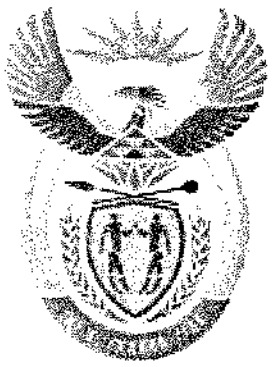

higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T110**(E)**(A4)T
APRIL EXAMINATION

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

(8060034)

4 April 2014 (Y-Paper)
13:00–16:00

Calculators may be used.

This question paper consists of 5 pages, 2 diagram sheets and 1 formula sheet.

ENGINEERING

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

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. ALL the diagrams, sketches and drawings must be large and in good proportion, fully and clearly labelled and done in pencil.
5. Write neatly and legibly.

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QUESTION 1

Define the following survey terms:

1.1 Cadastral surveying

1.2 Topographic surveying

1.3 Level surface

(3 × 2) **[6]**

QUESTION 2

2.1 Name the FOUR methods of measurement. (4)

2.2 Explain FIVE administrative and office work carried out by a surveyor. (10)
[14]

QUESTION 3

3.1 A map or plan is prepared for a particular purpose.

Name the FOUR factors influencing the accuracy of the map or plan. (4)

3.2 FIGURE 1 DIAGRAM SHEET 1 (attached), shows a plane table.

Write only the name of each component next to the question number (3.2.1–3.2.6) in the ANSWER BOOK. (6)

3.3 Calculate the area of a regular pentagon with sides 4 m long. (6)

3.4 Use a scale 1 cm = 100 m and plot the following coordinates as it would be done on the South African coordinate system:

	Y	X
A	- 750,0	+ 450,0
B	+ 380,0	+ 580,0

(4)
[20]

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QUESTION 4

4.1 State FOUR advantages of using a chain. (4)

4.2 A positive correction of 0,012 m was found when measuring a certain distance with a steel tape. The standard temperature is 20EC and the temperature at the time of measurement is 25EC. The coefficient of linear expansion is 0,0000113 /EC.

Calculate the measured distance. (4)

4.3 A length of 75 m was measured horizontally in catenary. The measurement was done in three equal bays. The mass of the tape is 0,015 kg/m and the tension applied is 7 kgf.

Calculate the correct length. (6)

4.4 Make use of diagrams and explain the following methods of fixing a point:

4.4.1 Ties (3)

4.4.2 Resection (3)

4.5 State FIVE advantages of using electronic distance measurement. (5)
[25]

QUESTION 5

5.1 FIGURE 2, DIAGRAM SHEET 1 (attached) shows part of a levelling staff.

Give the readings at 5.1.1, 5.1.2 and 5.1.3. (3)

5.2 In what position should a staff be held in order to obtain accurate readings? (1)

5.3 DIAGRAM SHEET 2 (attached) shows five different types of instruments.

Write the name and use of each instrument next to each instrument number (5.3.1–5.3.5) in the ANSWER BOOK. (10)

5.4 What is meant by the term *collimation line*? (2)

5.5 Explain how you would use an Abney level and TWO ranging rods to measure the ground slope. (5)
[21]

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QUESTION 6

6.1 Explain, with the aid of a diagram, the method of step-chaining. (8)

6.2 What is meant by the survey term *close chain surveying*? (2)

6.3 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (6.3.1–6.3.4) in the ANSWER BOOK.

6.3.1 A tilting level is more accurate than a dumpy level.

6.3.2 The 'Y' coordinates are positive to the east of the central meridian.

6.3.3 A decrease on a staff reading indicates a rise.

6.3.4 A foresight is the first reading taken after the instrument has been set up.

(4 × 1) (4)

[14]

