higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T160**(E)**(A12)T

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

(8060034)

12 April 2018 (X-Paper)
09:00–12:00

Calculators and drawing instruments may be used.

This question paper consists of 6 pages 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. Write neatly and legibly.

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QUESTION 1

Choose a description from COLUMN B that matches an item in COLUMN A. Write only the letter (A–J) next to the question number (1.1–1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1	Local disturbances	A	the location of the natural and artificial features of the area
1.2	Azimuth of a line	B	imaginary lines around the earth passing the earth through the poles
1.3	Field party	C	made of fiberglass coated with pvc
1.4	Plain meter	D	consists of a telescope and a bubble tube which make it possible to obtain a horizontal line
1.5	Synthetic tape	E	consists of a curved glass tube partly filled with a liquid such as alcohol
1.6	Meridian	F	influences preventing the needle from pointing to magnetic north in a given locality
1.7	Topographic surveying	G	consists of three legs which may be solid-framed
1.8	Bubble tube	H	the angle the line makes with the north-south meridian measuring clockwise from north
1.9	Tripod	I	a mechanical instrument used to calculate irregular areas for which there are no formula
1.10	Dumpy level	J	the members of a survey team doing work on site

(10 × 1) **[10]**

QUESTION 2

2.1 Name FIVE types of scales used in surveying. (5)

2.2 What is compass surveying? (2)

2.3 State FIVE disadvantages of a compass. (5)

[12]

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QUESTION 3

3.1 Explain the difference between a *building surveyor* and a *land-surveyor*. (6)

3.2 Describe how you would use an Abney level and two ranging rods to measure the ground slope. (5)

3.3 Differentiate between the following:

3.3.1 Official heights and local heights

3.3.2 Bench mark and datum

3.3.3 Backsight and foresight

(3 × 2) (6)
[17]

QUESTION 4

4.1 Define a *map*. (3)

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

4.2.1 Fence not on cadastral boundaries

4.2.2 Wall (with pillar)

4.2.3 Buildings

4.2.4 Water course

4.2.5 Traverse station

(5 × 2) (10)
[13]

