higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

BUILDING AND STRUCTURAL SURVEYING N4

10 APRIL 2015

This marking guideline consists of 9 pages.

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QUESTION 1

1.1
- The method of surveying where distances and elevation of points are obtained by theodolite and staff
- The method of surveying when measurements are done by optical means

(Any 1 × 2)

1.2 The bearing of a line is the angle it makes with the meridian

1.3 Are members of a survey team doing work on site

1.4 When the position of the previous foresight is used for the new backsight reading

1.5 Is the representation of the lines of latitude and longitude on a map

(5 x 2) **[10]**

QUESTION 2

2.1
- The area worked on is relatively small.
- It can therefore be assumed to be a horizontal plane.
- All measurements are portrayed on this plane except elevations.
- The curvature of the earth need not be taken into account. (Any 3 × 1) (3)

2.2
- It is an official record of the survey.
- It may be the only evidence of conditions at the time of survey.
- It reflects the surveyor's competence.
- It reflects the surveyor's credibility.
- It could supplement the original.
- Mistakes can be costly.
- It prevents backtracking.
- The notes are used to make drawings and calculations.
- Mistakes can occur if field notes cannot be read properly. (Any 5 × 1) (5)

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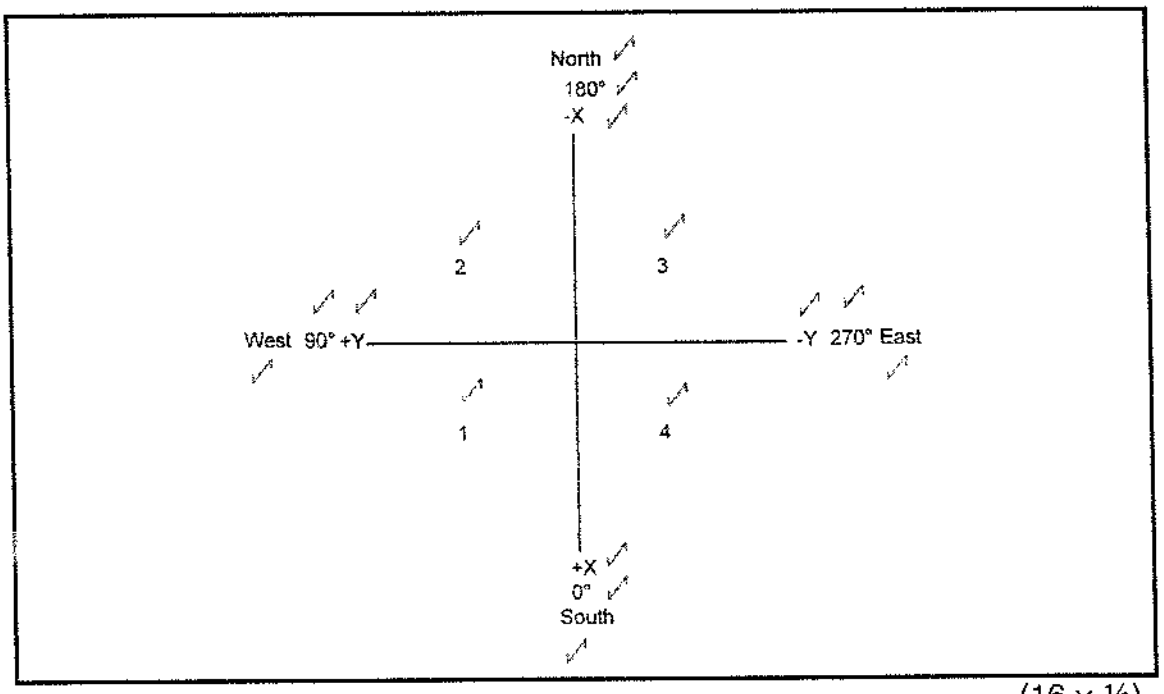
2.3



(16 × ½) (8)
[16]

QUESTION 3

3.1 RF = 1 : 50 000
Map distance = 28 mm
Actual distance = 28 × 50 000√
= 1 400 000 mm√
= 1 400 m√ (3 x 1) (3)

3.2 A = length × width

$$A = \left(\frac{375 x 2500}{1\ 000}\right) x \left(\frac{215 x 2500}{1\ 000}\right) \sqrt{}$$

$$A = 503\ 906,25\ m^2 \sqrt{}$$

$$A = 50,39\ ha \sqrt{}$$ (3)

