higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N6

9 April 2021

This marking guideline consists of 8 pages.

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QUESTION 1

1.1

REDUCED LEVEL	WEIGHTING	RL x WEIGHTING	
85.2	1	85.2	1/2 ✓
85.1	2	170.2	1/2 ✓
83.9	2	167.8	1/2 ✓
84.1	1	84.1	1/2 ✓
85.9	2	171.8	1/2 ✓
86.0	2	172.0	1/2 ✓
85.0	2	170.0	1/2 ✓
86.3	3	258.9	1/2 ✓
84.5	1	84.5	1/2 ✓
85.2	1	85.2	1/2 ✓
86.0	2	172.0	1/2 ✓
85.1	2	170.2	1/2 ✓
86.2	2	172.4	1/2 ✓
86.1	1	86.1	1/2 ✓
∑	**24**	**2050.4**	1/2 ✓

Mean level = 2 050,4/24 = 85,43 m √

Depth of filling = 86,5 – 85,43 = 1,07 m√

∴ Volume = Area × Depth of filling

= (10 × 10 × 7) (1,07)√

= 749 m^3 √ (10)

1.2 1.2.1 Area of triangle ACD = √(s)(s – a)(s – b)(s – c)

Where s = (a + b + c)/2

Substitution values s = (76 + 60 + 78)/2

= 107 ✓

∴ Area of ACD = √(107)(107 – 70)(107 – 60)(107 – 78)

= 2 322,95 m^2 ✓ (2)

1.2.2 Area of triangle ABC = √(s)(s – a)(s – b)(s – c)

Where s = (a + b + c)/2

Substitution values s = (63 + 45 + 76)/2

= 92

∴ Area of ACD = √(92)(92 – 63)(92 – 45)(92 – 76)

= 1 416,45m^2 ✓ (1)

1.2.3 Area of irregular shape = h/3 [1st + Last + 4 (Even offsets) + 2 (Ord offsets)]

= 10/3 [0 + 13,2 + 4(4,2 + 8,1 + 11,3) +2(6,4 + 10,3)]

= 470 m^2 ✓

(1)

1.2.4 Area of irregular shape = h/2 [1st + Last + 2 (Sum of other offsets)]

= 10,3/2 [0 + 9 + 2(6 + 7 + 0 – 7 – 7 + 0 + 11 + 5)] ✓

= 200,85 m^2 ✓

NB (the two negative ordinates are meant to subtract the portion of irregular shape along AD, which is included in the calculation of triangle ACD.

(2)

1.2.5 Area of shape X = Area of triangle = ½ Base × Height

= ½ × 15 × 5 ✓

= 37,3 m^2 ✓ (2)

