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 3

12 November 2024

This marking guideline consists of 5 pages.

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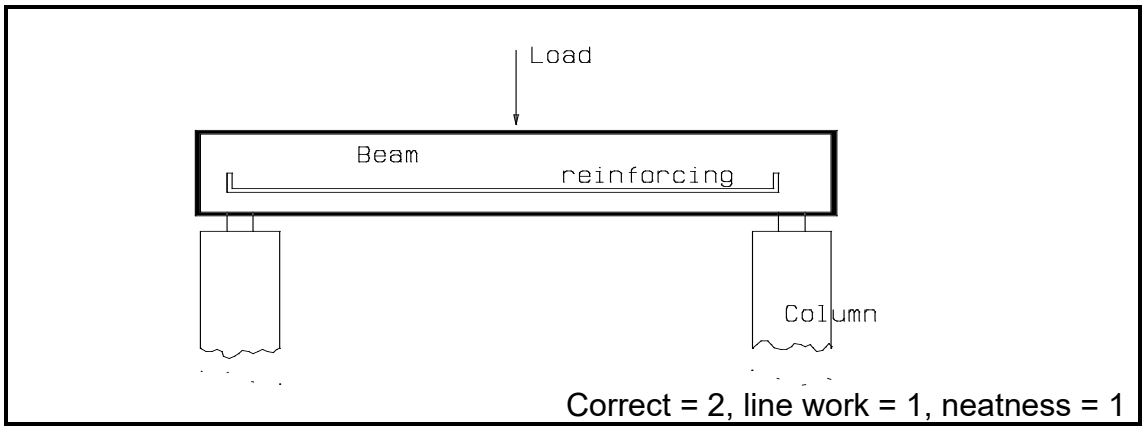
QUESTION 1

1.1
- Tensile force
- Compression force
- Shear force (3)

1.2 16 = number of bars
R12 = mild steel
05 = bar mark
150T = spacing top (Any 3 × 1) (3)

1.3
1.3.1 True
1.3.2 True
1.3.3 True
1.3.4 False
1.3.5 False
(5 × 1) (5)

1.4



Correct = 2, line work = 1, neatness = 1 (4)

[15]

QUESTION 2

2.1
- It provides a better estimation of reinforcement steel requirements.
- It provides better stock management for reinforcement.
- A bar bending schedule is very useful during the auditing of reinforcement.
- It can be used for reinforcement cutting, bending, and making skeletons.
- It provides quality control at the site where reinforcement is provided.
- It saves steel reinforcement material.
- Cutting and bending can be done at the factory and transported to the site.
- It provides benchmarks for quantity and quality requirements for reinforcement. (Any 3 × 2) (6)

2.2
- There is no difference in the thermal expansion of steel and concrete.
- Relatively thin steel bars can be used to reinforce concrete.
- Rebars can be joined easily.
- Relatively simple skills are required.
- Good availability of steel products.
- Steel can withstand compression.
- Steel has good ductility.
- Steel is very strong compared to other reinforcing materials. (Any 2 × 1) (2)

2.3 BENDING SCHEDULE

1 Member	2 Bar mark	3 Type and size	4 Number of Members	5 Number in each	6 Total number	7 Length of each bar	8 Shape
PAD							
B1	1	Y12	4	10	40		35
B2	4	Y16	4	10	40		35
COLUMN							
Main vertical bars	2	Y10	4	2 X 2	16		37/51
Stirrup	3	R8	4	5	20		60

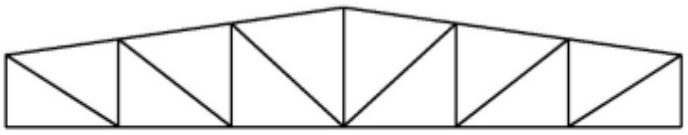
(½ each = 12 mark) (12)
[20]

QUESTION 3

3.1
3.1.1 D
3.1.2 F
3.1.3 E
3.1.4 A
3.1.5 C

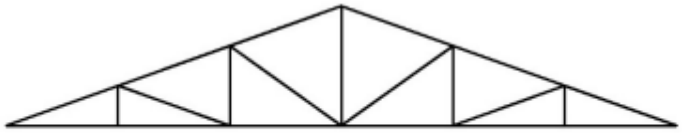
(5 × 1) (5)

3.2



PRATT TRUSS (2)

Correct = 2, line work = 1, neatness = 1



MONOPITCHED TRUSS (2)

Correct = 2, line work = 1, neatness = 1 (4)

3.3
- It has the disadvantage of being a corrosive material.
- It has lower fire resistance than precast concrete. (2 × 2) (4)

3.4
- Black bolts✓ − Grade 4,6✓
- Black bolts✓ − Grade 8,8✓
- High strength/friction bolts✓ – Grade 8,8S/10,9S✓ (3 × 2) (6)

3.5 3.5.1 A – Column
B − Gusset
C − Drilled hole
D − Base plate (4)

3.5.2 Column plate (1)

3.5.3 High-strength friction bolts (1)

3.6 3.6.1 A − Eaves/Shoe
B − Node joint
C − Apex
D − Node joint (4)

3.6.2 Portal frame (1)

[30]

QUESTION 4

4.1
- Aluminium
- Carbon steel
- Copper
- Low-alloy steels
- Magnesium
- Nickel
- Titanium (Any 5 × 1) (5)

4.2
- A welding hood
- Leather gloves
- A leather apron
- Leather shoes/spats
- Overall
- Goggles (Any 5 × 1) (5)

[10]

TOTAL: 75

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