2 $\uparrow Forces = \downarrow Forces$✓
$RR + RL = 10\ + 4$ ✓
$8.5\ + 5.5\ = 14$✓
$14\ kN = 14\ kN$✓ (4)

1.2
1.2.1 E
1.2.2 D
1.2.3 G
1.2.4 F
1.2.5 H
1.2.6 I
1.2.7 J
1.2.8 B
1.2.9 C
1.2.10 A

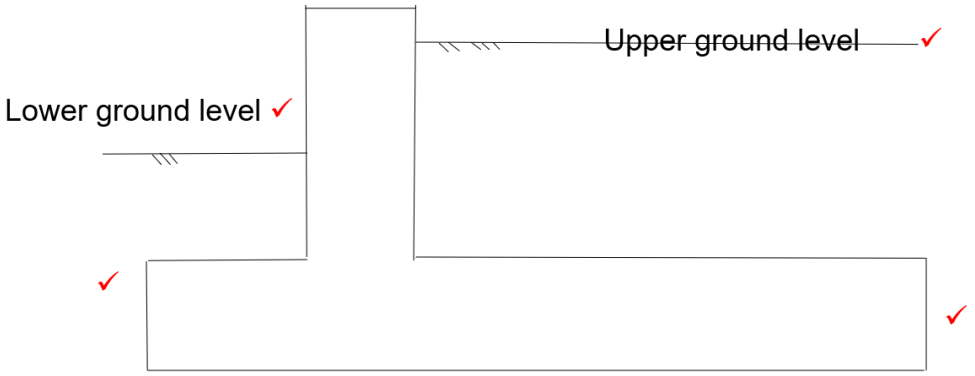
(10 × 1) (10)
[20]

QUESTION 2

2.1
2.2.1 $1960 \times 10^3 mm^3$
2.2.2 $896 \times 10^3 mm^3$
2.2.3 $274 \times 10^3 mm^3$
2.2.4 $2360 \times 10^3 mm^3$
2.2.5 $2300 \times 10^3 mm^3$

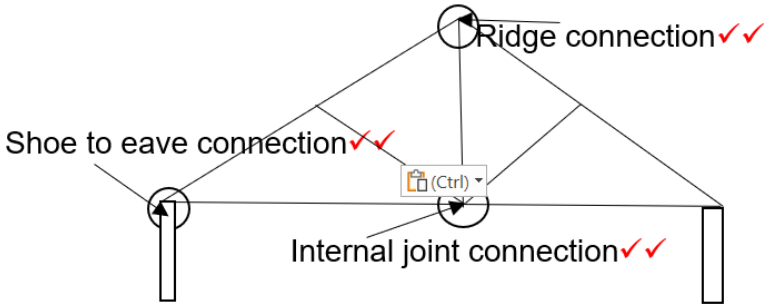
(5 × 2) (10)

2.2 A cantilever retaining wall



(4)

2.3



(6)

2.4 Gusset plates are flat steel plates with very specific shapes✓ that can be used to weld or bolt steel together.✓

Angle cleats are steel components✓ that are shaped like a corner and can be used to bolt or weld steel sections together. ✓ (4)

2.5 $0.405\sigma_c bx$ ✓ $= 0.87\sigma_y A_{st}$✓
$0.405(35)\ (400)(187.84)$ ✓ $= 0.87(350)A_{st}$✓
$1065052{,}8$✓ $= 304.5A_{st}$✓
$3497{,}71\ mm^2$✓✓ (6)

[30]

QUESTION 3

3.1

- **Load-Bearing Structures**✓
  Description: These structures support various types of loads, such as dead loads, live loads, and environmental forces like wind and seismic activity. ✓
  Examples: Beams, columns, trusses, and frames used in buildings and bridges.

- **Framed Structures**✓
  Description: Composed of a framework of beams and columns, these structures provide flexibility and allow for large open spaces. ✓
  Examples: Office buildings, shopping malls, and industrial warehouses.

- **Shell Structures**✓
  Description: Characterized by their thin, curved surfaces, shell structures efficiently distribute loads across their surface. ✓
  Examples: Domes, tanks, and certain types of roofs and storage containers. (Or any other classification based on construction method) (6)

3.2 Self-weight is mass✓ multiplied by gravitational acceleration✓. (2)

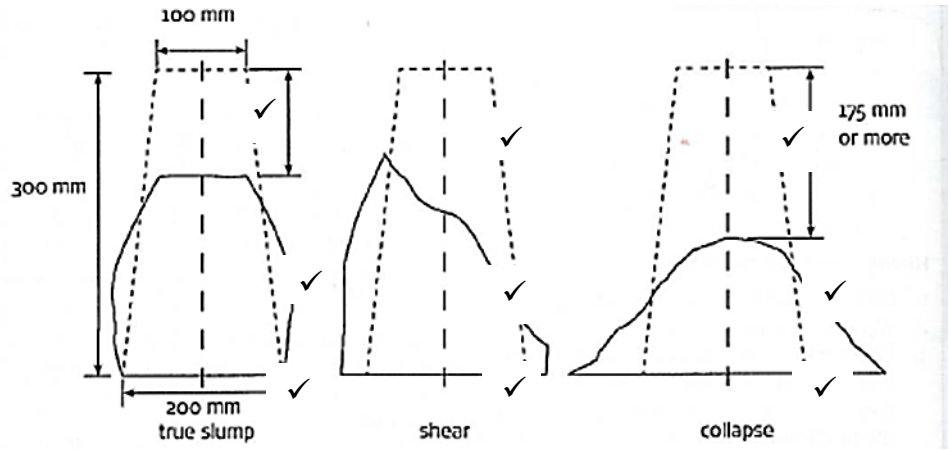
3.3 The level differential refers to the height difference between the top of the larger mass✓ of a soil wall and the top of the lower mass of soil.✓ (2)

3.4

- footings
- slabs
- beams
- columns (4)

3.5 A pile cap is used to keep the piles sturdy;✓ the maximum number of piles to be supported by a single cap is 16 piles.✓ (2)

3.6



(9)

[25]

TOTAL: 75

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