NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2024

NAUTICAL SCIENCE: PAPER I

MARKING GUIDELINES

Time: 3 hours 150 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

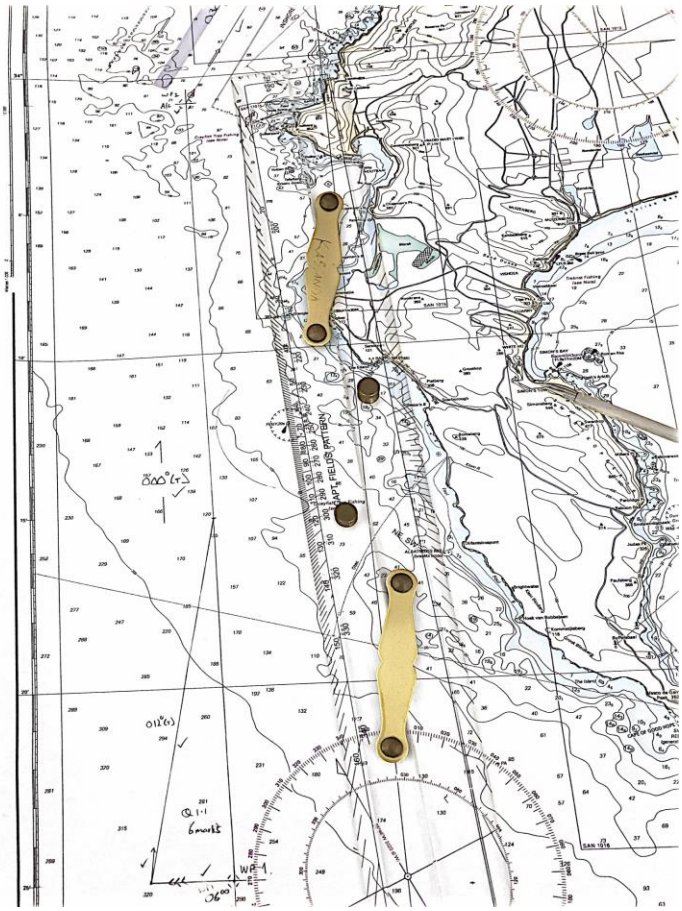
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SECTION A PRACTICAL CHARTWORK

QUESTION 1

1.1

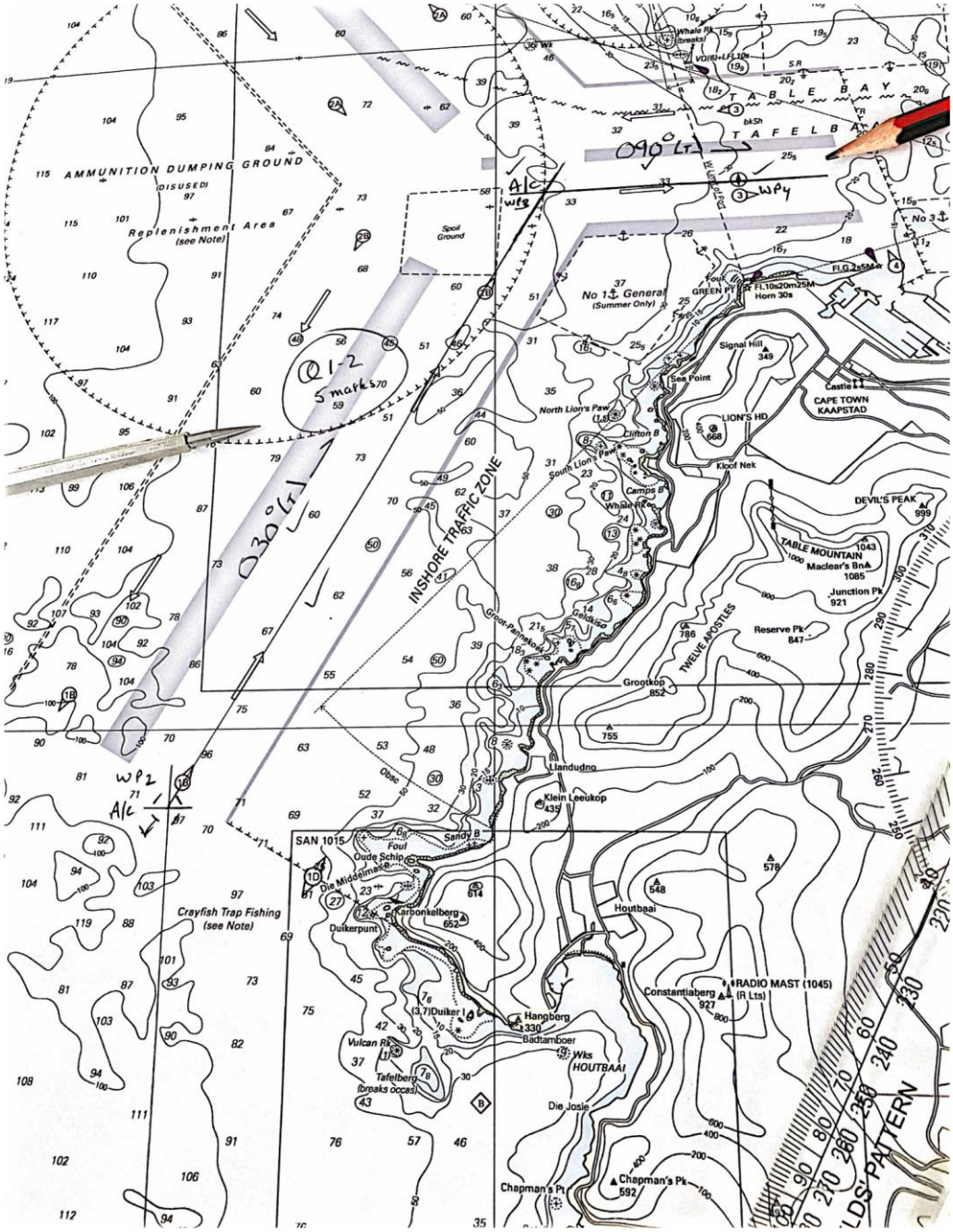
Course to make good	000° (T)
Course to counter current	012° (T)
Leeway NW	2° -
Course to steer	010° (T)
Variation	17° W
Magnetic	027° (M)
Deviation	3° E
Compass course	024° (C)



