higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CONSTRUCTION PLANNING
NQF LEVEL 2

(12010042)

21 November 2023 (Y-paper)
13:00–16:00

Calculators may be used.

This question paper consists of 8 pages and a diagram sheet.

193Q1N2321

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
CONSTRUCTION PLANNING
NQF LEVEL 2
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. All drawings must be neat and in proportion.
6. Write neatly and legibly.

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QUESTION 1: TERMINOLOGY AND COMPONENTS OF THE CONSTRUCTION INDUSTRY

1.1 Briefly describe where to use the following materials when building a house:

1.1.1 Concrete

1.1.2 Timber

1.1.3 Steel

(3 × 1) (3)

1.2 Give ONE example of each of the following categories of material used in the construction of a house:

1.2.1 Natural materials

1.2.2 Manufactured material

(2 × 1) (2)
[5]

QUESTION 2: MEASURING, SETTING OUT AND LEVELLING

2.1 State TWO advantages and TWO disadvantages of a steel measuring tape.
(2 × 2) (4)

2.2 Choose ONE term from the list below for each of the following descriptions and write it next to the question number (2.2.1–2.2.5) in the ANSWER BOOK.

tacheometric survey; datum level; elevation; benchmark; stadia lines

2.2.1 The altitude of a place above sea level

2.2.2 A post or other permanent mark established at a known elevation that is used as a basis for measuring the elevation of other topographical points

2.2.3 A reference system against which positional measurements are made for computing locations

2.2.4 Horizontal lines on a theodolite used to measure distance

2.2.5 A method of measuring used to produce a site map when other maps are not available or accurate

(5 × 1) (5)

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2.3 Define the following:

2.3.1 Setting out

2.3.2 Laser level

2.3.3 Transferring levels

(3 × 2) (6)

2.4 State FIVE ways of taking care of optical instruments to ensure accuracy at all times. (5)

2.5 Give TWO disadvantages of using a water level. (2)

2.6 An optical square is a simple sighting instrument used to set out right angles.

Briefly explain how you would get a right angle using an optical square with two ranging poles. (3 × 1) (3)

[25]

QUESTION 3: FOUNDATIONS

3.1 State FOUR reasons why the soil has to be investigated before building. (4)

3.2 Explain why compaction of soil is important. (3 × 1) (3)

3.3 Give THREE factors of soil to consider when deciding on the type of foundation to be used. (3)

[10]

QUESTION 4: BEHAVIOUR OF STRUCTURES

4.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–C) next to the question number (4.1.1–4.1.6) in the ANSWER BOOK.

4.1.1 A/An … is applied to a very small area of a member and is represented by a single arrow.

A axial load
B point load
C mixed load

4.1.2 A/An … is spread evenly over the entire length of the member.

A gravitational load
B uniformly distributed load
C asymmetrical load

4.1.3 The largest load at one point and gradually decreasing to zero:

A Trapezoidal load
B Triangular load
C Uniformly distributed load

4.1.4 The largest load situated at one point and gradually decreasing to a certain value:

A Triangular load
B Uniformly distributed load
C Trapezoidal load

4.1.5 Different types of loads on the same member:

A Gravitational load
B Axial load
C Mixed load

4.1.6 A/An … is also called a concentrated load.

A gravitational load
B uniformly distributed load
C point load

(6 × 1) (6)

4.2 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–F) next to the question number (4.2.1–4.2.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
4.2.1	Has slightly flattened sides and a curved top	A	high arch
		B	segmental arch
4.2.2	Has a very small amount of inner curves	C	elliptical arch
4.2.3	Has a more curved or pointed top	D	parabolic arch
4.2.4	Has the shape of a half circle	E	flat arch
4.2.5	Arch smaller than half a circle	F	semicircle arch

(5 × 1) (5)

4.3 A beam is a structural member that adds strength to the building. Answer the following questions with regard to beams:

4.3.1 Identify the TWO beams shown below. (2)



4.3.2 Differentiate between the length of a beam when a compressive load and a tensile load is applied. (2)

4.4 Explain why a triangular shape is used in most pin-jointed frames and not a rectangular shape. (2 × 1) (2)

4.5 A redundant element in a structure is not needed until another important part of the structure fails.

Give ONE reason why a redundant member is added to a structure. (1)

4.6 Briefly describe how can you prevent buckling of a column. (1)

4.7 Draw a neat freehand cross-sectional sketch of the following structures and use lines to show the position of their horizontal neutral axis:

4.7.1 T-beam section

4.7.2 Circular pipe

4.7.3 Rectangular section

(3 × 2) (6)

