



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

NOVEMBER EXAMINATION 2011

**CARPENTRY AND ROOF WORK
NQF LEVEL 3**

21 NOVEMBER 2011

This marking guideline consists of 5 pages.

QUESTION 1: HIPPED ROOFS

- 1.1 The shape of the roof ✓
 The size of the roof ✓
 The material used ✓
 The load that a roof has to support ✓
 Wind ✓
 The amount of bracing used ✓
 Communication between the bricklayer and the roof erector ✓
 ANY FOUR (4)
- 1.2 Rational design ✓ and Deemed to satisfy design. ✓
 Deemed to satisfy design is the one that is considered to satisfy rules based on experience rather than theory. ✓
 Rational design is done in the factory by the engineers through the use of calculations. ✓ (4)
- 1.3 These are trusses that are manufactured before hand or in the workshop ✓ then they will be transported to different sites. ✓
 They meet the standards according to the South African Standard Association ✓
 There is life time guarantee ✓ (4)
- 1.4 A truss that supports other trusses in a hip and valley section ✓
 A truss that is made up of more than one ply on the load it has to carry ✓ (2)
- 1.5 The additional members such as girders ✓, jack trusses ✓ and hip rafters ✓ provide extra stability. **By spreading the load evenly down to the foundation of the dwelling.** ANY TWO (2)
- 1.6 It involves a manufacturing process which is based on scientific calculations ✓
 It has to be designed through the use of computer programme to plan the design and print the drawings and specifications. ✓
 They are inspected by a professional engineer ✓/or a competent engineer.
 They are more complicated than a simple roof and they carry more load than its own weight ✓ ANY TWO (2)
- 1.7 Stability and rigidity ✓
 make the whole structure very firm ✓ and strong (2)
- 1.8 1.8.1 The top of the truss where two **top** chords or rafters meet ✓✓ (2)
- 1.8.2 Also known as tie beam. It forms the bottom edge of the truss and joins the two heel nodes and in certain instances also supports the ceiling. ✓✓ (2)

- 1.8.3 Any place on the truss where two or more members are joined together ✓✓ (2)
- 1.8.4 Also known as the slope. The angle between the top chord and the horizontal line from the support point and is expressed in degrees. ✓✓ (2)
- 1.8.5 Part or any component which together with others, makes up the structure or truss. ✓✓ / any part of the roof truss (2)
- [30]**

QUESTION 2: ERECTING L- SHAPED ROOFS

- 2.1 To provide cover and protection for people and their belongings. ✓
Gives stability to the building ✓
It also beautifies the structures ✓ (3)
- 2.2 A number of timber members joined together in a triangular pattern to form a sturdy frame to carry the roof covering and any other loads that it is designed for. ✓✓ any acceptable answer (2)
- 2.3 Live loads ✓ – Temporary loads such as wind, rain, workmen on the roof ✓
Dead loads ✓ – Permanent loads such as roof material, tiles slates, ceilings ✓ (4)
- 2.4 Due to trusses of different sizes and shapes ✓, it is complicated therefore, the designer, architect, draftsman and inspectors need to be involved and all this, makes it not possible to build it without the rational design ✓ (2)
Scientific calculations are used by the designer (any two)
- 2.5 As the bottom side of the jack trusses get longer, the top also gets longer decreasing the angle and therefore becomes lower ✓✓. (2)
- 2.6 Lined softal valley ✓ inverted roll-top ridging valley ✓ a concealed valley ✓ (3)
Open valley / Bastard valley (Any three)
- 2.7 Gradient = $\frac{\text{Change in vertical distance}}{\text{Change in horizontal distance}}$ ✓ (2)
Change in vertical distance divided by change in horizontal distance
- 2.8 Means to hammer a nail into something but not permanently. ✓ (1)
Not completely tight so that it can be easily removed (Anyone)
- 2.9 Debris such as leaves and twigs can collect in a valley and block water flow ✓. Water runs down the roof pitch and channels into the valley and therefore the valley carries more water and weight ✓ (2)
The flow of water should clear the debris completely (any two).

2.10 Correct wall plate sizes for the given roof spans

SPAN	WALL PLATE SIZES
Spans less than 10m	38mm x 76mm ✓
Spans between 10m and 15m	38mm x 114mm ✓
Spans between 15m and 20m	38mm x 152mm ✓

(3)

2.11 It makes the bearing surface level. ✓

It acts as a bearing surface for the roof trusses ✓

To spread the load all over evenly over a large area. ✓

ANY TWO

(2)

Spreads the load evenly to the foundation of the dwelling

2.12 Can be used for spans up to 6,6 meters wide. ✓

Includes small valleys up to 3 meters long. ✓

(2)

Standard loading (any two)

2.13 Mitre joint ✓

(1)

Could be used for joining skirting boards; making picture frames;

Fitting architraves; joining fascia boards; joining purlins; window beading.

ANY ONE ✓

(1)

[30]

QUESTION 3: INSPECTION OF ROOF STRUCTURES

3.1 3.1.1 Competent person – someone who is qualified by virtue of his training and experience to design, erect, manufacture and inspect of roof structures. ✓✓ (2)

3.1.2 Professional Engineer- a qualified engineer who is registered under the Engineering Professional Act 46, 2000. ✓✓ (2)

3.1.3 Someone who is qualified to perform a certain task after being trained as an apprentice and successfully completes a trade test. ✓✓ (2)

3.1.4 Is a person who designs the roofs and does all the calculations regarding all types of loads that act on roof structures. ✓✓ (2)

(answer incorrect award candidates two marks)

3.2 SANS 10400 ✓
SANS 10243 ✓

(2)

3.3 To make sure that it conforms to design. ✓

To ensure that it is safe for occupancy. ✓

To ensure that approved materials have been used ✓ (any two)

(2)

- 3.4 Personal injury may result and subject to personal liability ✓
 Failure of the roof ✓
 Wastage of funds through repairs ✓ (3)
Wastage of material / wastage of man hours (any three) [15]

QUESTION 4: HOW TO COVER A ROOF

- 4.1 The roof frame is built according to a specified type of roofing material ✓ and any other type of roofing material might not be suitable for that frame. ✓ (2)
- 4.2 Obtain written consent from the roof designer. ✓
 Install additional bracing where necessary. ✓ (2)
- 4.3 Eaves ✓
 Verges ✓
 Ridges ✓
 Downwind slopes ✓ ANY THREE (3)
- 4.4 Serrated nails and screws ✓, mechanical fixing ✓ storm clip fixing ✓, underlay and correct tile type ✓ Any other acceptable answer (2)
 ANY TWO
- 4.5 Concrete tiles ✓
 Metal ribbed sheets ✓
 Fibre cement slates ✓
 Metal tiles ✓
 Thatch ✓ ANY FOUR (4)
- 4.6 This is a way of covering the roof structure with any kind of roofing material to protect the timber structure and the inhabitants. ✓✓ (2)
- 4.7 Water and Moisture ✓✓ Condensation (any one) (2)
- 4.8 Pop- rivet gun ✓; angle grinder ✓; tape measure ✓; drilling machine ✓; hammer ✓ centre punch ANY THREE (3)
- 4.9 It is a seam which joins two sheets, formed by folding over the edges of the sheets. ✓✓ (2)
- 4.10 Prevents dust accumulation ✓
 Reduces suction on the tiles, caused by strong winds ✓
 Prevents water leaking in the event of a broken tile (any two) (2)
- 4.11 Should be fire-proof ✓
 Should have a long life span ✓
 Should be of a low maintenance material ✓ should be cost efficient (2)
 ANY TWO [25]

TOTAL: 100