NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2012

NAUTICAL SCIENCE: PAPER I

MARKING GUIDELINES

Time: 3 hours Marks: 150

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.

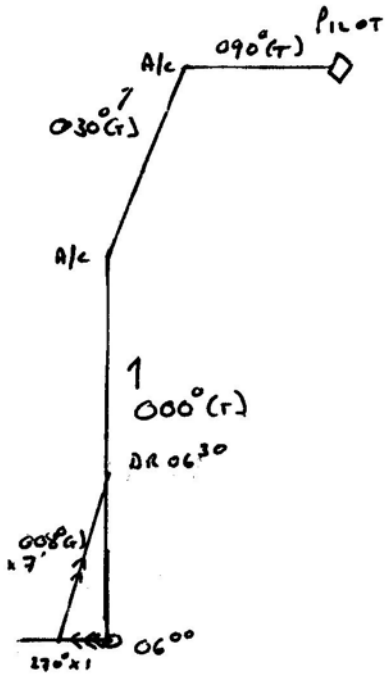
The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there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

SECTION A PRACTICAL CHARTWORK

QUESTION 1

1.1	Course to make good	000º (T)	
	Course to counter current	008º (T)	
	Leeway	2º W	
	Course to steer	006º (T)	
	variation	22º W	
	Magnetic course	028º (M)	
	deviation	3º E	
	Compass course to steer	**025º (C)**	(15)

1.2



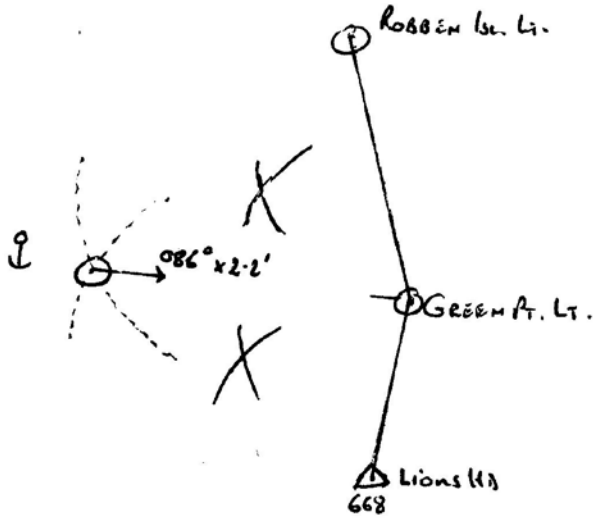
(5)

1.3	Distance made good 1/2 hr.	6,9 M	
	Speed made good	13,8 knots	
	Total distance to go	31,4 M	
	Steaming time	2h 17m	
	Time	06 00	
	ETA Pilot	**08 17.**	(5)

[25]

QUESTION 2

2.1	Green Pt/Robben Isl brg	346º/166º	
	Base angle 90º – 85º	15º	
	Brg fm Robben Isl lt 346º + 15º	001º	
	Brg fm Green Pt lt 166º – 15º	151º	(4)
	Green PT/Lions Hd brg	015°/195°	
	Base angle 90º – 52º	38°	
	Brg fm Green Pt Lt 195° + 38°	233°	
	Brg fm Lions Hd 015° – 38°	337°	
	Milnerton lt brg	080º (T)	(4)



(10)

2.2 Green Point Lt. bearing 086° 2,2 miles (2)

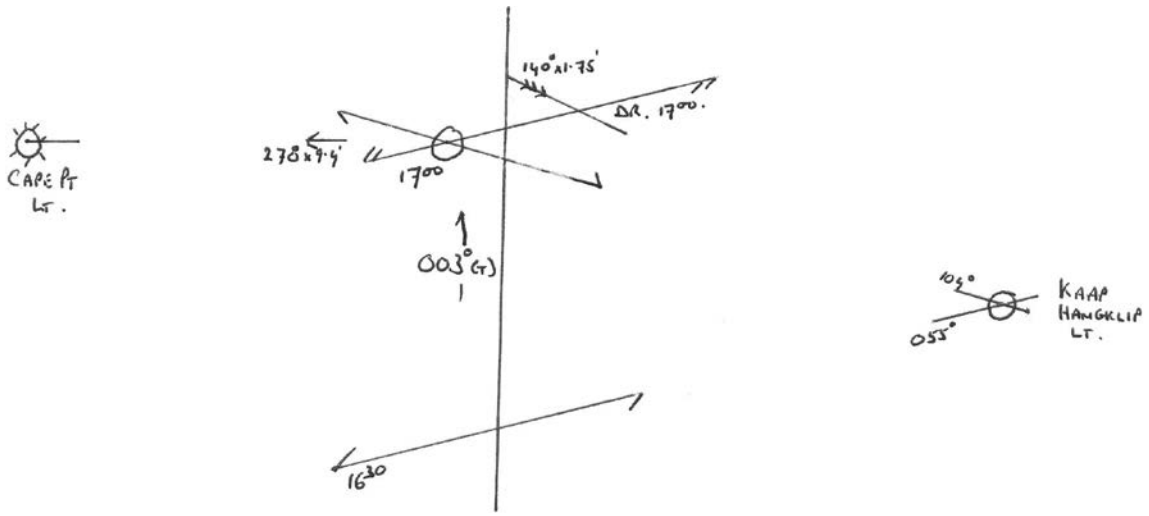
[20]