[25]

QUESTION 5: INTERNATIONAL SYSTEM (SI) UNITS OF MEASUREMENTS

5.1 What is the unit of measurement of length in the imperial system and in SI units? (2 × 1) (2)

5.2 Add 12 minutes and 25 seconds to 1 hour, 55 minutes and 42 seconds.

Give the answer in hours, minutes, and seconds. (3 × 1) (3)

5.3 Convert 144 500 grams to kilograms. (1)

5.4 What are the units of measurements used for the following quantities?

5.4.1 Fuel in a car's petrol tank (1)

5.4.2 Electricity used in the household (1)

5.4.3 The storage capacity of a cell phone (1)

5.4.4 The volume of concrete needed to cast a slab (1)

[10]

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QUESTION 6: AREA AND VOLUME

6.1 A sand pile in a conical shape has a diameter of 6 m and a height of 2 m.

Calculate the volume of the sand. ☆ (3)

NOTE: Round off your answer to TWO decimals.

6.2 How many bricks are needed to build a half-brick wall of 120 m²? Given: size of brick 390 L × 140 W × 190 H. (3)

NOTE: Ignore the thickness of mortar.

6.3 FIGURE 1, DIAGRAM SHEET 1 (attached) shows a hall. Use the following specifications to calculate the litres of paint needed to paint the outside walls if 1 litre of paint covers 2 m².

SPECIFICATIONS:

☆ The hall has a height of 5 m, a length of 15 m and a width of 10 m with a door opening 3 m high and 2 m wide. The gable height is 3 m. The hall has five windows on both opposite sides of the long walls. The size of the windows is 2 m × 1,5 m. (4)

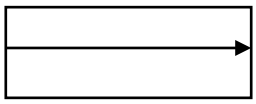
[10]

QUESTION 7: TECHNICAL DRAWINGS

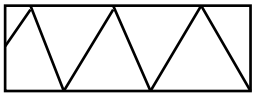
7.1 State FOUR important aspects of architect drawings. (4)

7.2 Various symbols are used in construction to represent various items. Identify the following symbols used in drawings:

7.2.1



7.2.2

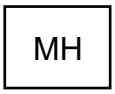


7.2.3

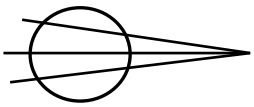


☆

7.2.4



7.2.5



(5 × 1) (5)

7.3 What do the following abbreviations mean?



7.3.1 U

7.3.2 SS

7.3.3 IC

7.3.4 DRG

7.3.5 COL

7.3.6 SWD



(6 × 1) (6)
[15]

TOTAL: 100

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DIAGRAM SHEET 1

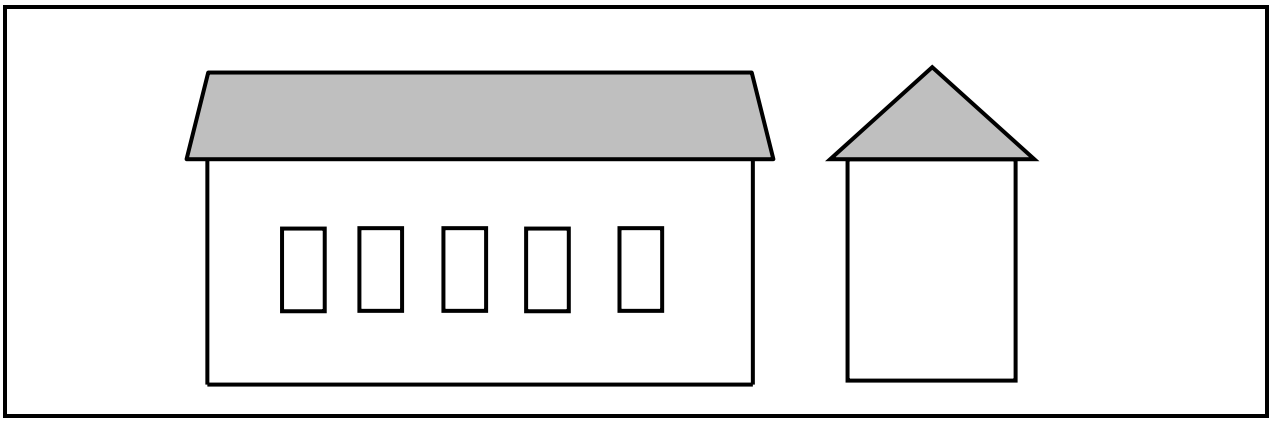

FIGURE 1

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