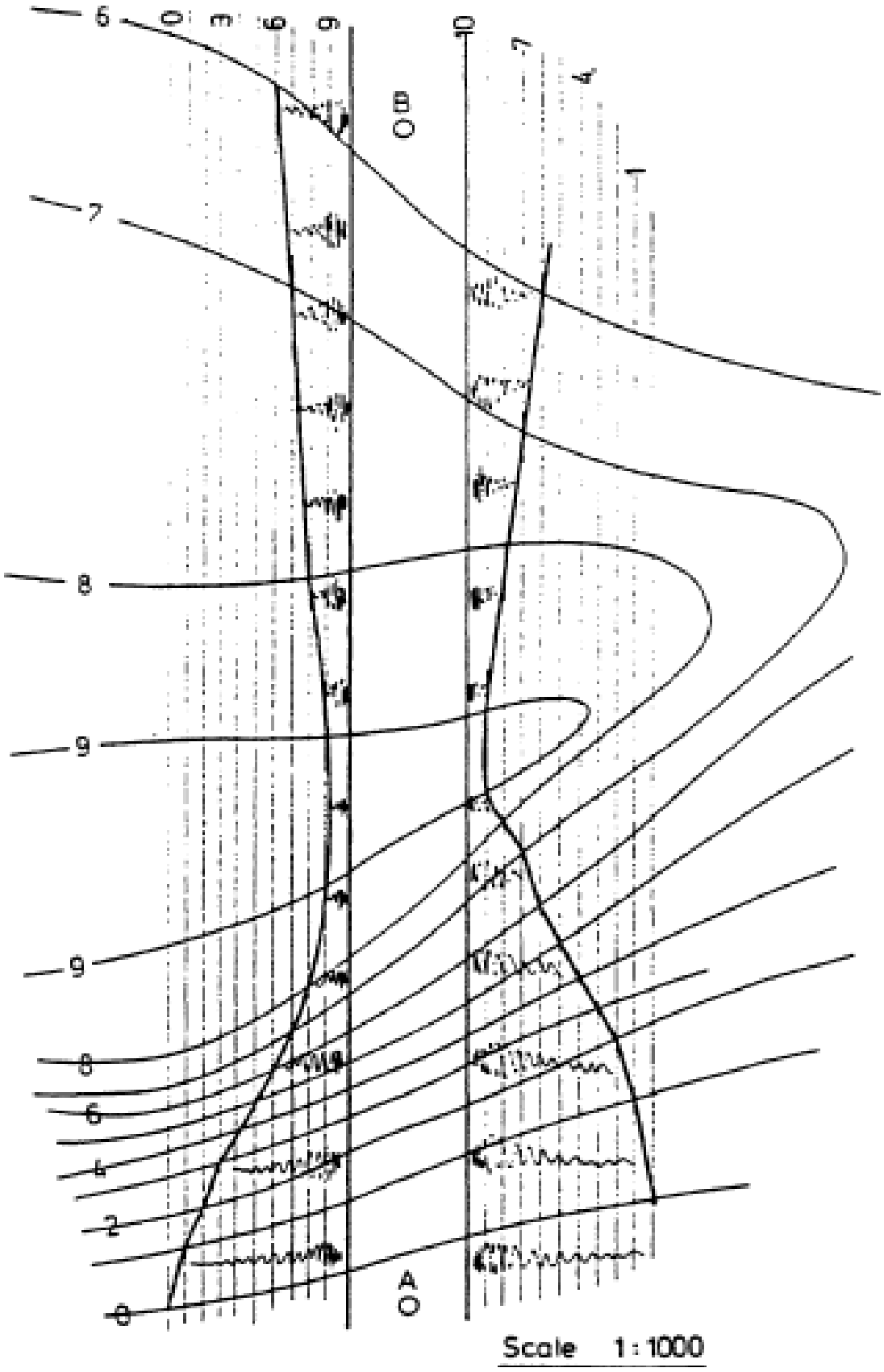
1.2.6 Total area in Ha = (2 322,95 + 1 416,45 + 470 +200,85 + 37,3)/10 000 ✓

= 0,445Ha ✓

(2)

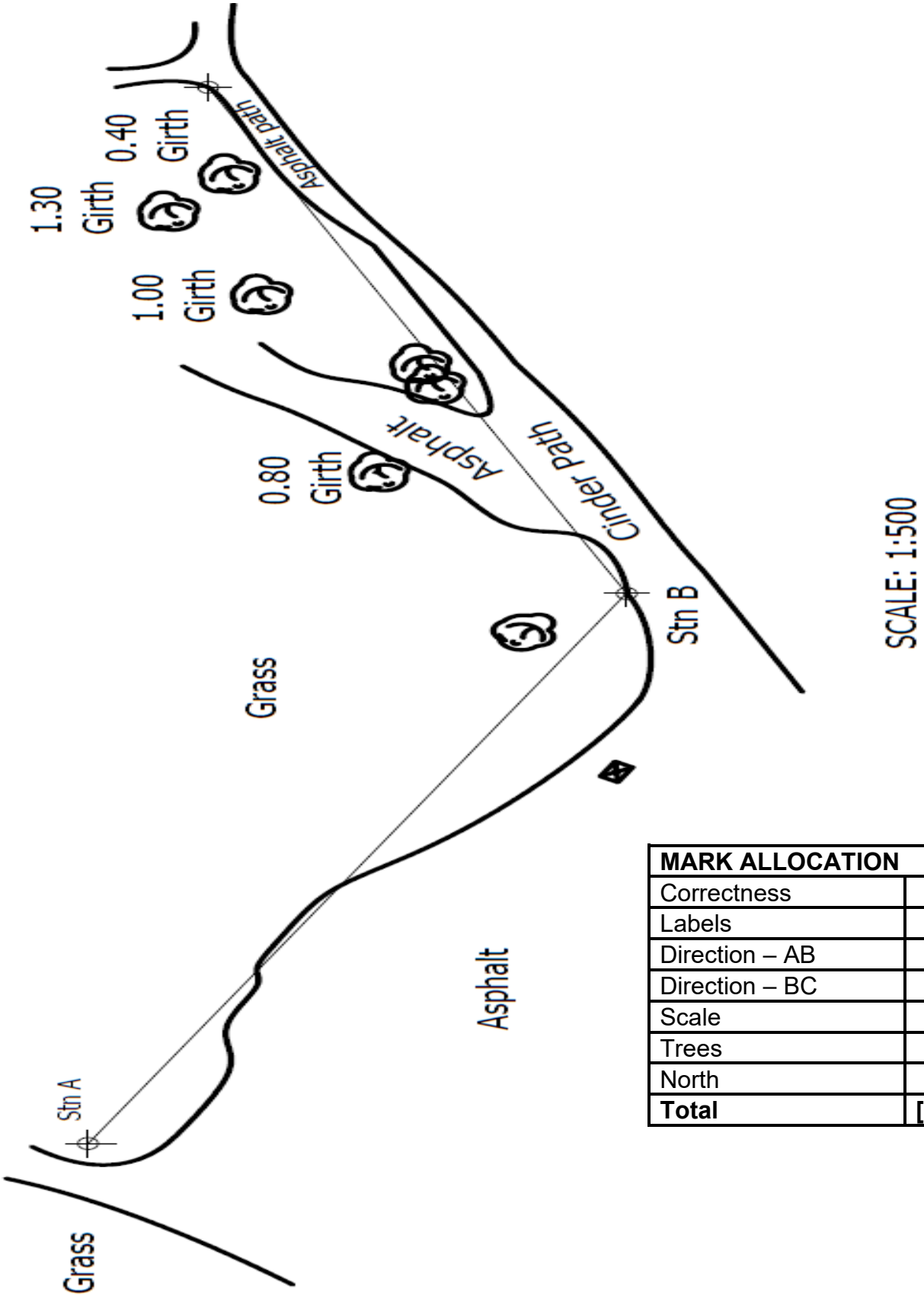
[20]