Chart

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1.2



Chart

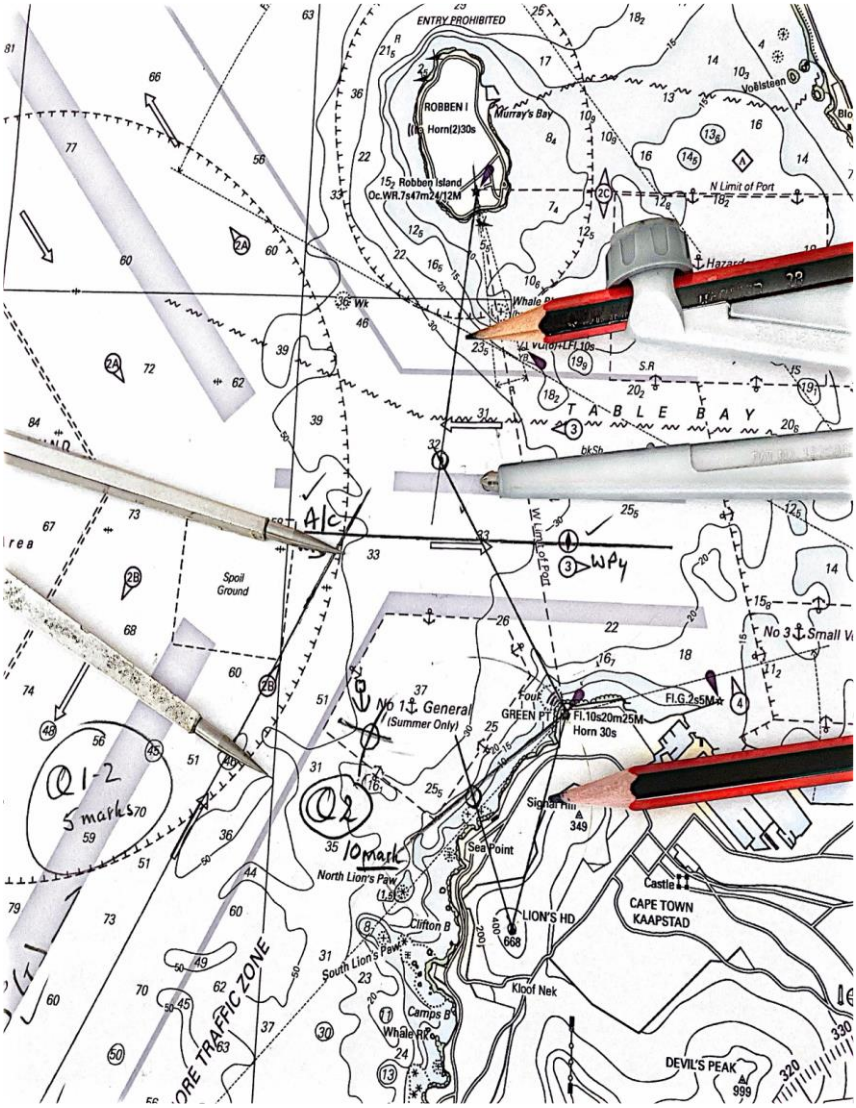
1.3	06:00 to position WP2 (000^0 T)		24,0	miles
	WP2 – WP3 (03^0 T)		9,9	
	WP3 – WP4 (090^0 T)		2,7	
	Total		36,6	miles
	At 8kts	4^{hrs}	36^{m}	
	WP1	06	00···	
	ETA Pilot	10	36···	