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3.3 Area of sector = $(\prod r^2)x\frac{\theta}{360}\sqrt{}$

= $(\prod 54^2)x\frac{42}{360}\sqrt{}$

Area of sector = 1 068,77 $m^2\sqrt{}$

Area of triangle = $\frac{r^2 \sin\theta}{2}\sqrt{}$

= $\frac{54^2 \sin 42}{2}\sqrt{}$

Area of triangle = 975,60 $m^2\sqrt{}$

Area of segment = 1 068,77 - 975,60 $\sqrt{}$

Area of segment = 93,17 $m^2\sqrt{}$ (Any 6 × 1) (6)

3.4
- Sexagesimal
- Centesimal
- Radian (3 x 1) (3)

3.5 180 + 63 = 243°√√ (2)

3.6 3.6.1
- Mistakes are blunders which are avoidable.
- They occur because of inexperience, carelessness or mental lapse.
- Mistakes are also unpredictable. (Any 2 × 1) (2)

3.6.2
- Wrong bookings
- Using incorrect data
- Incorrect reading (Any 2 × 1) (2)

3.6.3 Adjustments cannot be made. (1)
[22]

QUESTION 4

4.1
- Wrong bookings can occur.
- It is a laborious task.
- It takes a long time.
- Measurement could be entered on the wrong side of the chain line. (4 × 1) (4)

4.2
- Metallic tape
- Linen tape
- Plastic tape (3 × 1) (3)

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4.3 $$CD = MD \times \frac{ATL}{GTL}$$

$$800 = MD \times \frac{100 - 0,65}{100} \surd$$

$$800 = MD \times \frac{99,35}{100} \surd$$

$$800 = MD\ x\ (0,9935)$$

$$MD = \frac{800}{0,9935} \surd$$

$$MD = 805,234\,m \surd$$ (4 × 1) (4)

4.4 $$Ct = L\ x\ E\ x\ (Tm - Ts) \surd$$

$$+0,011 = 70\ x\ 0,0000113\ x\ (34 - ts) \surd$$

$$+0,011 = 0,000791\ x\ (34 - ts) \surd$$

$$\frac{+0,011}{0,000791} = 34 - ts \surd$$

$$ts = 34 - \left(\frac{0,011}{0,000791}\right) \surd$$

Ts = 20°C√ (6 × 1) (6)

4.5 $$Ch = \frac{LH}{R}$$

$$Ch = \frac{272\,x\,2300}{6373000} \surd$$

$$Ch = 0,098\,m \surd$$

Correct distance = 272 - 0,098√
= 271,902 m√ (4 × 1) (4)
[21]

