higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

22 April 2021

This marking guideline consists of 7 pages.

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QUESTION 1

1.1 F
1.2 I
1.3 A
1.4 H
1.5 G
1.6 D
1.7 E
1.8 C
1.9 J
1.10 B

(10 × 1) **[10]**

QUESTION 2

2.1 2.1.1 This is the examination of the area to be surveyed before taking measurements.✓ This will help the surveyor to plan the work accordingly:✓ to decide which method to use, to select the stations to use,✓ to assess the suitability of the site for the proposed works,✓ to assess the effects of change the proposed work will have on the environment.✓ (5)

2.1.2 This involves measuring distance✓ and angles accurately by the correct handling✓ and manipulation of instruments,✓to determine the horizontal and vertical distances of points✓ (4)

2.1.3 This is the recording of all data collected in a field book.✓ This data is what will be used to design the final map✓ or plan of the works.✓ (3)

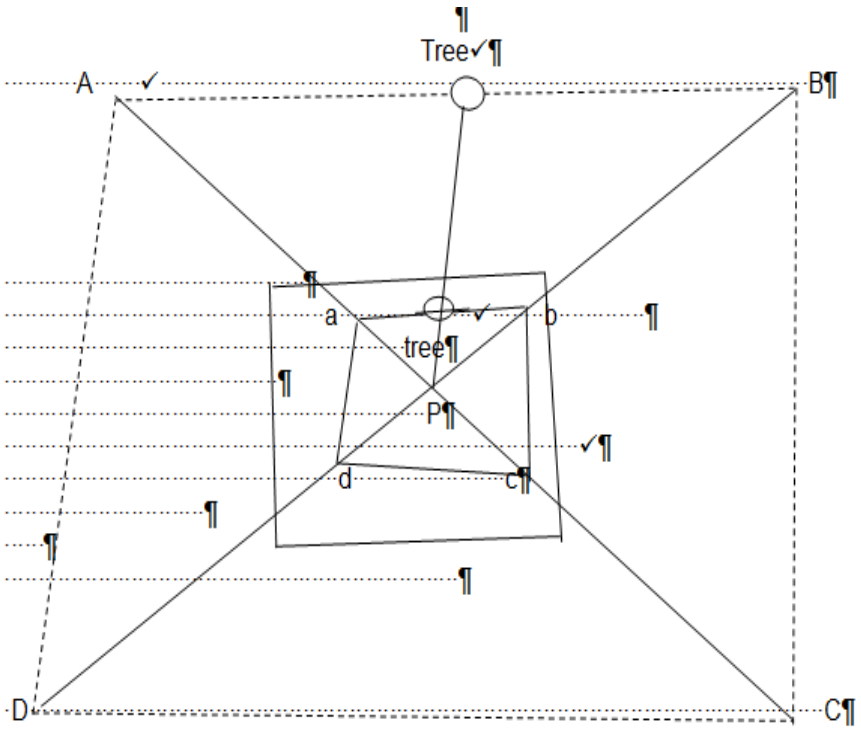
2.2 2.2.1 Open traverse is used when surveying along a river etc.✓ it starts from a known point and ends at another known point.✓ (2)

2.1.2 Closed traverse is used in the survey of boundary lines.✓ It starts from a known point and ends up at the same point.✓ (2)

[16]

