higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

(8060034)

17 April 2020 (X-paper)
09:00–12:00

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

293Q1A2017

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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. Start each section on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.10) in the ANSWER BOOK.

1.1 Levelling is the preparation of plans showing and defining legal property boundaries.

1.2 Topographical surveying determines the extent of existing work to keep the relationship between surface and underground work correct.

1.3 Mean sea level is the mean level of the sea.

1.4 Cadastral surveying determines the differences in height of points on the surface of the earth.

1.5 Qualities of a good surveyor include having a sound knowledge of the theory and practice of surveying.

1.6 A benchmark is a fixed point of known height from which the level of other points may be established.

1.7 A horizontal line at a point is perpendicular to the direction of the plumb line at the point and tangential to the level at that point.

1.8 A triangulation survey involves the building up of a network of triangles from an accurately measured base line by measuring the angle only.

1.9 Backsight is the last reading taken before moving the instruments.

1.10 A collimation line is a straight line joining the line of sight.

(10 × 1) **[10]**

QUESTION 2

2.1 Define the term *chain surveying*. (3)

2.2 Give FOUR disadvantages of a chain. (4)

2.3 The field book on the DIAGRAM SHEET (attached) give details of a chain survey. All measurements are given in meters.

Plot, to scale 1:500, the stations, lines and detail in the ANSWER BOOK. (10)
[17]

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QUESTION 3

3.1 A measured distance of 98,600 m was obtained between two points with a 100 m long tape that was later found to be 0,02% short.

Calculate the correct length. (4)

3.2 Which distance in metres does 30 mm represent on a map scale of 1:250 000? (3)

3.3 Calculate the distance between two points on a map if the representative fraction on the map is 1:10 000 and the actual ground distance is 1 500 m. (3)

[10]

QUESTION 4

4.1 Define the term *planimeter*. (3)

4.2 Give TWO advantages of a steel tape. (2)

4.3 Differentiate between a *polar planimeter* and a *linear planimeter*. (3 + 3) (6)

[11]

QUESTION 5

Define each of the following survey terms:

5.1 Plane

5.2 Datum

5.3 Change point

5.4 Grid north

5.5 Magnetic declination

5.6 Agonic line

5.7 Topographic survey

5.8 Prime meridian

5.9 Line of longitude

5.10 Parallax

(10 × 2) **[20]**

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QUESTION 6

Complete the following paragraph about the South African coordinate system by choosing an item from the list below. Write only the answer next to the question number (6.1–6.10) in the ANSWER BOOK. Some items may be used more than once.

2°; *y*-axis; even; longitude; *x*-axis; odd; central; boundary

Lines of (6.1) … are used instead of the equator. The system is a rectangular grid with the (6.2) … running parallel to the equator. The (6.3) … runs from north to south. The system consists of belts (6.4) … of longitude width. Each belt consists of one (6.5) … meridian which is an (6.6) … meridian and two (6.7) … meridians which are (6.8) … meridians. The (6.9) … is positive west and negative east of the central meridian. The (6.10) … is positive south of the equator. (10 × 1) **[10]**

QUESTION 7

7.1 Explain the objective of surveying. (5)

7.2 Define each of the following methods of surveying:

7.2.1 Tacheometric surveying (3)

7.2.2 Traversing surveying (3)

7.2.3 Compass surveying (2)

[13]

QUESTION 8

8.1 A tape is 0,73 too short.

Calculate the correct distance to be measured with the tape so that the base line is exactly 450 m long. (4)

8.2

Distance measured:	180 m
Standard temperature:	20 °C
Coefficient of linear expansion:	0,0000113/°C
Temperature at the time of measurement:	25 °C

Calculate the correct distance. (5)

[9]

