



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**CONSTRUCTION PLANNING
NQF LEVEL 2**

(12010042)

**8 December 2020 (X-paper)
09:00–12:00**

This question paper consists of 7 pages.

405Q1N2008



<p>TIME: 3 HOURS MARKS: 100</p>

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. Start each question on a new page.
 5. Use only a black or blue pen.
 6. Do drawings, diagrams and sketches in pencil.
 7. Drawings, sketches and diagrams must be neat, reasonably large and in proportion.
 8. Clearly cross out all work you do not want to be marked.
 9. All abbreviations and symbols must comply with the latest National Building Regulations and all relevant SANS (SABS) codes.
 10. Write neatly and legibly.
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QUESTION 1


Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.9) in the ANSWER BOOK.

- 1.1 Steel bars are added to concrete beams to take up the tension.
- 1.2 A beam that is fixed at one end is called a simple beam.
- 1.3 Wind is considered as a load when designing a building. 
- 1.4 A load that tends to cut a component is called shear load.
- 1.5 A building line is an invisible line on your property demarking the point up to which you cannot build.
- 1.6 Specifications provide clear instructions on the intent, performance and construction of a project.
- 1.7 A competent person is capable of identifying and correcting hazards based on experience and/or training.
- 1.8 Tolerance is a range of how far a true measurement can range from what is intended. 
- 1.9 Indemnity insurance covers the buyer and the mortgage lender in the event of any loss of value on the property as a result of the defect.

(9 × 1)

[9]**QUESTION 2**

- 2.1 Choose a tool 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	Used to measure inner diameters	A	builders square
2.1.2	Used to measure outer diameters only	B	optical square
2.1.3	Used for setting out	C	micrometer
2.1.4	Used to measure a vertical angle	D	vernier callipers
2.1.5	Used for setting out right angles 	E	theodolite

(5 × 1)

(5)

2.2 Name the different parts of the micrometer in FIGURE 1. Write only the answer next to the question number (2.2.1–2.2.5) in the ANSWER BOOK.

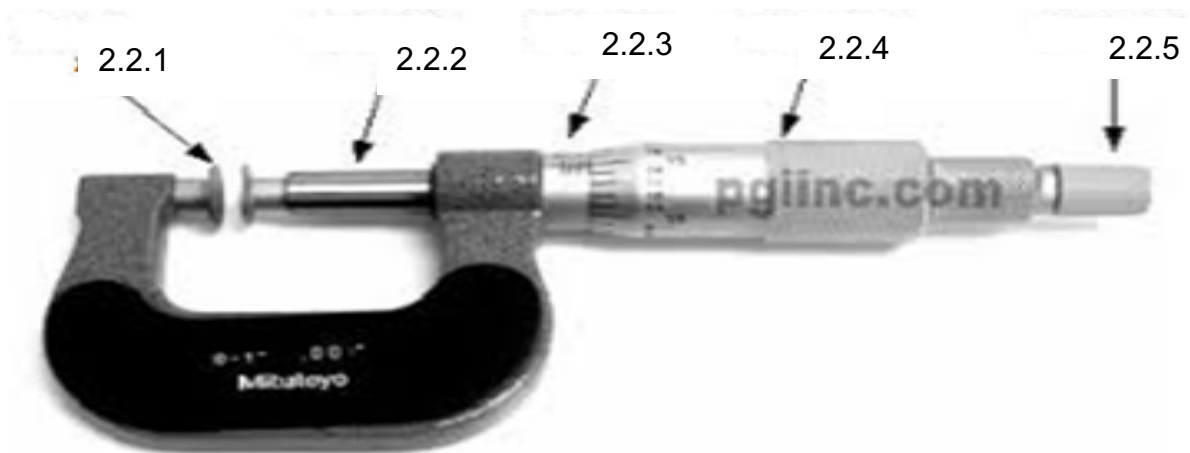


FIGURE 1

(5)

2.3 An optical square is a simple geodetic instrument that is used when setting out.



Briefly explain how to take care of an optical square after use.

(5)

2.4 Explain how to construct a hexagon on the ground if side AB is given to start with.

(6)

2.5 Complete the following sentences by choosing an item from the list below. Write only the answer next to the question number (2.5.1–2.5.4) in the ANSWER BOOK.

300 mm; 200 mm; 1:4:5; 100 Mpa; 400 mm; 600 mm



The national building regulations stipulate that the thickness of strip foundation must not be less than (2.5.1) ... and the width must not be less than (2.5.2) ... The minimum strength of the concrete mix should be (2.5.3) ... The depth of excavation should not be less than (2.5.4) ... below the natural ground level.

(4)

[25]

QUESTION 3

3.1 The soil can make or break a construction project.

Briefly explain the causes of foundation problems in relation with the soil.



(2 × 3)

(6)

3.2 Why is it important to compact and consolidate before laying the foundation?

(2 × 2)

(4)

[10]

QUESTION 4

4.1 Calculate the following and write the answer in prefix format:

$(25 \times 10^3) \times (20 \times 10^{-1})$



(2)

4.2 Calculate the density of a piece of wood that weighs 600 g and has a volume of 0,3 m³.

(3)

4.3 Convert the following:

4.3.1 2 000 mg to kg

4.3.2 24 km to mm

4.3.3 150 g to mg

4.3.4 25 l to kℓ



4.3.5 15 mm to cm

(5 × 1)

(5)
[10]

QUESTION 5

5.1 FIGURE 3 shows the plan of the trench of a house for footing.



Calculate the volume of concrete in m³ needed to make the strip footing if the width of the trench is 300 mm and the thickness is 230 mm.