TOTAL: 100

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DIAGRAM SHEET 1

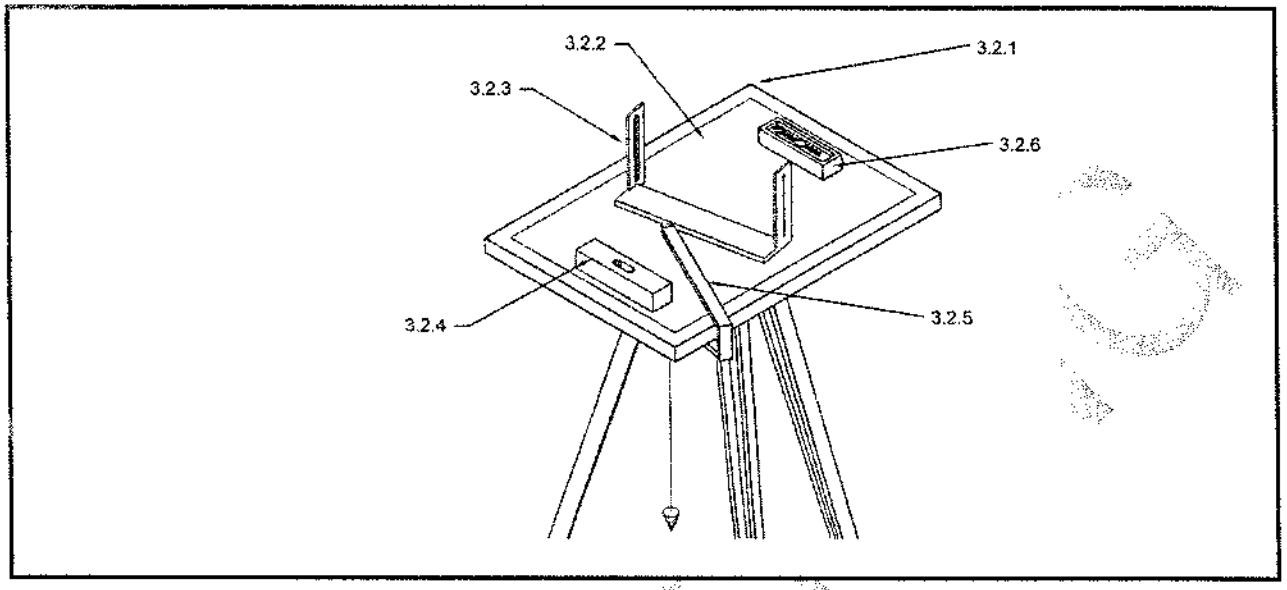


FIGURE 1

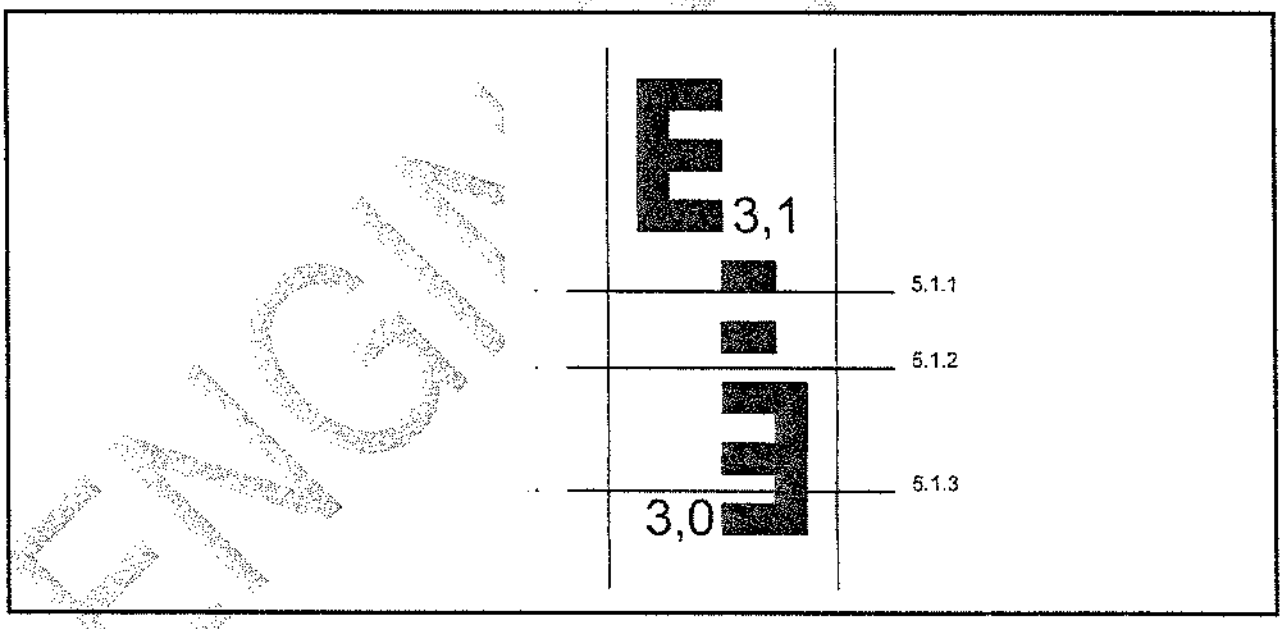
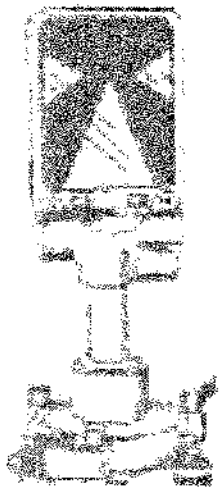


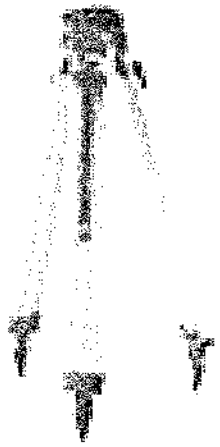
FIGURE 2

ENGLISH

DIAGRAM SHEET 2

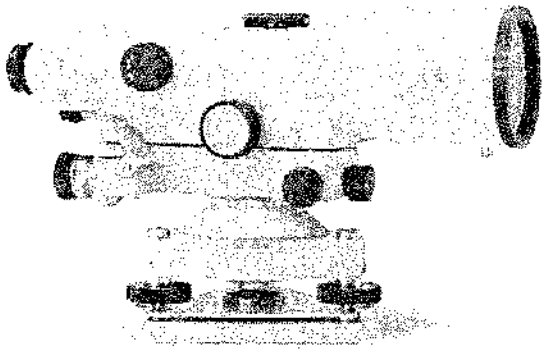


5.3.1



5.3.2

5.3.3



5.3.4

5.3.5

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BUILDING AND STRUCTURAL SURVEYING N4

FORMULA SHEET

Any other applicable formula may also be used.

1. $A = \frac{1}{2}b \times h$

2. $A = \sqrt{s(s-a)(s-b)(s-c)}$, $s = \frac{a+b+c}{2}$

3. $A = \frac{(a+b) \times h}{2}$

4. $A = a \times h$

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

6. $A = d\left[\left(\frac{y_2 + y_n}{2}\right) + y_2 + y_3 + \ldots + y_{n-1}\right]$

7. $C = L \times e \times (t_m - t_s)$

8. $C = \frac{w^2 L^3}{24\,T^2}$

9. $C = L(1 - \cos\theta)$

10. $C = H(\sec\theta - 1)$

11. $C = \frac{L.H}{R}$

12. $A = \frac{1}{2}\,abSinC$

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