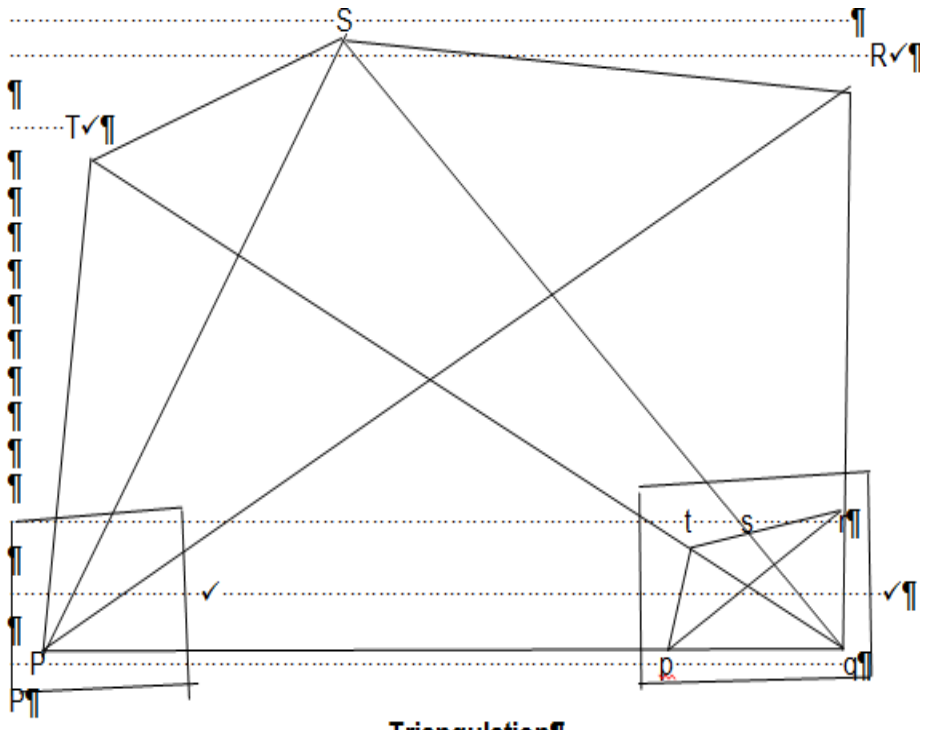
QUESTION 3

3.1 3.3.1



RADIATION¶ (4)

3.3.2



Triangulation¶ (4)

3.2
- Production of maps and plans of small areas.
- For the preparation of reconnaissance and exploratory survey maps and plans.
- Filling in details between control points established more accurate by theodolite traverse or triangulations, as plane table is faster than the chain survey method.
- When existing maps and plans are reviewed.
- For the location of contours. (5)

[13]

QUESTION 4

4.1 RF = 1:1200
GU = 660 m (convert to millimetres)
= 660 × 1 000 = 660 000 mm✓
MU = RF × GU✓
= $\frac{1}{1200} X 660000$ ✓
MU = $\frac{660000}{1200}$ ✓
= 550 mm or 0,55 m✓ (4)

4.2 Mu = 83 mm (convert to meters)

MU = $\frac{83}{1000}$ = 0,083✓

RF = 1:5000

MU = RF × GU✓

= 0,083 × 5 000✓

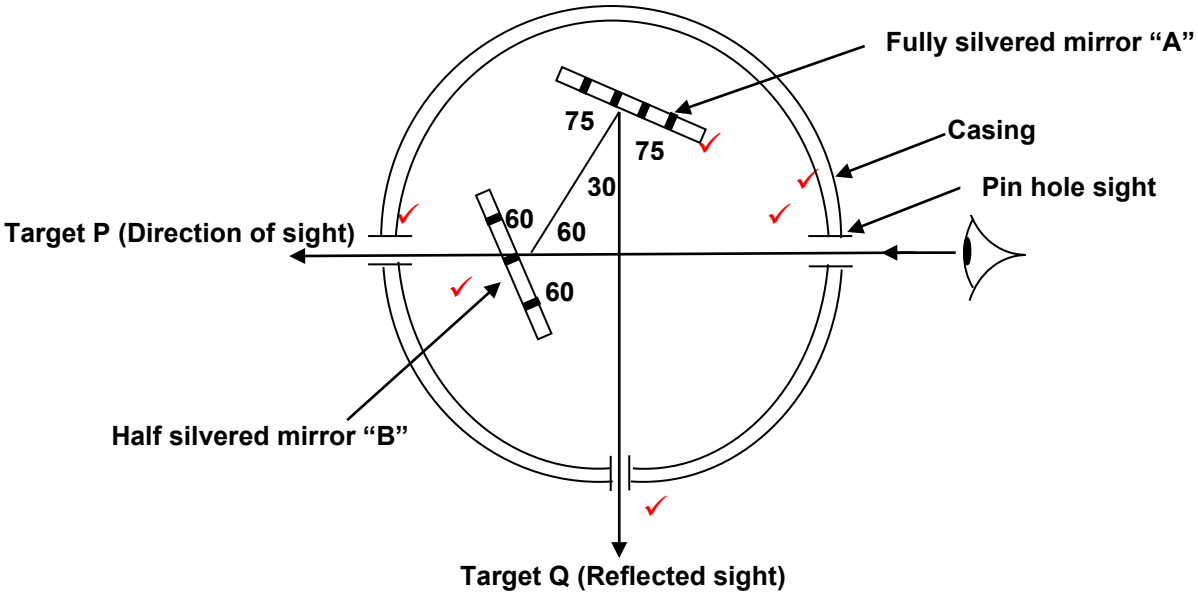
= 415 m or 415 000 mm✓ (4)

