higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T220(E)(N22)T
NOVEMBER 2010

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N5

(8060045)

22 November (X-Paper)
09:00 – 12:00

NO programmable calculators are allowed.

This question paper consists of 4 pages, a formula sheet and an answer 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 correctly 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 Distometer is mainly used to measure distances and is mounted on a theodolite. (2)

1.2 Dumpy is a common site name given to any levelling instrument. (2)

1.3 Some of the uses of the theodolite is to measure horizontal and vertical angles. (2)

1.4 A plumb bob is used for all levelling work in geodetic survey. (2)

1.5 A plumb bob is one of the instruments used when conducting step chaining. (2)
[10]

QUESTION 2

Briefly explain the following terms used in surveying:

2.1 Offsets (3)

2.2 Locate (3)

2.3 Benchmark (3)

2.4 A contour line (3)

2.5 Invert level (3)
[15]

QUESTION 3

Choose the correct word(s) from those given in brackets. Write only the word(s) next to the question number (3.1 – 3.5) in the ANSWER BOOK.

3.1 A traveller/boning rod is made to form a (T/H/S). (2)

3.2 The main purpose of using a traveller is to have (a uniform depth on an excavation/a slightly slanting excavation/to be able to lay the required bedding). (2)

3.3 A trig-beacon is a highest point of (known height above sea level/known co-ordinates/both). (2)

3.4 A plumb bob is mainly used to set out a true vertical to a point (on the ground/on a peg/both). (2)

3.5 A distometer is used together with a (dumpy level/theodolite/clinometer). (2)
[10]

QUESTION 4

4.1 Given the co-ordinates:

A	+310 248,17	-1 058,47
B	+309 295,17	-1 688,04

Calculate the orientated direction and distance between A and B. (15)

4.2 The following off-sets were taken from a baseline to the shoreline of a site that is along the coast at 10 m intervals for a distance of 100 m. The off-sets were 75 m, 85 m, 95 m, 105 m, 110 m, 125 m, 110 m, 100 m, 98 m and 80 m.

Calculate the area of the site. (5)

4.3 Explain how we go about setting out a rectangular building site for the removal of topsoil. In the explanation include any FIVE instruments that can be used. (10)
[30]

QUESTION 5

5.1 Explain the basic steps taken in setting up a levelling instrument. (5)

5.2 Determine the horizontal distance of a measurement of 256,57 m that was done on a slope of 1%. (5)

5.3 How would we set out the horizontal distance using step chaining? (5)
[15]

QUESTION 6

The following notes were taken during a levelling survey between A and B. Reduce the readings using the RISE and FALL method. Use the attached TABLE 1 to answer the question and submit it with your ANSWER BOOK. **[20]**

TOTAL: 100

BUILDING AND STRUCTURAL SURVEYING N5

FORMULA SHEET

Any applicable formula may also be used.

