higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N5

(8060045)

21 November 2023 (X-paper)
09:00–12:00

Drawing instruments and nonprogrammable calculators may be used.

This question paper consists of 5 pages, an addendum and a formula sheet.

012Q1E2321

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
BUILDING AND STRUCTURAL SURVEYING N5
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. Start each section on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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SECTION A

QUESTION 1

Choose the correct word(s) from those in brackets and write it next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 An intermediate sight in surveying falls between (back and foresight/rise and fall/inverted and horizontal level).

1.2 Dips are performed to determine if a fill has reached the required (level/slope/height).

1.3 Pegs for benchmarks are usually made of (strings/wood/steel).

1.4 Topsoil is removed to a required depth of about (200 mm/150 mm/125 mm)

1.5 To set out a point using the 3:4:5 method requires (three people/four people/five people).

(5 × 2) **[10]**

QUESTION 2

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1–2.5) in the ANSWER BOOK. Give ONE reason for each answer.

2.1 Instrument is a common site name for a surveying instrument on a tripod.

2.2 Instrument is a common site name for any instrument mounted on a tripod.

2.3 Dumpy is a common site name for any levelling instrument.

2.4 A tripod is used mainly to set out a vertical angle line on a building site.

2.5 An optical square is a hand held instrument used to set out right angles on a building site.

(5 × 2) **[10]**

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QUESTION 3

Briefly describe the following words used in surveying.

3.1 Change point

3.2 Intermediate sight

3.3 Foresight

3.4 Back sight

3.5 Bench mark

(5 × 3) **[15]**

TOTAL SECTION A: 35

SECTION B

QUESTION 4

4.1 A sloping rectangular site has been set out. As a site surveyor, you are required to place profiles for excavation to level the site.

Explain how one would go about transferring formation levels onto the profiles based on the length of the traveller. (10)

4.2 Gross errors can be avoided largely by adopting a methodical procedure in recording the results.

List FIVE practical steps in sequence. (10)

4.3 A square plot has an area of 49 m^2. If the land is to be represented on a plan of 1:200, find the length of a side in millimetres. (6)

[26]

QUESTION 5

5.1 Explain how one would set out a rectangular site along a road if the road is used as reference on the site plan. (10)

5.2 State any TWO practical uses of contours. (4)

5.3 State FIVE general requirements for accurate taping. (10)

[24]

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QUESTION 6

Reduce the levelling information in TABLE 1, (ADDENDUM A) (attached) to obtain the elevation of points A, B, C, D, E and F using the rise and fall method. Do the necessary checking for errors (DO NOT DO ANY CORRECTIONS).

Do ALL the calculations in TABLE 1 on ADDENMDUM A (attached) and submit it with your ANSWER BOOK. **[15]**

TOTAL SECTION B: 65
GRAND TOTAL: 100

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EXAMINATION NUMBER: | | | | | | | | | | | | | | |

ADDENDUM A

TABLE 1

POINT	BACK SIGHT	INTER SIGHT	FORE SIGHT	RISE	FALL	REDUCED LEVEL	REMARKS
A	2,300						TBM 34,723
B	2,545		2,332				
C	2,754		2,233				
D		2,264					
E	2,936		2,342				
F			2,342				TBM 36,002

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(8060045)

BUILDING AND STRUCTURAL SURVEYING N5

FORMULA SHEET

Any applicable formula may be used.

$\Delta h = 50Isin\ 2\Theta + HI - MH = 100IsinΘcosΘ + HI - MH$

OR

$V = - KS\ cosΘ\ sinΘ$

$HD = 100/cos^2Θ\ of\ KScosΘ$

$Ct = L.e.(Tm-Ts),\ Ct = L.e(Tm-Ts)\ of\ L[1+e(Tm-Ts)]$

$Cs = L.\ (1-cosΘ)$

$Cs = H\ (secΘ-1)$

$Ce = {}^{L.H}/_{R}$

$Slope = {}^{\Delta h}/_{HD}$

$V = {}^{d}/_{3}\ [(y_1+y_n) + 2(y_3+y_5+….+y_{n-2}) + 4(y_2+y_4+…..+y_{n-1})]$

$S = {}^{\Delta y}/_{sin\alpha}$

$S = {}^{\Delta x}/_{cos\alpha}$

$\alpha = tan^{-1}\ {}^{y}/_{x}$

$\alpha = tan^{-1}\ {}^{x}/_{y} + 90°$

$\alpha = tan^{-1}{}^{y}/_{x} + 180°$

$\alpha = tan^{-1}{}^{x}/_{y} + 270°$

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