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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T170**(E)**(N13)T
NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

(8060034)

13 November 2013 (X-Paper)
09:00–12:00

Calculators may be used.

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

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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 should 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 Reduced level

1.2 Meridian convergence

1.3 Magnetic declination

(3 x 2) **[6]**

QUESTION 2

2.1 Name FOUR types of surveying. (4)

2.2 State FIVE points to be carefully observed when taking field notes. (10)

[14]

QUESTION 3

3.1 Distinguish between *natural scales* and *engineering scales.* (4)

3.2 A rectangular farm measures 2 200 m x 800 m.

Draw the farm to scale 1 : 20 000 in the ANSWER BOOK. (4)

3.3 The area of a rectangular site is 0,98 ha. The site is twice as long as it is wide.

Calculate the perimeter of the site. (6)

[14]

QUESTION 4

4.1 Name FOUR typical mistakes that could occur during taping. (4)

4.2 Name FIVE means of maintenance and handling of steel tapes. (5)

4.3 What is meant by the following?

4.3.1 Standard pull

4.3.2 Standard temperature

(2 x 2) (4)

[13]

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QUESTION 5

5.1 A distance of 75,60 m between A and B was measured with a tape at a slope of 32 : 26 : 44.

Calculate the horizontal distance between A and B.

5.2 A distance was measured and found to be 137,66 m at a temperature of 29 °C. The standard temperature of the tape is 20 °C and the coefficient of linear expansion of the steel tape is 0,0000113/°C.

Calculate the correct distance.

5.3 A distance of 234,76 m was measured as 950 m above sea-level.

Calculate the length at sea-level if the radius of the earth is 6 373 km.

(3 x 4) **[12]**

QUESTION 6

6.1 Define the following survey terms:

6.1.1 Foresight

6.1.2 Closed survey

6.1.3 Tacheometry

(3 x 2) (6)

6.2 What is the purpose of the bubble tube in surveying instruments? (2)

6.3 What are the FOUR important qualities regarding the properties of a surveying telescope? (4)

6.4 FIGURE 1, on the DIAGRAM SHEET (attached) shows a section through a spirit level of a levelling instrument.

Label the numbered parts and write the answers next to the numbers (6.4.1–6.4.7) in the ANSWER BOOK. (7)

[19]

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QUESTION 7

7.1 When planning to carry out a chain survey over a site, certain practices have to be followed.

State SIX of these practices. (6)

7.2 FIGURE 2, on the DIAGRAM SHEET (attached) shows a site with corner posts A, B, C and D.

Explain how you would use the plane table to plot the corner posts by means of the radiation method.

Do the necessary sketches on FIGURE 2 to motivate your explanation. (10)

7.3 Make neat sketches of the following and state the function of each:

7.3.1 Sight rail

7.3.2 Boning rod

(2 x 2) (4)

7.4 Show, by means of simple sketches, how the following details are shown on a detailed map:

7.4.1 Swamp

7.4.2 Hedges

(2 x 1) (2)

[22]

TOTAL: 100

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EXAMINATION NUMBER:

DIAGRAM SHEET

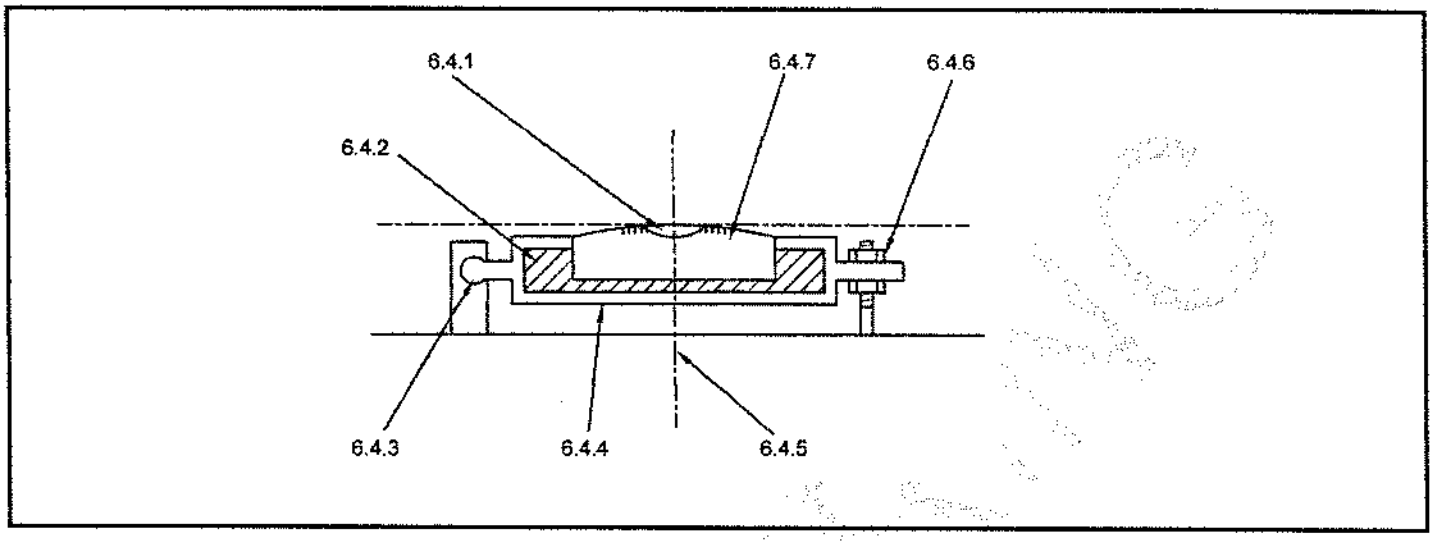

FIGURE 1

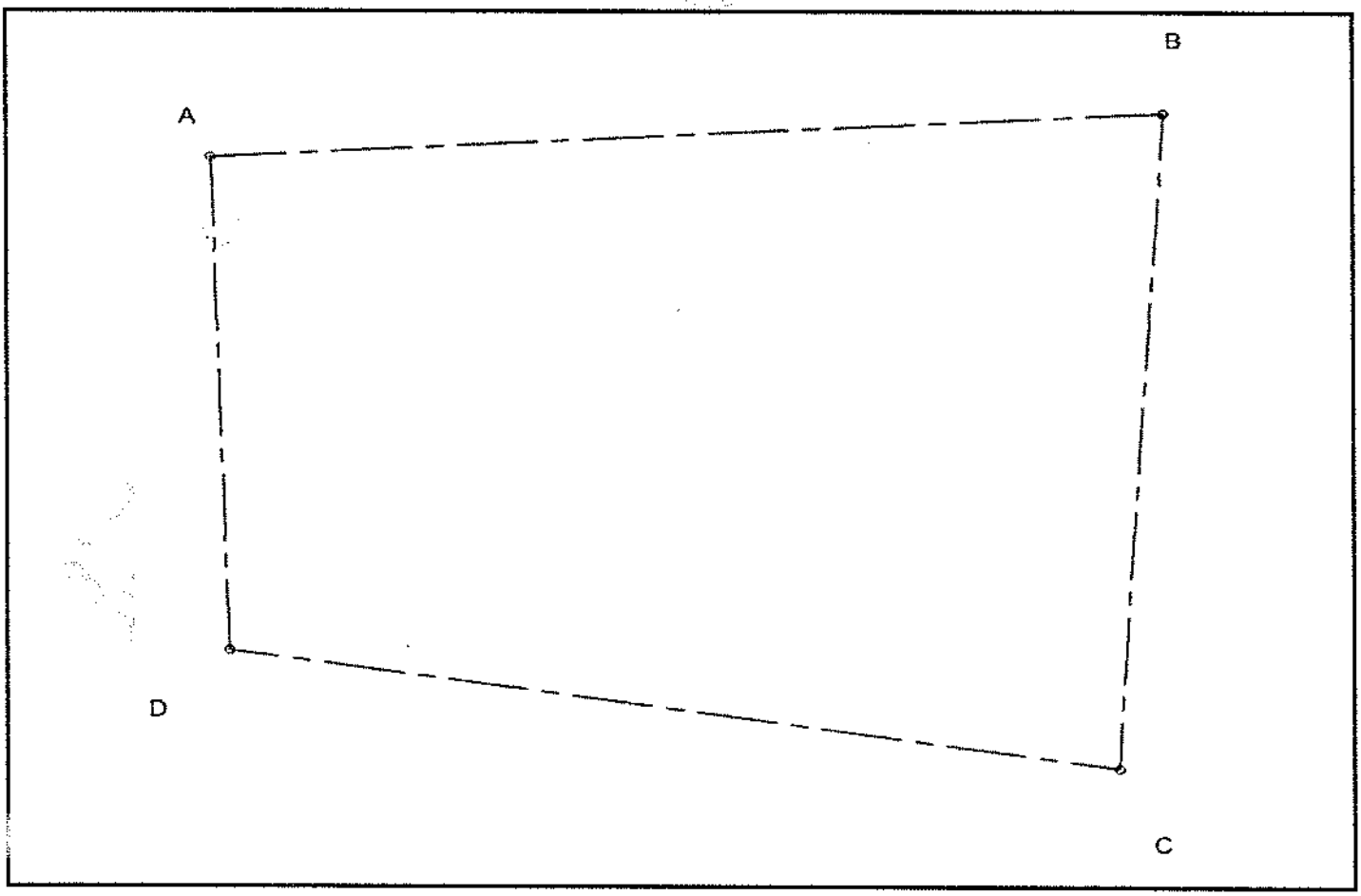

FIGURE 2

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BUILDING AND STRUCTURAL SURVEYING N4

FORMULA SHEET

Any other applicable formula may also be used.

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

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

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

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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