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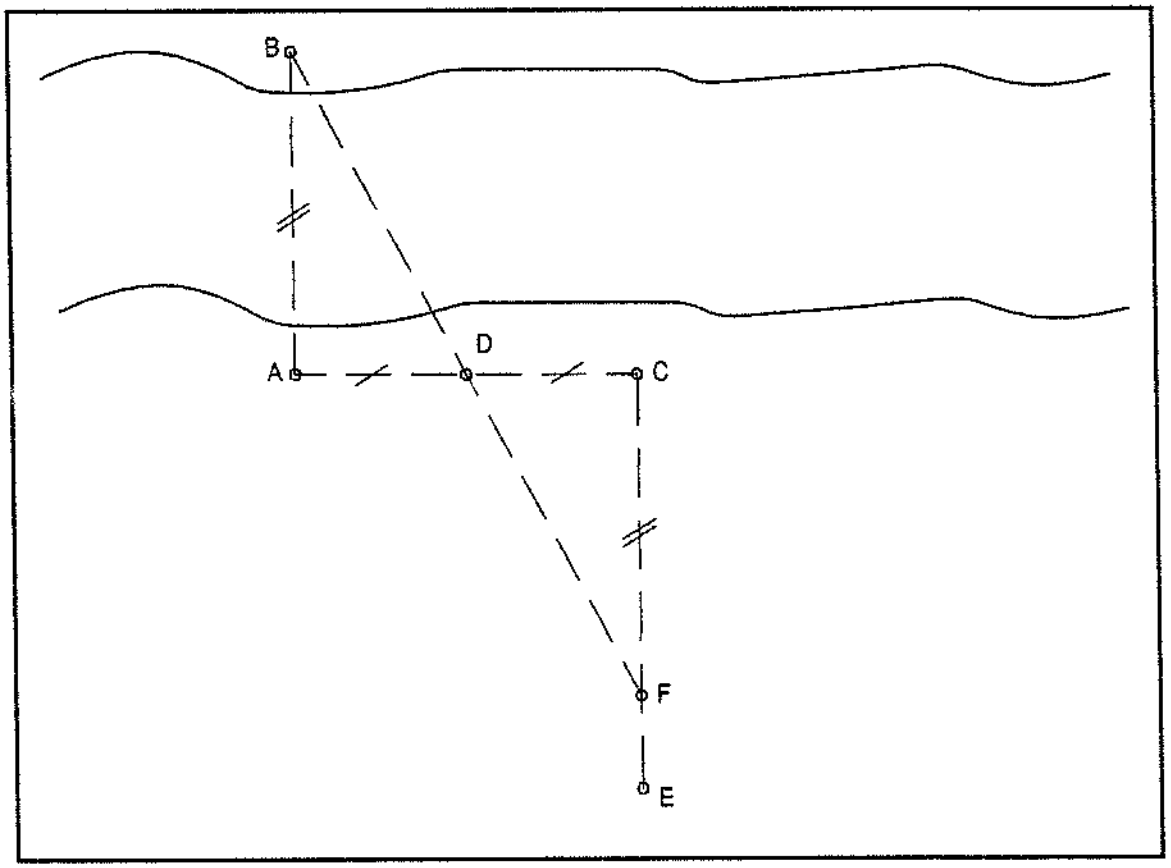
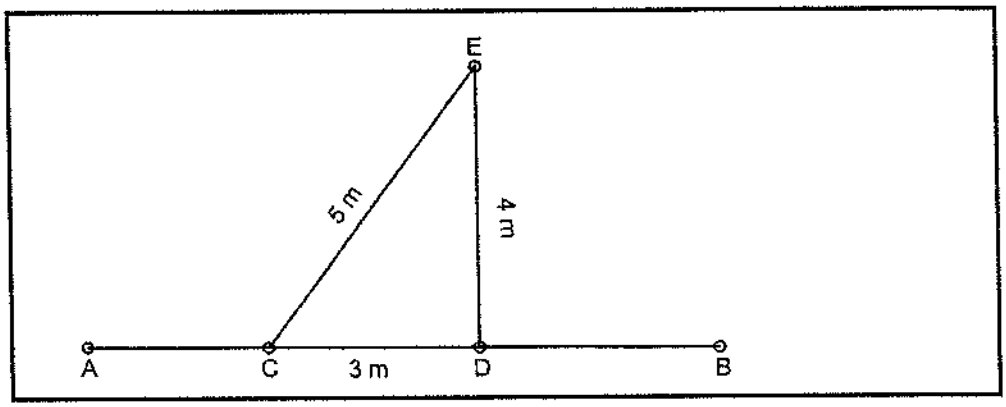
QUESTION 5

5.1 5.1.1



SKETCH NN
Set out line AC perpendicular to AB. N N
Find D the midpoint of AC. N
Set off CE perpendicular to AC. N N
Move along CE until point B and D are in line. N
This will be point F. N
CF will be equal to AB. N (10 × ½) (5)

5.1.2



SKETCH ✓✓

D is the point from which the right angle must be set out. ✓
Place a peg at C 3 m from D along line AB. ✓
One person keeps the first tape at the zero mark at D. ✓
Another person keeps the zero mark of a second tape at C. ✓
A third person keeping the first tape at the 4 m mark and the second tape at ✓
the 5 m mark walks outwards until both tapes are fully extended and the 4 m ✓
and 5 m marks on the tapes coincides at E. ✓
A peg is placed at E which will be perpendicular to D ✓ (10 × ½) (5)

5.2
- The angle between the line of sight through an optical instrument and the position the line would have in a perfect instrument
- The small angle by which the line of sight departs from the actual level surface through the instrument when the instrument is considered to be level (Any 1 × 3) (3)

[13]

