higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CARPENTRY AND ROOF WORK L3
NQF LEVEL 3

(12030333)

7 December 2020 (X-paper)
09:00–12:00

This question paper consists of 7 pages.

325Q1N2007

Copyright reserved

TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

Copyright reserved

QUESTION 1: HIPPED ROOFS

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 The heel or heel point of a truss is the … 

A point where the tie beam rests on the internal wall.
B end of the wall plate.
C area below the eaves.
D point where the rafter and tie beam meet.

1.1.2 The apex of a truss is at the …

A top of the truss where the two top chords meet.
B centre of the king post.
C top of the queen post.
D highest point of the rafter.

1.1.3 A rectangular hipped roof slopes … 

A at both ends.
B on all sides.
C on two sides.
D at an angle of 45°.

1.1.4 The stability of a roof can be affected by …

A the cost of the roof.
B poor workmanship.
C untreated timber.
D overhead wires.

1.1.5 An experienced carpenter can …

A design the trusses for a hipped roof.
B make the trusses for a hipped roof.
C erect a hipped roof.
D calculate the wind speeds the roof has to withstand.

(5 × 1) (5)

1.2 Differentiate between the manufacturing process of a *deemed-to-satisfy* roof and a *rationally-designed* roof.  (4)

1.3 Give TWO reasons why the roof for a large block of flats would be *rationally designed.* (2)

1.4 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 The shape of a hipped roof makes it less vulnerable to strong winds.

1.4.2 The hipped end of the roof acts as horizontal bracing.

1.4.3 A hipped roof requires more bracing than a gabled roof.

1.4.4 The details of a roof shown on a plan, is referred to as the *roof layout.*

1.4.5 A *deemed-to-satisfy* roof is also known as an *empirically-designed* roof.

(5 × 1) (5)

1.5 State THREE reasons why it is essential for anyone designing a roof to consider the rules and regulations specified in the National Standards. (3)

1.6 Give THREE reasons why a roof erector would do a site inspection before starting with the roof construction. (3)

1.7 Most hipped roofs incorporate girder trusses.

Name TWO hardware items used to assemble the girder plates. (2)

1.8 Explain why the top of the walls must be level before installing the wall plates. (2)

1.9 Differentiate between the height of the top of the fascia on a *tiled roof* and on a *sheeted roof*. (2)

1.10 Complete the following sentence by writing only the answer next to the question number (1.10) in the ANSWER BOOK:

The width of the wedges used for levelling trusses, must be of the same width as … (other roofing timber/member). (1)

1.11 Which factor determines the size of the tilting batten? (1)

[30]

QUESTION 2: ERECTING AN L-SHAPED ROOF

2.1 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–E) next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1.1	SANS 1400 states that only a qualified engineer may design this roof component	A	45° truss hanger
2.1.2	The slope of this roof area is always less than the slope of the intersecting roofs	B	monopitch
2.1.3	This truss resembles a right-angled triangle	C	90° truss hanger
2.1.4	A galvanised metal fitting used to support jack trusses	D	25 metre girder truss
2.1.5	A galvanised metal fitting used for supporting roof trusses against a brick wall	E	valley

(5 × 1) (5)

2.2 Make a neat, detailed drawing of a void former used for creating a space in a wall to support the stub end of a monopitch truss. (5)

2.3 Name the THREE types of trusses used in the erection of an L-shaped monopitch roof. (3)

2.4 Write the trusses you mentioned in QUESTION 2.3, in the order in which they are raised. (3)

2.5 2.5.1 Explain why the joint between the runner and the valley girder must be reinforced. (2)

2.5.2 Name a component that can be used for the reinforcement mentioned in QUESTION 2.5.1. (1)

2.6 Give an alternate use for a ridge capping. (1)

2.7 State FIVE guidelines for installing a good valley gutter. (5)

2.8 Give THREE reasons why a roof is most likely to leak at the valley. (3)

2.9 Explain a method of avoiding an overflow of rainwater at the valley on a roof with a shallow pitch. (2)

[30]

QUESTION 3: INSPECTION OF ROOF STRUCTURES

3.1 Name the individuals that are responsible for each of the following operations related to roof inspection:

3.1.1 Appointing an accredited roof inspector

3.1.2 Conducting a roof inspection

3.1.3 Repairing patent or latent defects to the roof structure

3.1.4 Signing off the roof structure

3.1.5 Ensuring that roof inspectors adhere to good standards

(5 × 1) (5)

3.2 Name FIVE structural items to consider when inspecting a roof. (5)

3.3 State THREE ways in which the proper setting out of the battens will improve the overall appearance of a tiled roof. (5)

[15]

QUESTION 4: HOW TO COVER A ROOF

4.1 Name TWO roof covering materials that offer poor protection against fire. (2)

4.2 Give the reason why concrete tiles cannot be used to clad a roof that has a pitch/slope of 15°. (2)

4.3 Name TWO timber members used to support roof cladding material. (2)

4.4 State FIVE factors a roof designer has to consider once the home owner has decided on a choice of roof cladding material. (5)

4.5 Give a brief description of the undertile membrane, commonly known as underlay. (2)

4.6 At what stage of roof cladding is the underlay attached? (1)

4.7 In which regions of South Africa is the installation of underlay compulsory? (1)

Copyright reserved

4.8 An extract from a data sheet for a tiled roof is shown in the TABLE below.

Rafter length	Courses on roof	Batten centres	Rafter length	Courses on roof	Batten centres	Rafter length	Courses on roof	Batten centres
1,050	4	0,263	2,750	9	0,305	4,450	14	0,318
1,200	4	0,300	2,900	10	0,290	4,600	15	0,307
1,250	4	0,313	2,950	10	0,295	4,650	15	0,310
1,400	5	0,280	3,100	10	0,310	4,800	16	0,300
1,700	6	0,283	3,400	11	0,309	5,100	16	0,319
1,750	6	0,292	3,450	11	0,314	5,150	17	0,303
2,600	9	0,289	4,300	14	0,307	6,000	19	0,316

4.8.1 How many courses of tiles will be laid for a rafter length of 5,1 metres?

4.8.2 How many courses of tiles will be laid if the top chord is 1,750 metres long?

4.8.3 What batten spacing should be used if 15 courses of tiles are to be laid and the rafter length is 4,650 metres?

4.8.4 If the batten centres are 0,316 metres apart, how long are the rafters likely to be?

4.8.5 What is the batten centre for a rafter length of 4,800 metres?

(5 × 1) (5)

4.9 A gable roof that is accurately constructed will simplify the fitting of roofing sheets.

Describe TWO ways of checking for the accuracy of the roof construction.

(2 × 2) (4)

4.10 For what purpose is bituminous aluminium paint applied to galvanised roofing sheets? (1)

[25]

TOTAL: 100

Copyright reserved