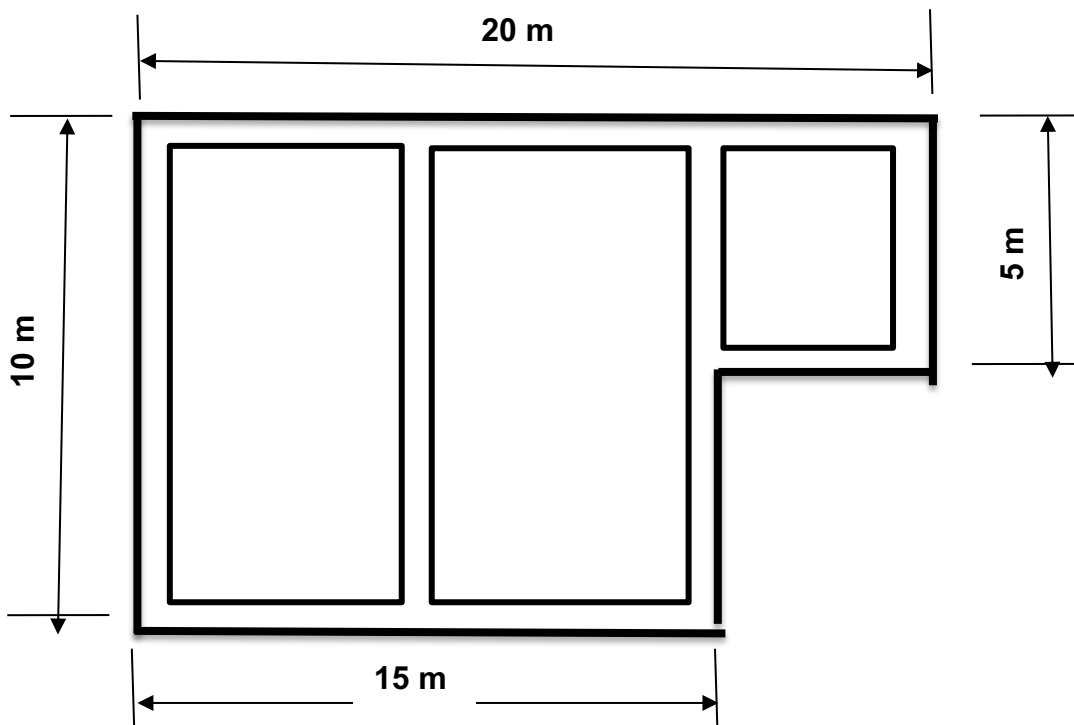


FIGURE 3

(5)

5.2 A room has a size of 15 m × 8 m and a height of 4 m. It has 2 openings as shown in FIGURE 4 below.

Calculate the amount of paint needed to paint the entire room, if one litre of paint covers 5 m².

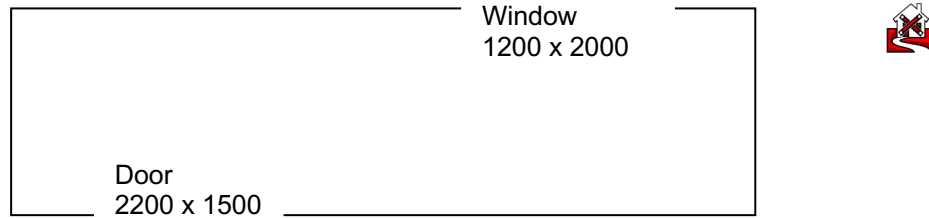


FIGURE 4

(5)
[10]

QUESTION 6

6.1 Explain the difference between scale 1:5 and 5:1. (2)

6.2 Hatching patterns are used as symbols on drawings to identify different types of commonly used materials, objects and spaces easily and quickly.

Draw a free hand sketch with a hatching pattern for each of the following materials:

6.2.1 Brickwork 

6.2.2 Concrete

6.2.3 Hard core

6.2.4 Blockwork

6.2.5 Glass

(5 × 1) (5)

6.3 Briefly explain why a plan and section drawings must have a north arrow sign. (3)


6.4 The following abbreviations are commonly found on construction drawings.

What does each abbreviation represent?

6.4.1 COL

6.4.2 MH




6.4.3 WIC

6.4.4 BM 

6.4.5 HC

(5 × 1) (5)
[15]

QUESTION 7

- 7.1 A simply supported beam is a type of beam that has support at both ends.
 Draw a diagram that indicates what happens to a simply supported beam when a point load is applied at the centre. Clearly indicate the neutral axis, tension, compression and applied point load. (6)
- 7.2 7.2.1 What is a redundant member?  (1)
- 7.2.2 Why is a redundant member added to a structure? (1)
- 7.3 Loads are imposed on a partially completed or temporary structure during and as a result of the construction process.
 Explain the following types of load:
- 7.3.1 Live load
- 7.3.2 Dead load  (1)
- 7.3.3 Point Load
- 7.3.4 Axial Load (4 × 1) (4)
- 7.4 Draw a simple arch and indicate the following on the diagram:
 - Voussoir
 - Springing point
 - Rise
 - Keystone
 - Span  (5)
- 7.5 Briefly describe a pin-jointed frame structure. (4)
- [21]**
- TOTAL: 100**