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QUESTION 2

Green Point Lt. / Robben Island Lt.	346/146°
Base angle 90 – 70°	20°
Brg. from Robben Isl. Lt. 346 + 20°	006° (T)
Brg. from Green Pt. Lt. 146 – 20	126° (T)
Green Point Lt. / Lions Head	015/195°
Base angle 90 – 52°	38°
Brg. from Green Pt. Lt. 195 + 38°	233° (T)
Brg. from Lions Head 015 – 38°	337° (T)

2.1



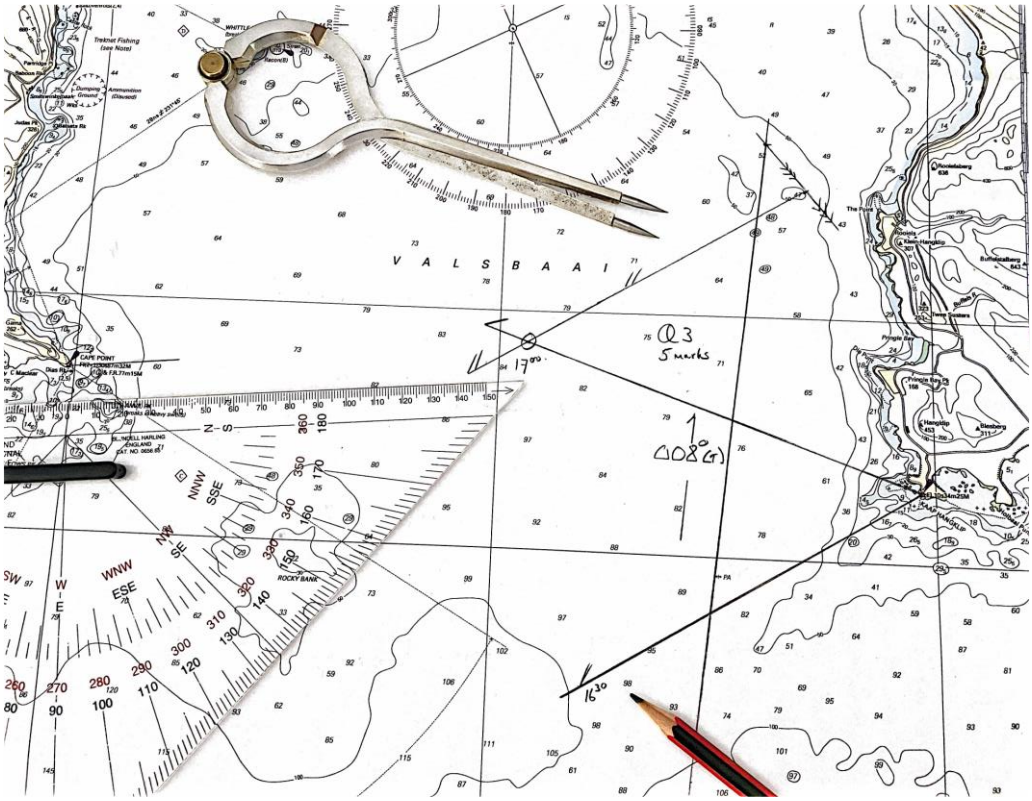
Chart

2.2 Green Point Lt. bearing 082° × 2,3 miles

QUESTION 3

3.1

	V/l Heading	16:30 brg.	17:00 brg
Compass	018° ..	073° ..	122° ..
deviation	4° E	4° E	4° E
Magnetic	022° ..	077° ..	126° ..
variation	17° W	17° W	17° W
True	005° ..	060° ..	109° ..
Leeway (W'ly)	3° …		
Track	008° (T)		

