NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2023

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.

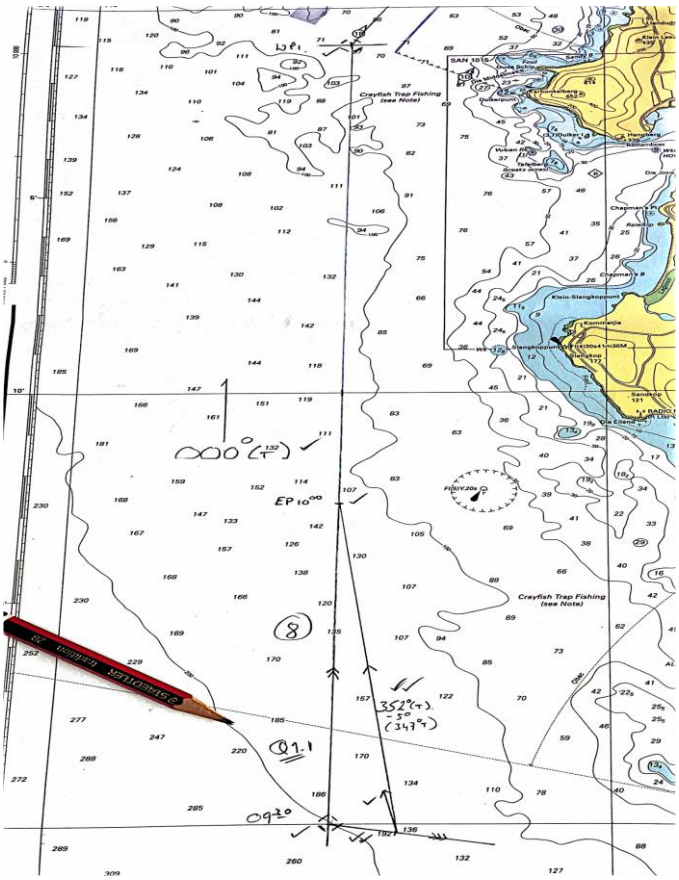
The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there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

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SECTION A PRACTICAL CHARTWORK

QUESTION 1

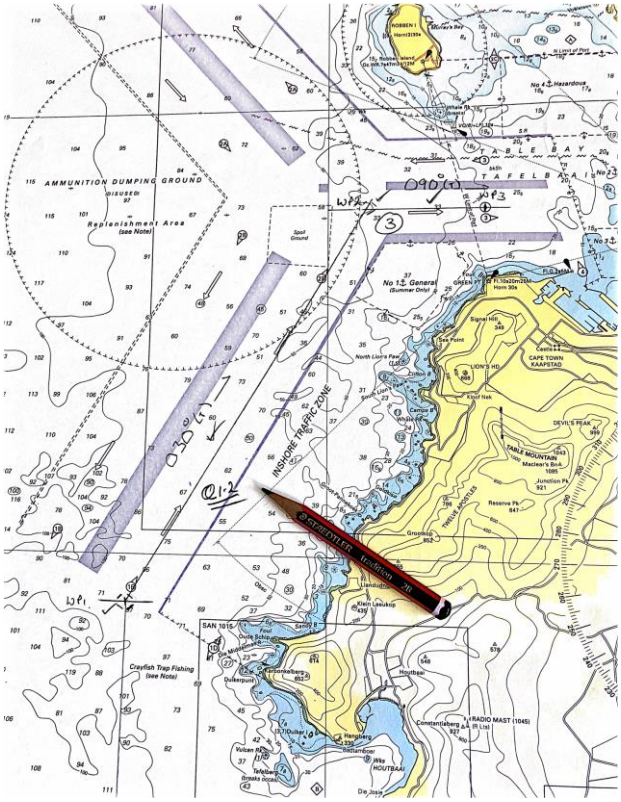
1.1 CHART – course from 09:30 to waypoint



Course to make good	000° (T)
Course to steer for the current	352° (T)
Leeway (NW'ly)	5°
Course to steer	347° (T)
Variation	23° W
Magnetic Course	010° (T)
Deviation	5° E
Compass course	005° (C)

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1.2 CHART – courses to Pilot rendezvous



1.3 ETA to Pilot

09:30 to WP 1	19,0	M	
000° (T)			
WP1 – WP2	10,0		
030° (T)			
WP2 – WP3	2,5		
090° (T)			
Total distance	31,5	M	@ 12 kts = 2,625 hrs
ETA from 09:30			ETA = 12:08

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QUESTION 2

Simonsberg/Paulsberg	167°/347°
Sextant angle	65°
–90°	25°
Bearings	192°/322°
CHART	

