higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T110**(A)**(N28)T
NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N5

(8060045)

28 November 2016 (X-Paper)
09:00–12:00

Non-programmable calculators may be used.

This question paper consists of 4 pages and 1 formula sheet.

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. Sketches should be neatly and clearly labelled.
5. Your understanding of the subject is what is important NOT reproduction of the study material.
6. Start each question on a NEW page.
7. Write neatly and legibly.

QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1–1.10) in the ANSWER BOOK.

1.1 Step chaining is mainly used during the construction of a staircase.

1.2 The optical square is used to set off a perpendicular from an existing straight line.

1.3 The Pythagoras theorem does not apply in the join calculation.

1.4 Co-ordinates of a point in surveying are written in brackets starting with the Y co-ordinate.

1.5 A trigonometrical beacon is normally situated at the top of a hill or a high structure where it can easily be seen.

(5 × 2) **[10]**

QUESTION 2

2.1 Briefly explain the following terms:

2.1.1 Cadastral survey

2.1.2 Contours

2.1.3 Geodetic surveying

2.1.4 Survey station

2.1.5 Level line

(5 × 2) (10)

2.2 Describe the uses of the following survey instruments:

2.2.1 Levelling instrument

2.2.2 Optical square

2.2.3 Measuring tape

2.2.4 Ranging rod

2.2.5 Theodolite

(5 × 2) (10)
[20]

QUESTION 3

A line K-N was measured in three sections:

K-L 90.288 m at a slope of 3°44'20"
L-M 72.408 m at a slope of 4°32'59"
M-N 47.652 m at a slope of 2°09'07"

Find the horizontal distance K to N. **[10]**

QUESTION 4

4.1 State FIVE requirements to obtain sufficient accuracy when a tape is used. (5)

4.2 Explain how the 3,4,5 method of setting out a right angle from a point is executed on a building. (5)
[10]

QUESTION 5

5.1 Explain, with the aid of a sketch, how to obtain a straight line between two points which are not within sight of each other. (2 × 5) (10)

5.2 Explain, with the aid of a sketch, how to measure the distance if the chain is obstructed, for example by a building. (2 × 5) (10)

5.3 Explain, with the aid of a sketch, how to measure across a river. (2 × 5) (10)
[30]

QUESTION 6

6.1 A square plot has an area of 16 m^2. If the land is to be represented on a plan of 1:150, find the length of a side in millimetres. (6)

6.2 State TWO characteristics of contours according to the slope of the terrain. (2 × 2) (4)

6.3 A sloping rectangular site has to be set out. As site surveyor you are required to put profiles for excavation so as to level the site.

Explain how you would go about transferring your formation levels onto the profiles based on the length of your traveller. (5 × 2) (10)
[20]

TOTAL: 100

FORMULA SHEET

Any applicable formula may be used.

$\Delta h = 50I\sin 2\Theta + HI - MH = 100I\sin\Theta\cos\Theta + HI - MH$

Or

$V = -KS\cos\Theta\sin\Theta$

$HD = 100/\cos^2\Theta$ *of* $KS\cos\Theta$

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

$Cs = L.(1-\cos\Theta)$

$Cs = H(\sec\Theta-1)$

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

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

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

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

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

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

$\alpha = \tan^{-1}{}^{x}/_{y}+90°$

$\alpha = \tan^{-1}{}^{y}/_{x}+180°$

$\alpha = \tan^{-1}{}^{x}/_{y}+270°$