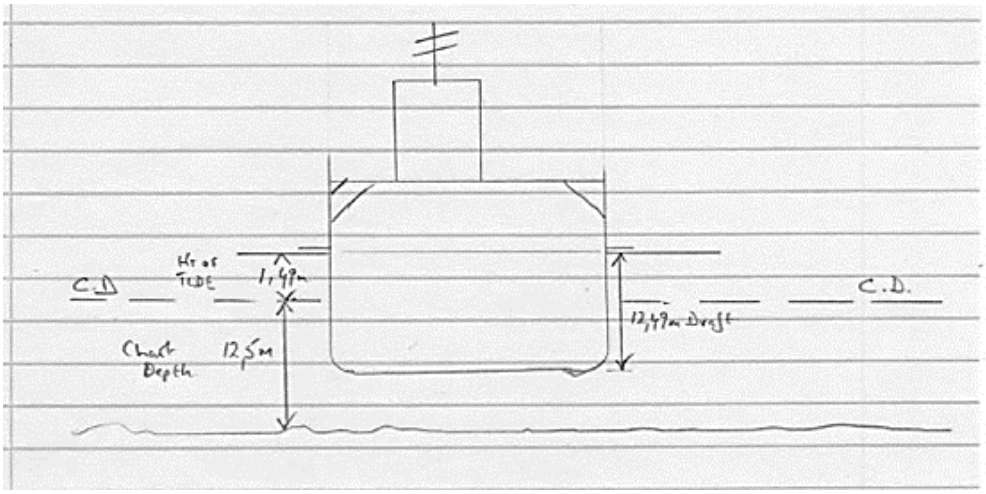


Chart

3.2 Cape Pt. Lt. brg. 265° × 9,0 miles

QUESTION 4

4.1	Height of tide at HW 5 Nov. am	1,49	m
	Chart depth	12,50	
	Depth	13,99	
	UKC	1,50	
	Max. draught required	12,49	m



4.2	HW 5 Nov am	06:00	
	Passage time	00:45	Mins.
	Departure from berth	05:15	

4.3 A tide is the periodic rise and fall of the level of the sea.
Tides are caused by the combined lunar and solar gravitational forces acting on the earth.

4.4 TRUE.

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QUESTION 5

5.1 D 170° × 0,9 kts

5.2.1	Slangkop Lt.	White light group flash 4 times every 30 seconds Height of light is 41 m above MSL Nominal visibility range 30 miles
5.2.2	Kaap Hangklip Lt.	White flashing light every 10 seconds Height of light is 34 m above MSL Nominal visibility range 25 miles
5.2.3	Whittle Rock buoy	Cardinal East buoy (safe to pass on East side) White light quick flash 3 times every 10 seconds Colour Black, Yellow, Black Radar transponder beacon with morse identity BRAVO (3 cm X-band & 10 cm S-Band) Siren sounded

5.3 B Horn 2 blasts every 30 seconds.

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SECTION B ASTRO-NAVIGATION

QUESTION 6

6.1	LMT sunset 20° S	18^h	26^m	
	Latitude correction 6° S		13^m	+
	LMT sunset 26° S	18^h	39^m	
	Long. 11° E		44^m	-
	GMT sunset	17^h	55^m	
	Zone	1^h	00^m	+
	Zone time	18^h	55^m	
6.2	Dec. 17^{00} 2 Dec.	21°	57,0'	S
	'd'		0,3'	+
	Dec 17^{55}	21°	57,3'	S

Sin Amp. = Sin Dec/Cos Lat = Sin 21° 57,3'/Cos 26°
= 0,41599
Amplitude = W 24 ½ ° S

True brg. = 294 ½ °
Compass brg. 300 °
Compass error = 5 ½ ° W

6.3 Variation is 22 ½ ° W
Deviation on heading 145° (C) 17° E

6.4 Compass course 145° (C)
Error 5 ½ ° W
True course 139 ½ ° (T)

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QUESTION 7

7.1

Chronometer		14^h	42^m	48^s	Latitude 29° 43' N
Error				24^s	-
GMT at observer		14^h	42^m	24^s	
GHA 14:00		32°	51,8'		
Inc. 42^m 24^s.		10°	36,0,		+
GHA 14:42:24		43°	27,8'		
Long.	W	69°	27,0'		-
LHA		334°	00,8'		
Dec 14:00		21°	37,0'		S
'd'			0,3'		+
Dec 14:43		21°	37,3'		S

=

Sin θ° = Cos LHA × Cos Lat × Cos Dec ± Sin Lat × Sin Dec

= Cos 334° 00,8' × Cos 29° 43' × Cos 21° 37,3 – Sin 29° 43' × Sin 21° 37,3'

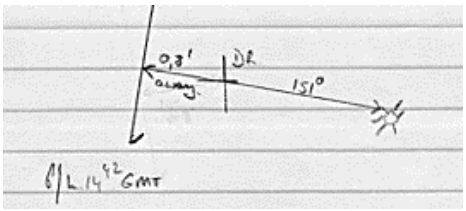
= 0,725749 – 0,182657

= 0,5430913

θ° = 32° 54' (Calculated Altitude)

Sextant alt.	32° 41,8'		A	1,18 S
Index error (off)	1,0'	+	B	0,90 S
Obs. Alt.	32° 42,8'		C	2,08
Dip (Ht eye 6,1 m)	4,4'	-	Az.	S 29° E
Apparent alt.	32° 38,4'			151°
Total correction	14,8'	+	Pos. Line = 061/241°	
True alt.	32° 53,2'			
Calculated alt.	32° 54,0'			
Intercept	0,8'	away		

7.2



Total: 150 marks

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