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

or

$V = -KS\ Cos\theta\ Sin\theta$

$HD = 100I\cos^2\theta$ of $KS\cos\theta$

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

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

$$\alpha = \tan^{-1}\frac{\Delta x}{\Delta y} + 90°$$

$$\alpha = \tan^{-1}\frac{\Delta y}{\Delta x} + 180°$$

$$\alpha = \tan^{-1}\frac{\Delta x}{\Delta y} + 270°$$

$$S = \frac{\Delta y}{\sin\alpha}$$

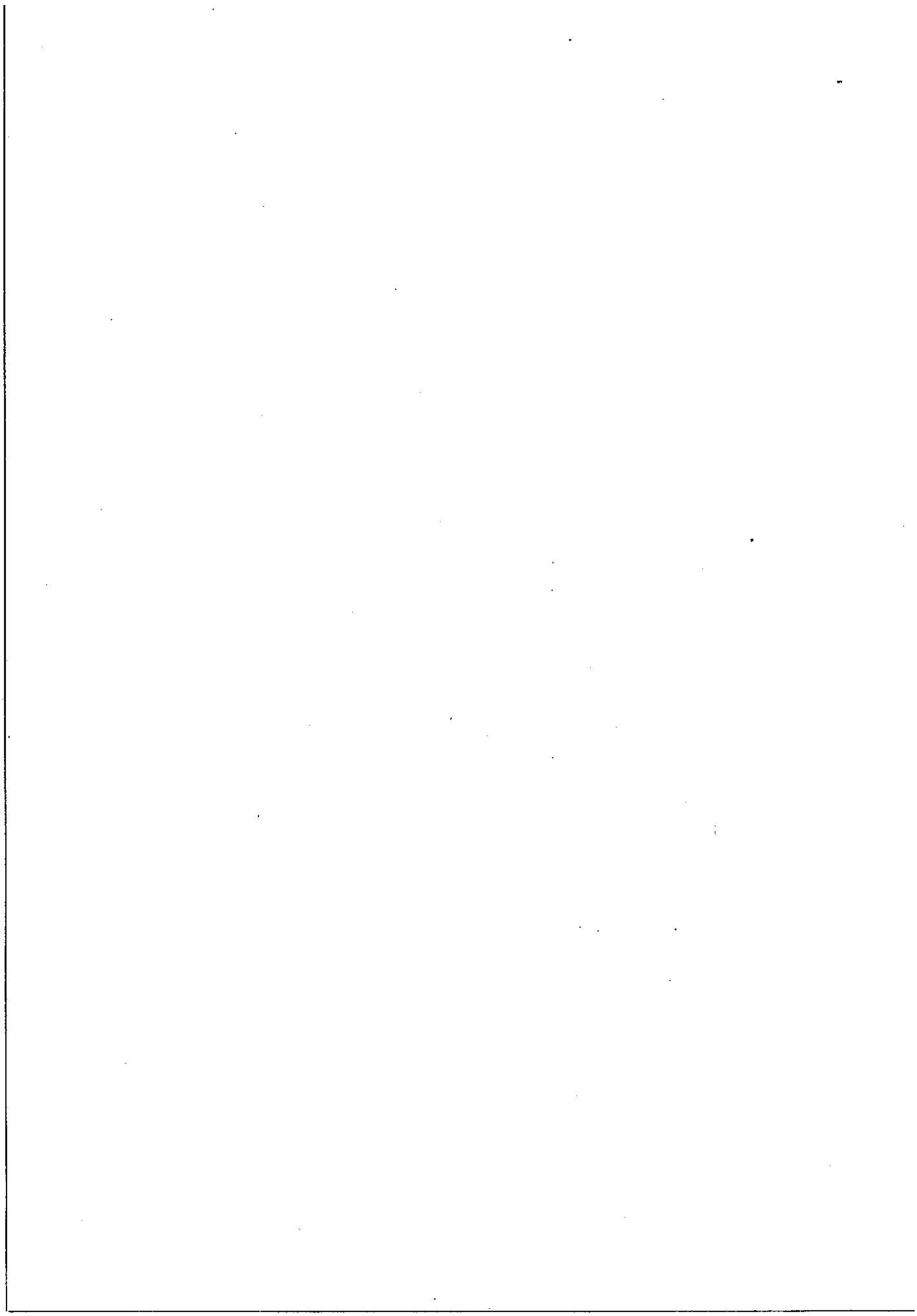
$$S = \frac{\Delta x}{\cos\alpha}$$

$\Delta y = s.\sin\alpha$

$\Delta x = s.\cos\alpha$

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

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



ANSWER SHEET **EXAMINATION NUMBER:**

TABLE 1

POINT	BACK SIGHT	INTER SIGHT	FORE-SIGHT	RISE	FALL	RED LEVEL	REMARKS
A	0,49						
B	0,27		3,29				
C	0,39		3,77				
D	3,72		3,59				
E		1,11					
F	3,56		0,82				
G	3,89		1,36				
H	3,72		0,99				
I	3,69		1,02				
J	3,86		1,31				
K	3,90		1,56				BM 1275,00
L			2,40				