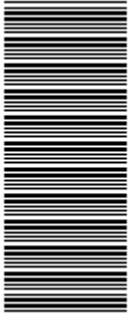


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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T120(E)(J28)T
AUGUST EXAMINATION
NATIONAL CERTIFICATE
BUILDING AND STRUCTURAL SURVEYING N5
(8060045)

28 July 2014 (Y-Paper)
13:00–16:00

Non-programmable calculators may be used.

This question paper consists of 5 pages, 1 addendum 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 (1.1–1.5) in the ANSWER BOOK.

- 1.1 A distometer is mainly used to measure distances and is mounted on a theodolite.
- 1.2 Dumpy is a common site name given to any levelling instrument.
- 1.3 Some of the uses of the theodolite are to measure horizontal and vertical angles.
- 1.4 A plumb bob is used for all levelling work in geodetic survey.
- 1.5 A plumb bob is one of the instruments used when conducting step chaining. (5 x 2) [10]

QUESTION 2

Briefly explain the following terms:

- 2.1 Survey station
- 2.2 Level line
- 2.3 Geodetic survey
- 2.4 Cadastral survey
- 2.5 Contours (5 x 2) [10]

QUESTION 3

Select the correct answer from the words given in brackets. Write only the correct answer next to the question number (3.1–3.5) in the ANSWER BOOK.

- 3.1 Instrument is a common site name given to any (surveying instrument on a tripod/hand-held instrument/type of tape measure).
- 3.2 A traveller is mainly used (to control an excavation/in pipe-laying/in water mains hydraulic pressure).
- 3.3 One of the basic requirements when setting up a levelling instrument is to (adjust the circular bubble to be in its centre/make sure that the tripod feet are not firmly forced on the ground/ensure the top of the tripod is sloping gently).
- 3.4 A theodolite can be used to set out (vertical angles/horizontal angles/levelling/all three).
- 3.5 Errors are classified as (gross errors/systematic errors/accidental errors/all three).

(5 x 2) [10]

QUESTION 4

A line A-E was measured in three sections:

A-B 90.288 m at a slope of $3^{\circ}44'20''$

B-C 72.408 m at a slope of $4^{\circ}32'59''$

C-D 47.652 m at a slope of $2^{\circ}09'07''$

D-E 62.081 m at a slope of $2^{\circ}44'30''$

Find the horizontal distance A to E.

[15]

QUESTION 5

- 5.1 Explain the basic steps taken in setting up a levelling instrument.
- 5.2 How is the horizontal distance set out using step chaining?
- 5.3 Explain how you would set out a rectangular site along a road if the road is used as a reference on the site plan.

(3 x 5) [15]

QUESTION 6

- 6.1 Explain how a rectangular building site is set out for the removal of topsoil. In the explanation include any FIVE instruments that can be used. (10)
- 6.2 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)
- [15]

QUESTION 7

- 7.1 A square plot has an area of 16 m².
- If the land is to be represented on a plan of 1 : 150, find the length of a side in millimetres. (6)
- 7.2 State TWO characteristics of contours according to the slope of the terrain. (4)
- [10]

QUESTION 8

Reduce the levelling information in TABLE 1 (ADDENDUM A) to obtain elevation of points A, B, C, D, E and F using the rise and fall method. Do the necessary checking for error (DO NOT DO ANY CORRECTIONS). Do ALL the calculations in TABLE 1. Write your examination number in the given space and submit it inside your ANSWER BOOK.

[15]

TOTAL: 100

ADDENDUM A

EXAMINATION NUMBER:

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TABLE 1

POINT	BACK-SIGHT	INTER-MEDIATE SIGHT	FORE-SIGHT	RISE	FALL	REDUCED LEVEL	REMARKS
A	1,320						TBM 28,965
B	1,360		1,332				
C		1,233					
D	2,145		1,113				
E	2,165		2,652				
F			2,536				

[15]

FORMULA SHEET**BUILDING AND STRUCTURAL SURVEYING N5**

Any applicable formula may be used.

$$\Delta h = 50l \sin 2\theta + HI - MH = 100l \sin \theta \cos \theta + HI - MH$$

Or

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

$$HD = 100 / \cos^2 \theta \text{ of } KS \cos \theta$$

$$Ct = L \cdot e \cdot (Tm - Ts), Ct = L \cdot e \cdot (Tm - Ts) \text{ of } L[1 + e(Tm - Ts)]$$

$$Cs = L \cdot (1 - \cos \theta)$$

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

$$Ce = L \cdot H / R$$

$$\text{Slope} = \Delta h / HD$$

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

$$S = \Delta y / \sin \alpha$$

$$S = \Delta x / \cos \alpha$$

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

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

$$\alpha = \tan^{-1} y/x + 180^\circ$$

$$\alpha = \tan^{-1} x/y + 270^\circ$$