4.3
- Scale
- Speed and cost
- Skill and experience
- Control (frame work) – (fixed points) (4)

[12]

QUESTION 5

5.1



The observer holds the instrument over the selected point and sights the target P✓ through the half silvered mirror B.✓ An assistant holding the ranging pole is directed at Q until the pole is seen to coincide exactly with target P in the upper silvered half B,✓ whereupon a right angle will have been formed.✓ (10)

5.2 A magnetic needle consists of a piece of magnetized cast steel supported at its centre,✓ which aligns itself win a position determined by the earth's magnetic field.✓ (2)

5.3
- It should be sensitive.
- The magnetic axis should coincide with the geometrical axis.
- The ends should lie in the same horizontal and vertical planes as the pivot point.
- For stability the centre of gravity should be as far below the pivot point as possible.
- The housing box should be non-magnetic. (5)

5.4
- Slide
- Bubble tube
- Graduated rule
- Vane with 5 peep-holes (4)

[21]

QUESTION 6

6.1 Ct = L × e (tm – ts)
= 2056,40 × 0,0000113 (38 – 20) ✓
= 0,418✓

CD = 2 056,40 + 0,418✓
= 2 056,818✓

HD = SD × Cos $15,9^0$
= 2056,818 × Cos 15,9✓
= 1978,127 m✓ (6)

6.2 Ct = L × e (tm – ts)
= 456,51 × 0,0000112 (14 – 22)✓
= - 0,041✓

CD = 456,51 – 0,041✓
= 456,469 m✓

HD = SD × Cos 7^0 49 10
= 456,469 × Cos 7,819✓
= 452,225 m✓ (6)

[12]

QUESTION 7

7.1 Geological survey is an investigation of the subsurface of the ground✓ to create a geological map or model.✓ (2)

7.2 Hydrographic survey is the gathering of information about navigable waters✓ for the purpose of safe navigation of vessels. ✓ (2)

7.3 Topographic survey is a survey that measures the elevation of points on a particular piece of land✓ and present them as contour lines on a plot.✓ It is done to locate features such as hills, rivers, valleys, lakes etc.✓ (3)

7.4 Alidade is a sight rule with sighting vanes at both ends✓ it is used for sighting the direction of the distant target,✓ or fitted with a telescope.✓ The edge of the alidade acts as a straight edge, and is used to rule lines,✓ parallel to the observed sight direction, on the paper.✓ (5)

7.5 Plumbing fork is a bent steel arm used to position the station point on the ground onto the drawing paper on the plane table.✓ The upper arm on the drawing paper is set in such a way that it points to the position of the ground,✓ and the plumb bob hangs on the lower arm,✓ vertical above the station point which corresponds with the position of the upper arm.✓ (4)

[16]

TOTAL: 100

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