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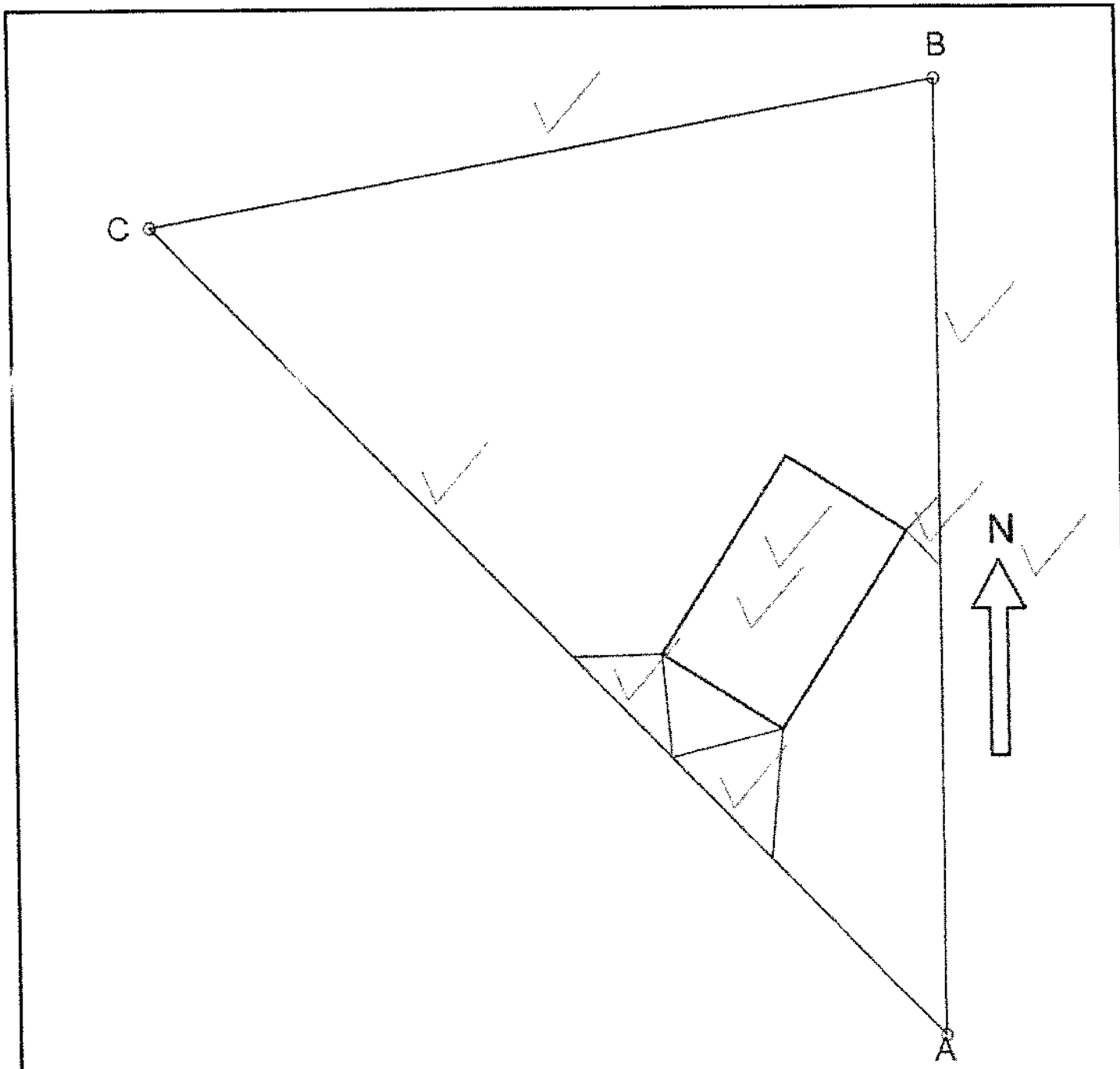
QUESTION 6



Correct plotting of AB = 1
BC = 1
CB = 1
Correct ties = 3 × 1
Building correct = 2 × 1
North = 1
Neatness = 1
Total **10**

[10]

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QUESTION 7

7.1 It is to set the line of sight of the instrument perpendicular to gravity. (2)

7.2
- Alcohol
- Ether
- Chloroform (Any 2 × 1) (2)

7.3
- They have a lower viscosity.
- They have a low freezing point.
- They do not evaporate easily. (Any 2 × 1) (2)

7.4 So that the bubble will find its way to the highest part of the tube. (1)

7.5
- To bring the bubble to the centre of its run.
- To show the exact position of the bubble when it is level. (Any 1 × 1) (1)

[8]

TOTAL: 100

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