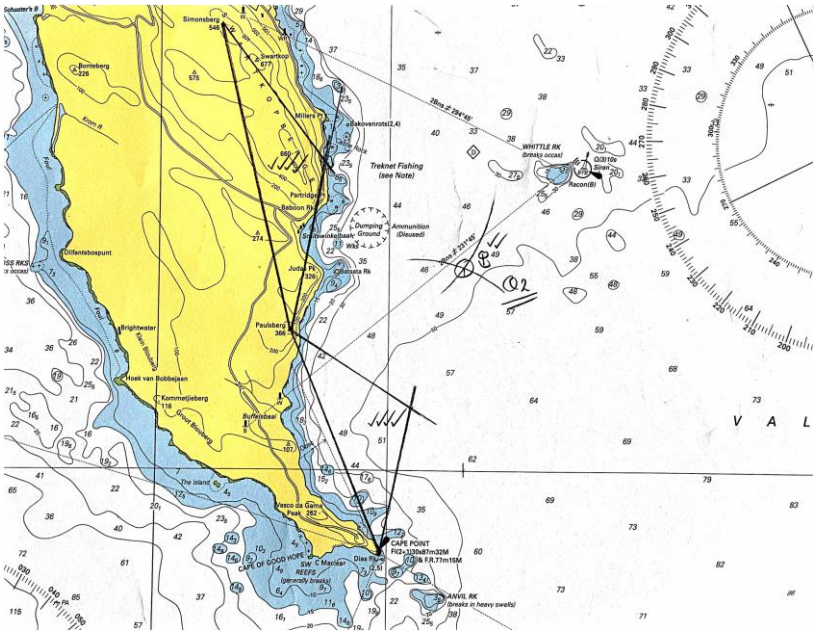
Paulsberg/Cape Point	337°/157°
Sextant angle	55°
–90°	35°
Bearings	012°/122°
CHART	

Anchor position 34° 16,5'S 018° 31,6'E

Whittle Rock Racon bearing 050 × 2,7M

Cape Point Lt bearing 197° × 5,0M

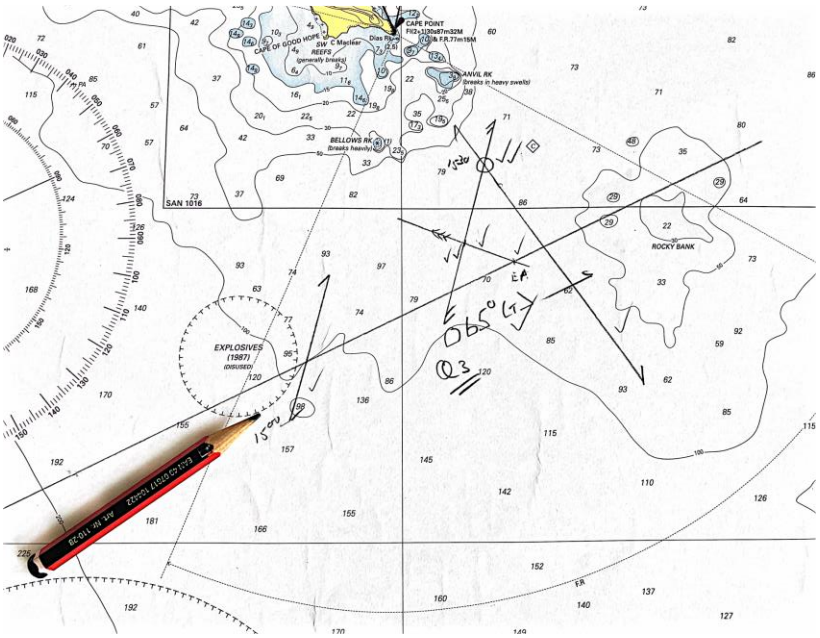
Chart position



QUESTION 3

	Heading		Bearing at 15:00		Bearing at 15:30	
Compass	092°	(C)	042°	(C)	352°	(C)
Deviation	4°	W	4°	W	4°	W
Magnetic	088°	M	038°	M	348°	M
Variation	23°	W	23°	W	23°	W
True	065°	(T)	015°	(T)	325°	(T)

CHART



Position at 15:30 Lat. 34° 23,8'S Long. 018° 31,8'E

QUESTION 4

Range of the tower = 1,856 x height of tower/vertical sext. Angle in minutes

= 1,856 x (250/140)

