higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N5

(8060045)

31 March 2020 (X-paper)
09:00–12:00

This question paper consists of 5 pages, 1 formula sheet and 1 addendum.

012Q1A2031

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. Write neatly and legibly.

SECTION A

QUESTION 1

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK. Give ONE REASON for each answer.

1.1 Linen tapes are useful for short-distance measurements but are not used for accurate work.

1.2 Offsets are long perpendiculars measured by a straight line.

1.3 Flagpoles may be used as temporary signals to indicate the location of a point or the direction of a line.

1.4 Measuring tapes are standard at a particular temperature and region.

1.5 Standard tension is maintained by spring balance for accurate measurements.

(5 × 2) **[10]**

QUESTION 2

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–L) next to the question number (2.1–2.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1	Curved line normal to the direction of gravity at all points	A	datum surface
2.2	Any sight taken between backsight and foresight	B	spirit levelling
2.3	Any level surface from which heights or levels are measured	C	geological
2.4	Straight line normal to direction of gravity at a point	D	collimation
2.5	Levelling operations carried out with a surveyor's level (dumpy, tilting, automatic)	E	geodetic
2.6	Height of point above datum	F	level line
2.7	Surveys concerned with distribution of minerals, rocks, et cetera	G	bearings
2.8	High-accuracy surveys concerned with shape of earth	H	sensitivity
2.9	True geographical angles of direction related to true north/south	I	horizontal line
2.10	Angle through which tube must be tilted to move bubble one graduation	J	engineering
		K	intermediate sight
		L	elevation

(10 × 1) **[10]**

QUESTION 3

Explain each of the following terms used in surveying:

3.1 Inverted staff levelling

3.2 Orientation

3.3 Parallax

3.4 Systematic error

3.5 S.A. co-ordinate system

(5 × 5) **[25]**

TOTAL SECTION A: 45

SECTION B

QUESTION 4

4.1 Explain the process involved in setting out a rectangular building site for the removal of topsoil. Include in your explanation any FIVE instruments to be used. (10)

4.2 Use the ordinates given below and calculate the orientated direction and distance between A and B.

A	- 2 167,59	+ 303 248,75
B	- 2 315,81	+ 303 409,06

(15)

4.3 Explain how to obtain a straight line between two points which are not in sight of each other. Use a neat sketch to support the explanation. (10)

4.4 State at least FIVE requirements for sufficient accuracy when taping. (5)

[40]

QUESTION 5

Complete the table on the attached ADDENDUM regarding notes taken during a levelling survey between station A and B. Use the rise and fall method and reduce the readings. Do not do any corrections. Submit the ADDENDUM with the ANSWER BOOK. **[15]**

TOTAL SECTION B: 55
GRAND TOTAL: 100

BUILDING AND STRUCTURAL SURVEYING N5

ADDENDUM

EXAMINATION NUMBER:

QUESTION 5

POINT	BACK-SIGHT	INTER-SIGHT	FORE-SIGHT	RISE	FALL	REDUCED LEVEL	REMARKS
A	4.50						TBM 94.20
B		4.00					
C		2.05					
D	3.32		0.42				
E		2.28					
F	0.26		1.54				
G		0.98					
H	0.20		4.24				TBM

(8060045)

BUILDING AND STRUCTURAL SURVEYING N5

FORMULA SHEET

Any other applicable formula may also 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 $L[1+e(Tm-Ts)]$

$$C_T = \frac{W^2 L^3}{24.T^2}$$

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

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

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

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