NATIONAL SENIOR CERTIFICATE EXAMINATION
SUPPLEMENTARY EXAMINATION – MARCH 2018

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.

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SECTION A PRACTICAL CHARTWORK

QUESTION 1

1.1	Course to make good	013° (T)	*(4)*	
	Course to counter current	021° (T)	*(5)*	
	Leeway	2° W		
	Course to steer	019° (T)	*(1)*	
	variation	22° W		
	Magnetic course	041° (M)	*(1)*	
	deviation	3° E		
	Compass course to steer	**039° (C)**	*(1)*	
			+Chart (3)	(15)

1.2

(5)

1.3	Distance made good 1/2 hr.	6,7 M	
	Speed made good	13,4 knots	
	Total distance to go	32,0 M	
	Steaming time	2 h 23 m	
	Time	06 00	
	ETA Pilot	**08 23**	(5)
			[25]

QUESTION 2

2.1	Green Pt/Robben Isl brg	346°/166°	
	Base angle 90° – 85°	5°	
	Brg fm Robben Isl lt 346° + 5°	351°	
	Brg fm Green Pt lt 166° – 5°	161°	(4)
	Green PT/Lions Hd brg	015°/195°	
	Base angle 90° – 52°	38°	
	Brg fm Green Pt Lt 195° + 38°	233°	
	Brg fm Lions Hd 015° – 38°	337°	(4)

(10)

2.2 Green Point Lt. bearing 093° 2,0 miles (2)

[20]

QUESTION 3

3.1

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

(8)

(4)

3.2 Cape Point Lt. bearing 270° (T) × 9,0 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	06 h	00 m	
	passage time	00	45 minutes	
	Depart 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 171° @ 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;
foghorn 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 foghorn: Two blasts every 30 seconds. (2)

[20]

100 marks

SECTION B ASTRO-NAVIGATION

QUESTION 6

6.1	LMT sunset 20° S	18h 26 m		
	Lat correction 6° S	13	+	
	LMT sunset 26° S	18 39		
	Long. 11° E	44	–	
	GMT sunset	**17 55**		
	Zone	1 00	+	
	Zone time	**18 55**		(8)
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° = 0,739/0,8988			
	= 0,41599			
	Amp = W24½° N			
	True brg.	294½°		
	Compass brg	300°		
	Compass error	**5½° W**		(11)
6.3	variation	22½ W		
	deviation	**17° E** (on heading 145° (C)		(3)
6.4	Compass course	145° (C)		
	error	5½° W		
	True course	**139½° (T)**		(3)
				[25]

QUESTION 7

7.1

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

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

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

A = 0,911 +
B = 0,289 +
C = 1,200 +
Az. = S44° E = 136°
Position line = **226° / 046°** (20)

7.2

(5)
[25]

50 marks

Total: 150 marks

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