higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CARPENTRY AND ROOFWORK
NQF LEVEL 2

(12020122)

12 March 2018 (X-Paper)
09:00–12:00

This question paper consists of 7 pages.

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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. ALL sketches must be neat and clear.
5. ALL work you do not want to be marked must be clearly crossed out.
6. Rule off across the page on completion of each question.
7. Start each question on a NEW page.
8. ALL abbreviations and symbols must comply with the latest National Building Regulations and all relevant SANS (SABS) codes.
9. Write neatly and legibly.

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SECTION A

QUESTION 1: TERMINOLOGY AND BASICS USED IN ROOFWORK

1.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 Clear span is the distance along the bottom cord between the truss ends (heel).

1.1.2 A competent person is a person who is qualified by training and experience to design, erect, manufacture or inspect a roof structure.

1.1.3 Bay spacing is the distance between the centres of two of the same elements.

1.1.4 Gable is when the end of the building is vertical, the same shape as the trusses usually constructed of brickwork.

1.1.5 Jack truss a monopitch truss in a hipped end roof is supported at the top by the hip girders.

(5 × 1) (5)

1.2 Name FIVE different types of trusses that are used to construct a roof. (5)

1.3 Give another name for each of the following:

1.3.1 Top chord

1.3.2 Slope

1.3.3 Binder

1.3.4 Tie beam

1.3.5 Roof cladding

(5 × 1) (5)

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1.4 Choose an item or words from COLUMN B that matches a description in COLUMN A. Write only the letter (A–G) next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.4.1	The tool used to mark 90° and 45º angles	A	chalk line
1.4.2	The tool used to check that the object is vertical/plumb	B	rip saw
1.4.3	The tool used to mark a straight line	C	spirit level
1.4.4	The tool used for checking whether a surface is level or plumb	D	cross cut saw
1.4.5	The tool for cutting wood along the grain	E	plumb bob
		F	combination square
		G	sliding bevel

(5 × 1) (5)
[20]

QUESTION 2: ROOF CONSTRUCTION

2.1 Give a brief description of the following roof structures:

2.1.1 Mono-pitch roof

2.1.2 Flat roof

2.1.3 Gable-to-gable roof

2.1.4 Hip roof

(4 × 2) (8)

2.2 Define the term *rational design.* (2)

2.3 State TWO negative consequences of not fixing roof anchors tightly. (2 × 1) (2)

2.4 State any FIVE operations that are covered by the principles of roof construction. (5 × 1) (5)

2.5 What are the basic functions of a roof? (2)

2.6 What influences the spacing between trusses? (1)

2.7 Complete the following paragraph by using the words in the list below. Write only the word(s) next to the question number (2.7.1– 2.7.10) in the ANSWER BOOK.

double; top chord; slope; braces; strong; damage; bottom chord; support; hip girder; heel; 90º angle; mono-pitch

DIFFERENT TYPES OF TRUSSES

In a (2.7.1) … jack truss, there is only one rafter (2.7.2) …. You could say that this truss is half a (2.7.3) … .pitch truss. The (2.7.4) … joins the tops of the jack trusses. A valley truss is supported on the top chords of other trusses at a (2.7.5) … The top chord does not go past the (2.7.6) … A scissors truss has sloping (2.7.7) … and sloping (2.7.8) … A girder truss is a (2.7.9) … single or multiple-ply truss used to (2.7.10) … other trusses. (10 × 1) (10)

[30]

QUESTIONS 3: BUILD A HOWE ROOF TRUSS

3.1 Make a neat sketch of a HOWE truss and clearly label the following:

3.1.1 The eaves

3.1.2 The overhang

3.1.3 The pitch

3.1.4 The king post

3.1.5 The webs/struts

3.1.6 The run

3.1.7 The rise

3.1.8 The queen post

3.1.9 The tie beam span

3.1.10 The apex

3.1.11 The clear span

(11 × 1) (11)

Overall impression and correctness of drawing (2)

3.2 The steps needed to be followed when assembling a HOWE roof truss are listed below in their incorrect sequence. Rearrange these steps by writing only the answer next to the question number (3.2.1–3.2.12) in the correct order in the ANSWER BOOK.

3.2.1 Lay the rafter on top of the tie beam and the king post. Mark and cut the top plumb cuts.

3.2.2 Lay the queen posts on top of the tie beam and rafters. Mark and cut them to the correct size.

3.2.3 Lay the tie beam on the setting-out template.

3.2.4 Join the struts to the tie beam and the rafters with 100 mm nails.

3.2.5 Turn the truss over and clinch the nails on the other side.

3.2.6 Mark off the tie beam and cut it to the correct size.

3.2.7 Join the rafters to the tie beam and king post with 100 mm nails.

3.2.8 Drill holes in the centre of the joints and bolt them together with the bolts and washers.

3.2.9 Join the queen post to the tie beam and rafters.

3.2.10 Lay the king post on the template on top of tie beam and cut it to the correct size at the apex.

3.2.11 Join the king post to the tie beam with 100 mm nails.

3.2.12 Lay the struts on top of the tie beam and rafters. Mark and cut them to the correct size.

(12 × 1) (12)
[25]

QUESTION 4: GABLE ROOF CONSTRUCTION

4.1 What are the functions of struts or webs in a roof truss? (2)

4.2 STATE TWO places on the roof where it is permissible to start with the erecting of trusses. (2)

4.3 Describe a tilting batten and say where on a roof it is fixed. (3)

4.4 Calculate the rise of the truss if the pitch of the roof is 30° and the tie beam span is 4 500 mm. (4)

4.5 State ALL steps to be followed when levelling a wall plate. (11)

4.6 The size of wall plates must be in accordance with SANS 10243.

List the required sizes for roofs with spanning widths of 10 m, 15 m, and 20 m respectively. (3)

[25]

TOTAL: 100

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