



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2014

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.

SECTION A PRACTICAL CHARTWORK

QUESTION 1

	Ship's Heading		Robben Isl. Lt. Bearing		Marks
Compass	131°		102°		
Deviation	9°	W	9°	W	
Magnetic	122°		093°		
Variation	23°	E	23°	E	
True	145°		116°		(4)

- 1.1 Course to make good 140° (T) *See Chart SAN 3002*
 Course to counter the 131° (T) *See Chart SAN 3002*
 current
 Leeway allowed 7° +
 (Wind W'ly)
 Course to steer 138° (T) *Chart work* (10)
 Variation 23° E
 Magnetic course to 115° (M)
 steer
 Deviation 9° ½ W
 Compass Course to 124° ½ (C) (4)
 steer
- 1.2 Course from A/C to 090° (T) *See Chart SAN 3002* (2)
 Pilot
- 1.3 Dist. 05:00 to Pilot 14.2 M
 Time @ 10 kts 01^h 25^m
 05 00
 ETA Pilot 06 25 (5)
[25]

QUESTION 2

- Simonsberg/Paulsberg brg. 347°/167°
 Base angle 90° – 65° 25°
 Brg. from Simonsberg 167° – 25° 142°
 Brg. from Paulsberg 347° + 25° 012° (6)
- Paulsberg/Cape Point Lt. brg. 336°/156°
 Base angle 90° – 55° 35°
 Brg. from Cape Point Lt. 336° + 35° 011°
 Brg. from Paulsberg 156° – 35° 121° (6)
- Chart work marks (8)
 Anchor position: Lat. 34° 16,6'S Long. 018° 31,6'E
 or – Whittle Rk buoy brg. 051° × 2,8'
 or – Cape Point Lt. brg. 197° × 5,1'

[20]

QUESTION 3

	V/I Hdg.	Brg. 16:30	Brg. 17:00			
Compass	332° (C)	027° (C)	076° (C)			
Deviation	5° E	5° E	5° E			
Magnetic	337° (M)	032° (M)	081° (M)			
Variation	23° E	23° E	23° E			
True	000° (T)	055° (T)	104° (T)			(6)
Leeway (W'ly)	5° +					
Track (T)	005° (T)					(1)

- 3.1 *Chartwork* (8)
- 3.2 Cape Point Lt. brg. 271° (T) × 9,8 miles. (5)
[20]

QUESTION 4

Draught	5,05
Clearance	0,5
Depth required	5,55
Chart depth	4,90
Height of tide required	0,65

The earliest time to cross on the afternoon rising tide will be at 18:05 on Saturday 24 November. [15]

QUESTION 5

- 5.1 Robben Island light will display the following characteristics: (2)
- Occulting white light changing to red on its Southern sector; (2)
 - The frequency is 7 seconds; (1)
 - Height is 47 metres above sea level; (1)
 - Nominal range of the white light is 24 miles, and of the red light 12 miles. (2)
- 5.2 The safe passage past Whittle Rock is to the East. (4)
- 5.3 'Obsc' means obscure, and the dotted arc line adjacent denotes the arc of the circumference of Cape Point light which is obscured. (3)
- 5.4 Variation for 1999 is 23° 22'W, increasing 2'W each year. Therefore the variation for 2014 will be 23° 52'W. (3)
- 5.5 'Mariners should navigate with caution in the area between Green Point and Cape Point within 3 nautical miles off the coast, on account of the presence of anchored or drifting small fishing vessels and their unlit bottom gear, marker buoys and recovery lines.' (4)
[20]

100 marks

SECTION B: ASTRO-NAVIGATION

QUESTION 6

6.1	LMT Mer. Pass. 1 Dec.		11 ^h 49,0'	
	Long. 018 ^o 10'E	–	1 ^h 12,7'	
6.1.1	GMT Mer. Pass. 1 Dec.		10 ^h 36,3'	(3)
	Zone GMT		1 ^h 00,0'	
	+1hr.			
6.1.2	Mer. Pass. Zone time		11 ^h 36,3'	(2)
6.2	Dec. at Mer. Pass.		S 21° 47,9'	
	Sext. Alt.		80° 41,7'	
	Index error	+	1,2'	
	Observed altitude		80° 42,9'	(2)
	Dip	–	6,1'	
	Apparent altitude		80° 36,8'	(2)
	Total correction	+	16,0'	
	True altitude		80° 52,8'	(3)
			90° 00,0'	
	Zenith distance ZX		9° 07,2'	(3)
	Declination QX	S	21° 47,9'	
	Lat.		21° 45,1'S	(5)
	Position at Mer. Pass.		21° 45,1'S 018° 10,0'E.	
6.3	05:00 Lat.		23° 22,6'S	
	11:36 Mer. Pass.		21° 45,1'S	
	D'Lat.		1° 37,5'..	
	Distance		97,5 miles	(3)
	Time		6,6 hrs	
	Speed		14,8 kts	(2)

[25]

QUESTION 7

	LMT	08 ^h 30 00					
	Long. 044 ^o 20'E	02 ^h 57 20					
	GMT	05 ^h 32 40					(2)
	GHA 05 ^h 00	257° 41,0	Dec.	S 21° 55,0			
	Inc. 32 ^m 40 ^s	8° 08,2	'd'	0,2			
	GHA 05 ^h 32 40	265° 49.2	Dec.	S 21° 55,2			(3)
	Long. E	044° 20,0					
	LHA	310° 09.2					(5)
	A	0,432 N	True brg.	095½° (T)			
	B	0,536 S	Comp brg.	083° (C)			
	C	0,104 S	Compass error	12½° E			
	T Brg.	S 84½° E	Ship's Hdg.	250° (C)			(5)

- 7.1 T. Brg. 095½° (T) **True Hdg.** 262½° (T) (5)
- Compass error 12½° E
- Var. 23° E
- 7.2 **Dev.** 10½° E (5)
- [25]

50 marks

TOTAL: 150