= 3,314 miles

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QUESTION 5

5.1 At Tide 4,5 m UKC = sounding – draught

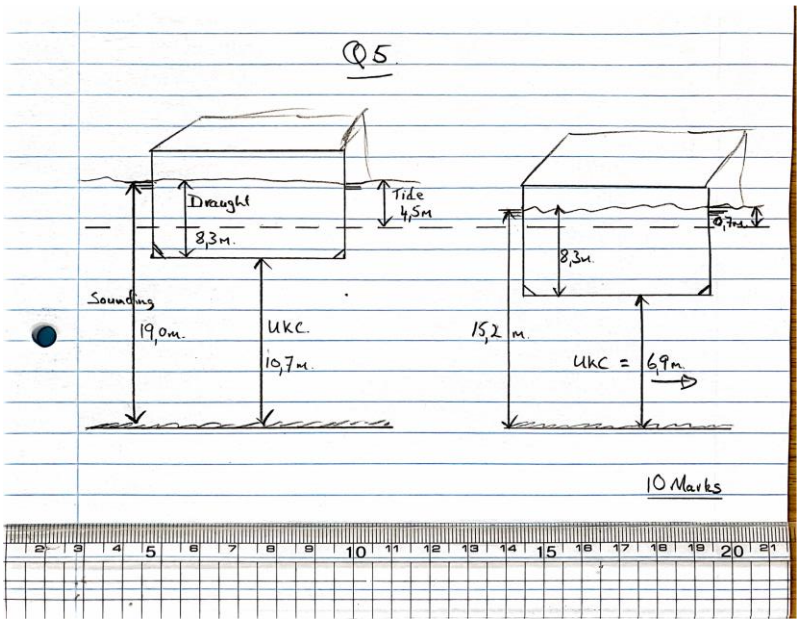
= 19,0 – 8,3 m

= 10,7 m when tide is 4,5 m

Tidal range Dif. in tide = 4,5 – 0,7 m
= 3,8 m

UKC when tide is 0,7 m UKC = 10,7 – 3,8 m
= 6,9 m

5.2



QUESTION 6

6.1 From the chart –
"Mariners should navigate with caution in the area between Green Point and Cape Point within three nautical miles of the coast, on account of the presence of anchored or drifting small fishing vessels and their unlit bottom gear, marker buoys and recovery lines."

6.2 The "Obsc" adjacent a dotted arc or line indicates that Cape Point light is not visible or observed over this arc or range due to obstruction of the mainland.

6.3 Robben Island light will display the following characteristics:

Oc.WR	Occulting white light changing to red on its southern sector;
7s	period or frequency the light occults every 7 seconds;
47m	the elevation or height of the light above MHWS;
24/12M	the white light has a nominal range of 24 nautical miles, the red light has a nominal range of 12 nautical miles.

6.4 The scale of the Chart SAN 3002 is
1 : 100 000 at Lat. 34° 10'S

6.5 Safe side to pass Whittle Rock is on the East side.
East cardinal buoy requires passing to the East.

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SECTION B ASTRO-NAVIGATION

QUESTION 7

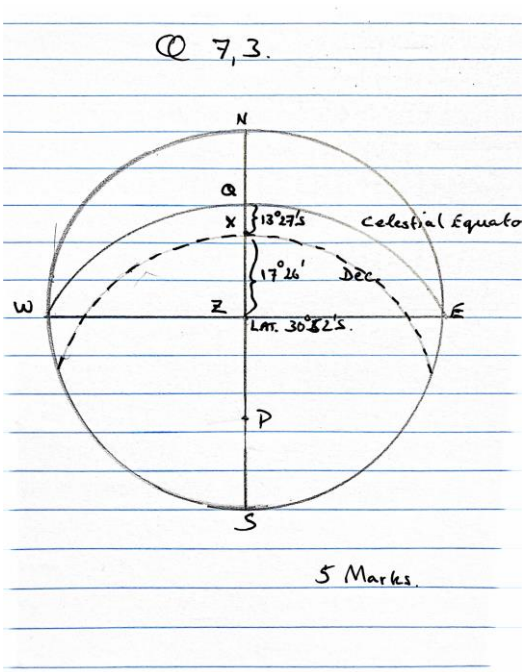
7.1

LMT Mer. Pass.		12h 14m 00s
Long. 013° 35'E	–	00h 54m 20s
GMT Mer. Pass		**11h 19m 40s**
Zone	+	01h 00m 00s
Zone Time Mer. Pass		**12h 19m 40s**

7.2

Sext. Alt.		72° 23,0'	Dec.	13° 27,4' S	
i.e. OFF	+	1,2'	'd'	– 0,3'	
Obs. Alt.		72°24,2'	Dec.	13° 27,1' S	
Dip	–	5,8'			
App. Alt.		72° 18,4'			
Total Corr.	+	15,9'			
		72° 34,3'			
		90° 00,0'			
ZX		17° 25,7'			
Dec.	S –	13° 27,1'			
Lat.		**30° 52,8' S**			

7.3



QUESTION 8

8.1

LMT 12 Feb. 1987		08 30 00		
Long 044° 20'E	–	02 57 20		
GMT		05 32 40		
GHA		251° 26,0'	Dec.	13° 52,4' S
Inc.	+	8° 10,0'	d	0,4' –
GHA		259° 36,0'	Dec.	13° 52,4' S
Long.	E	+ 44° 20,0'		
LHA		303° 56,0'		

A = 0,339 N
B = 0,298 S
C = 0,041 N
Az. = N88°E

Azimuth	=	088° (T)
Observed brg.	=	083° (C)
Compass error	=	5° E
Ship's head	=	250° (C)
True heading	=	**255° (T)**

8.2

Comp. error	=	05° E
Variation	=	19° E
Deviation	=	**14° W**

Total: 150 marks

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