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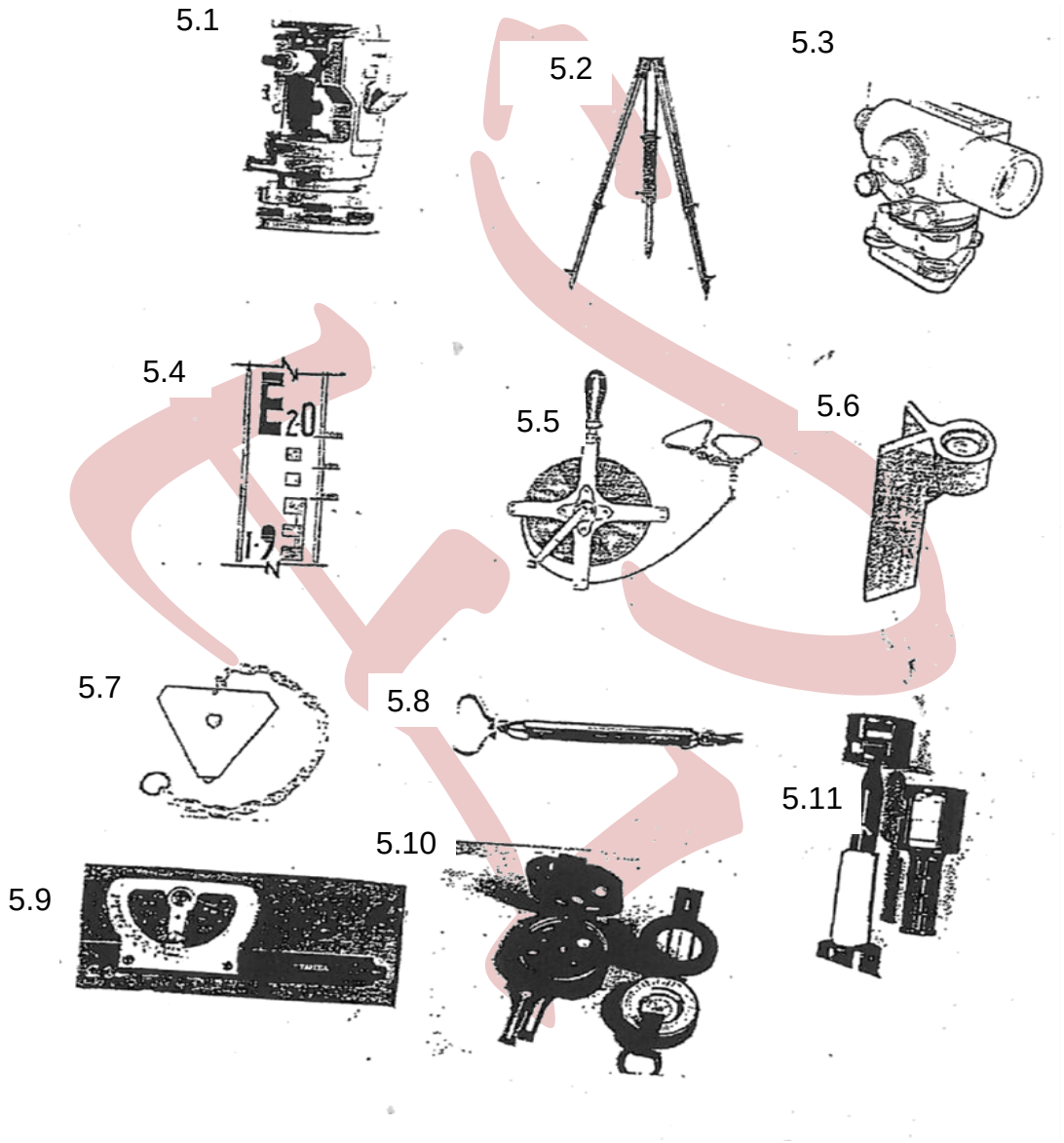
QUESTION 5

The pictures below show 11 different types of instruments that are used by a surveyor.

Name and state the use of each instrument by writing the answer next to the question number (5.1–5.11) in the ANSWER BOOK.



(11 × 2) **[22]**

QUESTION 6

Name FIVE parts or accessories of each of the following:

6.1 Optical square

6.2 Plane table

6.3 Abney level

(3 × 5) **[15]**

QUESTION 7

7.1 Calculate the area of a segment in a circle with a radius of 8 m.

The included angle is 65°. (6)

7.2 A distance of 104 m was measured with a steel tape at a temperature of 15 °C.

The standard temperature of the tape is 20 °C and the coefficient of linear expansion is 0,0000113/°C.

Calculate the correct distance. (5)

[11]

TOTAL: 100

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FORMULA SHEET

BUILDING AND STRUCTURAL SURVEYING N4

Any other applicable formula may also be used.

1. $A = {}^{1}/_{2}\, bx \perp h$ $A = ½\ bx\ \underline{i}\ h$
2. $A = \sqrt{s(s-a)(s-b)(s-c)}$, $\frac{a+b=c}{2}$
3. $A = \frac{(a+b)x\ h}{2}$
4. $A = a\ x\ h$
5. $A = \frac{d}{3}[(y_1 + y_n) + 2(y_3 + y_5 + ... + (y_n - 2) + 4(y_2 + y_4 + ... + y_n - 1)]$
6. $A = d\ [(\frac{y_2 + y_n}{2} + y_2 + y_3 + ... + y_{n-1}]$
7. $C = L\ x\ e\ x(t_m - t_s)$
8. $C = \frac{W^2 L^3}{24T^2}$
9. $C = L\ (1 - Cos\theta)$
10. $C = H\ (sec - 1)11.C = \frac{LH}{R}$
12. $A = \frac{1}{2} abSinC$

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