higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

CARPENTRY AND ROOF WORK
NQF LEVEL 3

16 November 2022

This marking guideline consists of 5 pages.

Copyright reserved

QUESTION 1

1.1
- It is designed by a competent person.
- It involves a process of reasoning and calculation.
- It is based on standard and other documents, e.g. ICT and SANS. (3)

1.2 1.2.1 The roof construction is a rational design ✓
- Girders must be designed and approved by an Engineer. ✓
- The Hipped roof structure is more complicated than a simple gabled roof structure. ✓ (3)

1.2.2 A – Common rafter or Common truss
B – Ridge board
C – Jack or Jack truss
D – Jack truss
E – Jack truss
F – Fascia board
G – Hip rafter
H – Girder truss or full girder (8)

1.2.3 A girder truss is designed to carry a higher load than the common trusses in the same construction. Where other trusses or half trusses connect with the girder truss, the load of these trusses will be carried by the girder truss. In FIGURE 1 it can be illustrated where the hipped rafter (G) and Jack rafters (E, D, and C) connect with the girder truss (H).

(Any relevant 4 × 1) (4)

1.2.4
- H × 2
- G × 4

(Correct letter 2 × 1)
(Correct number of girders 2 × 1) (4)

1.2.5 (2 × 9600) + (2 × 6000) + (4 × 110) ✓✓
= 19200 + 12000 + 440 ✓
= 31640 mm or
= 31.64 m ✓ (4)

1.3
- The wind condition of the area
- The quality of the craftsmanship
- The load that the roof must support
- The materials used to erect the roof
- The size of the roof
- The shape of the roof

(Any 4 × 1) (4)
[30]

Copyright reserved

QUESTION 2

2.1 2.1.1 False ✓
The L-shape roof structure must be a rational design✓ according to the SANS 10400 because a qualified roof work designer must design the girder trusses for such a structure.✓ (3)

2.1.2 True (1)

2.1.3 False✓
The slope angle of a valley is always lower✓ than the intersecting roofs because the angle will decrease✓ as the bottom line gets longer. (3)

2.1.4 False✓
Wall plates must be fixed on only the one side of the wall✓ and not on the opposite side of the wall that supports the pitch.✓ (3)

2.1.5 True (1)

2.1.6 True (1)

2.1.7 False ✓
The tilting batten is bigger than the rest of the battens✓ because it must compensate for the first row of tiles not having a preceding row underneath it.✓ (3)

2.2 The underlay must be fixed to the rafters before fixing the battens. If the bricklayers must still do the beamfilling between the rafters, then you must first let them finish with the beamfilling before you start with the installation. The underlay consists of plastic sheeting that must be fixed with a clout nail driven through a small piece of cardboard. Fix only one length at a time from the one gable or hip to the other and then immediately fix the battens over the underlay except the underlay will go over the tilting batten. It is recommended that the underlay must not be fixed on a windy day. (Any relevant 7 × 1) (7)

2.3
- Use truss hangers
- Cut pockets into the wall (2)

2.4
- Lift the small end onto the wall plate first without bending the truss. ✓✓
- Pick the pitch end up onto the scaffolding and flip it upright. Slide it now into its pockets. ✓✓
- Lift the rest of the trusses with the last few trusses in an almost upright position. ✓
- Temporarily brace the trusses in the upright position before the lining up process commence. ✓ (6)

[30]

QUESTION 3

3.1

NO	ITEM	CONFORMS WITH DESIGN			COMMENTS
	Structural Item	N/A	YES	NO	
	Trusses				
1	Spacing				
2	Plumbness				
3	Plies as per drawing				
4	Nailing of multiple plies				
5	Internal supports				
6	Holding down detail				
7	Plate positioning				
8	Timber grades				
9	Timber treatment (coast)				
	Girders				
1	Connections				
2	Nailing of connections				
3	Nailing and bolting of multiple plies				
4	T-bracing				
5	Connection of batten /purlin to each ply				
6	Tortional restraint				
7	Truss to girder strapping				

Checklist		3
Checks:		
Trusses	8 × ½	4
Girders	4 × ½	2
Total		9

(9)

3.2
- Ensure that it conforms to the design.
- Ensure that it is safe for occupancy.
- Ensure that approved materials have been used during construction.

(Any relevant 3 × 1) (3)

3.3
- SANS 10400
- SANS 10243
- NHBRC
- ICT (Institute for Timber Construction)

(Any relevant 3 × 1) (3)

[15]

Copyright reserved

QUESTION 4

4.1
- The roof frame is built according to a specified type of roofing material.
- Any other type of roofing material might not be suitable for that frame. (2)

4.2 4.2.1 38 x 38 mm battens can be used✓ The trusses are spaced less than 760 mm apart✓ and the pitch of the roof is more than 28°.✓ The concrete tiles are less than .55 kN/m^2.✓ (4)

4.2.2 350 mm (1)

4.2.3 4000 mm ÷ 12 spaces ✓✓
= 333. mm ✓✓ (4)

4.2.4 11 purlins will be needed✓✓ (2)

4.2.5 9.66 m × 4 m ✓
= 38.64 m^2 × 2✓
= 77.28 m^2 × 10✓
= 772.8 tiles or 773 tiles ✓ (4)

4.3
- Eaves
- Verges
- Ridges (Any 2 × 1) (2)

4.4 It is covering the roof structure with any kind of roofing material to protect the timber structure and the inhabitants. (2)

4.5
- It prevents dust accumulation.
- It reduces suction of the tiles, caused by strong winds.
- It prevents a water leakage in the event of a broken tile. (Any 2 × 1) (2)

4.6
- Should be fireproof
- Should have a long-life span
- Should be low maintenance and cost-effective (Any 2 × 1) (2)

[25]

TOTAL: 100