QUESTION 3

3.1

	V/l heading	Brg at 16:30	Brg at 17:00
Compass	018º	073º	122º
deviation	4º E	4º E	4º E
Magnetic	022º	077º	126º
variation	22º W	22º W	22º W
True	000º	055º	104º
Leeway W'ly	3º +		
Track (T)	003º		

(8)



(4)

3.2 Cape Point Lt. bearing 270° (T) × 9,4 miles. (3)

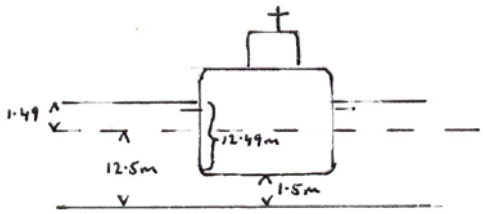
[15]

QUESTION 4

4.1

Ht of tide at H. W. 5 Nov 2001	1,49 m	(06:00)
Chart depth	12,50 m	
Depth	13,99 m	
Clearance	1,50 m	
Max. draft	**12,49 m**	

(10)



4.2

H. W. 5 Nov	06h	00m
passage time	00	45 minutes
Depth time	**05**	**15**

(5)

4.3 A tide is the periodic rise and fall of the level of the sea caused by the combined lunar and solar gravitational forces acting on the earth. During a period of 24 hours and 50 minutes two High Water and two Low Water tides occur. (5)

[**20**]

QUESTION 5

5.1 Tidal stream: Direction 171º @ 0,8 knots. (5)

5.2 5.2.1 Slangkop Lt.: White light, group flash 4 times every 30 seconds; height of light is 41 m above MSL; nominal visibility 30 miles. (5)

5.2.2 Green Point Lt.: White light flashing every 10 seconds; height of the light 20 m above MSL; nominal visibility 25 miles; fog horn blast every 30 seconds. (5)

5.2.3 Kalkbaai Lt.: Long flashing red light with a nominal distance of 6 miles. (3)

5.3 Robben Island fog horn: Two blasts every 30 seconds. (2)

[20]

100 marks

SECTION B ASTRO-NAVIGATION

QUESTION 6

6.1

LMT sunset 20ºS	18h	26 m
Lat correction 6ºS		13 +
LMT sunset 26ºS	18	39
Long. 11ºE		44 –
GMT sunset	**17**	**55**
Zone	1	00 +
Zone time	**18**	**55**

(8)

6.2

Dec 17:00 2 Dec	21º 57,0' S
'd'	0,3 +
Dec 17:55	21º 57,3' S

Sin amp. = Sin Dec / Cos Lat
= Sin 21º 57,3' / Cos 26º = 0.739/0.8988
= 0,41599
Amp = W24½ºN

True brg.	294½º
Compass brg	300 º
Compass error	**5½º E**

(11)

6.3

variation	22½ W
deviation	**17º E** (on heading 145° (C)

(3)

6.4

Compass course	145º (C)
error	5½º E
True course	**139½º (T)**

(3)
[25]

QUESTION 7

7.1

Chron.	14h 42m 48s	GHA 14:00	26º 47,8'	Dec	8º 24,4' S
error	24s –	Inc 42' 24'	10 36,0	'd'	,6' –
GMT @ obs.	14h 42m 24s	GHA14:42:24	37º 23,8'	Dec	8º 23,8' S
		Long. W	69º 27,0'		
		LHA	327º 56,8'		

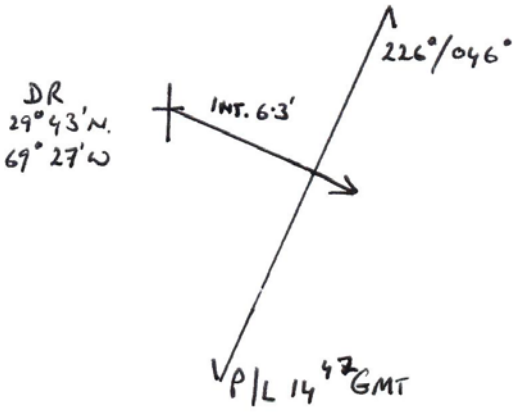
SinΘº = CosLHA × Cos Lat × Cos Dec ± Sin Lat × Sin Dec
= Cos 327º 56,8' × Cos 29º 43' x Cos 8º 23,8' ± Sin 29º 43' × Sin 8º 23,8'
= 0,728 – 0,072
= 0,656 **7.2**
Θº = 40º 59,8' (Calculated alt.)

Sext. alt.	40º 41,8'
index error (off)	1,0' +
observed alt.	40º 42,8'
dip	4,4' –
apparent alt.	40º 38,4'
total correction	15,1' +
True alt.	40º 53,5'
Calculated alt.	40º 59,8'
Intercept towards	6,3'

A = 0,911 +
B = 0,289 +
C = 1,200 +
Az. = S44ºE = 136º
Position line = **226º / 046º**

(20)

7.2



(5)
[25]

50 marks

Total: 150 marks