TOTAL: 100

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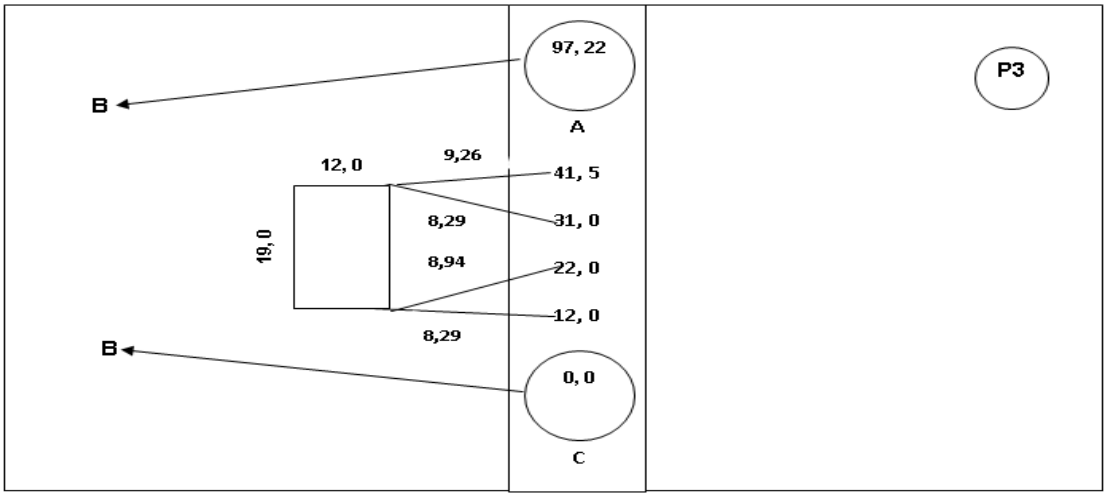
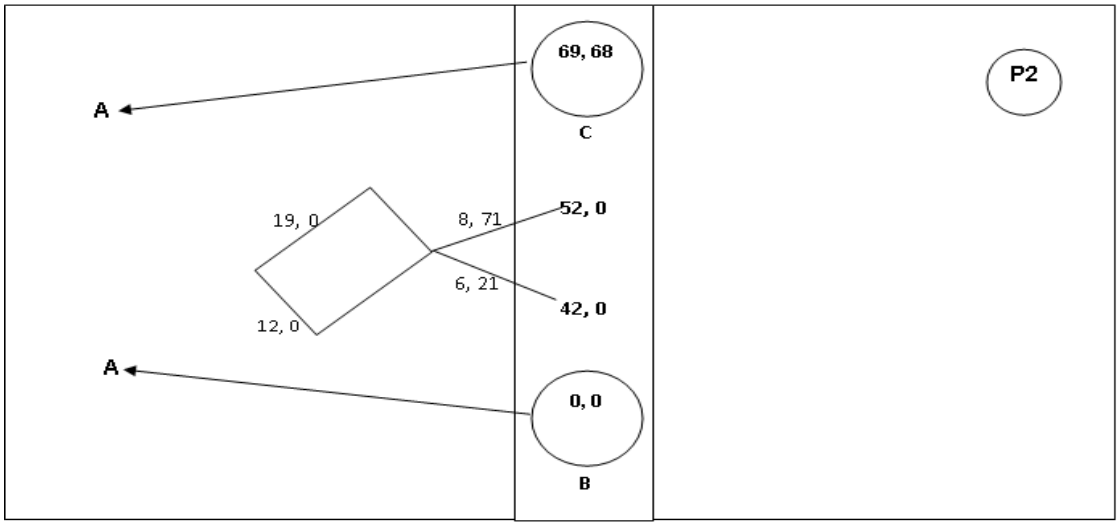
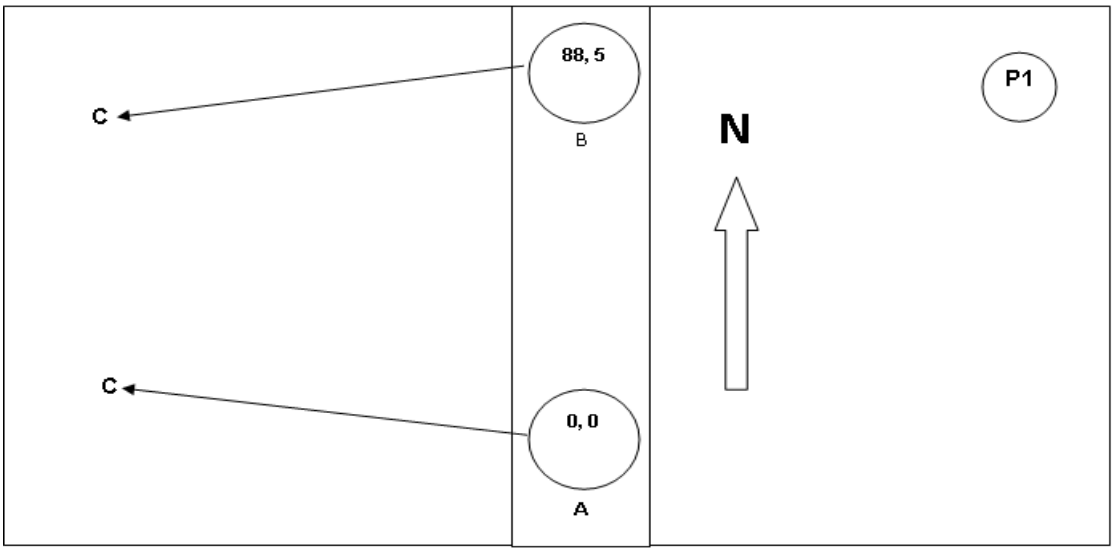
(8060034)

DIAGRAM SHEET







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FORMULA SHEET

Any other applicable formula may also be used.

1. $A = \frac{1}{2}bx \perp h$
2. $A = \sqrt{s(s-a)(s-b)(s-c)}$, $\frac{a+b=c}{2}$
3. $A = \frac{(a+b)x\,h}{2}$
4. $A = a \times h$
5. $A = \frac{d}{3}[(y1 + yn) + 2(y3 + y5 + \ldots + (yn - 2) + 4(y2 + y4 + \ldots + yn - 1)]$
6. $A = d\,[(\frac{y_2 + y_n}{2} + y2 + y3 + \ldots + yn - 1]$
7. $C = L \times e \times (tm - ts)$
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. $A = \frac{1}{2}absincC$

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