QUESTION 2



[20]

QUESTION 3



MARK ALLOCATION	
Correctness	6
Labels	6
Direction – AB	1
Direction – BC	1
Scale	1
Trees	4
North	1
Total	**[20]**

[20]

QUESTION 4

Given information:

Chainage of PI = 1 956,57 m
Intersection angle Δ = 48:20:00
Radius of curvature 153,28 m

$\Delta/2$ = 24:10:00 ✓

Tangent length, T = R Tan ($\Delta/2$)
= 153,28 Tan(24:10:00)
= 68,77 m ✓

Arch length, A = $\pi\Delta R/180$
= 129,30 m ✓
Chainage of beginning of curve, BC = PI-T
= 1 956,57 – 68,77
= 1 887,80 m ✓
Chainage of end of curve, EC = BC + A
= 1 887,80 + 129,30
= 2 017,10 m ✓
Deflection angles , Θ

For a = 12,2 m	Θ = 2:16:48.73 ✓
For a = 20 m	Θ = 3:44:16.94 ✓
For a = 17,10 m	Θ = 3:11:45.69 ✓

(8)

CHAINAGE	CHORD DISTANCE	DEFLECTION ANGLE	OFFSET ANGLE
BC 1887.80			360:00:00 ✓
	12.20 ✓	2:16:48.73	
1900.00			357:43:11.27 ✓
	20.00	3:44:16.94	
1920.00			353:58:54.33 ✓
	20.00	3:44:16.94	
1940.00			350:14:37.39 ✓
	20.00 ✓	3:44:16.94 ✓	
1960.00			346:30:20.45 ✓
	20.00	3:44:16.94	
1980.00			342:46:03.51 ✓
	20.00	3:44:16.94	
2000.00			339:01:46.57 ✓
	17.10 ✓	3:11:45.69	
EC 2017.10			335:50:00.88 ✓

(12)
[20]

QUESTION 5

5.1

Station		Distance		HI or middle hair MH	Angles		HI-MH +-	Height com-ponent +-	Height difference +-	Elevation of point	Remarks
From	To	Stadia	Horiz		Horiz	Vert					
A				**1.55**						263.48	BM
	B	1.06 0.69	36.21 (√)	0.875 (√)	300:21:04	-8:24:21 (√)	0.675 (√)	-5.35(√)	-4.675(√)	258.805 (√)	
	C	1.09 0.70	37.87 (√)	0.895 (√)	36:24:20	-9:46:43 (√)	0.655 (√)	-6.53 (√)	-5.875 (√)	257.605 (√)	
	D	2.28 0.98	129.98 (√)	1.63 (√)	100:36:02	00:39:02	-0.080 (√)	+1.36 (√)	+1.28 (√)	264.76 (√)	

(10)

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5.2
- Establish the line of the building from control information.
- Set up theodolite on this line and locate two corners of the building and two offset pegs or profile boards.
- Set up the theodolite at one corner, then sight onto the other corner or the original instrument location, whichever is furthest.
- Turn the theodolite through 90° and establish a third corner of the building the correct distance away from the line of site, plus further offset pegs or profile boards.
- Repeat the previous step at the second corner.
- Check the length of the furthest side and the diagonals.
- Set up the theodolite on the third corner, sight the fourth corner and establish the remaining offset pegs or profile boards. (10)

[20]

TOTAL: 100

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