



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2019

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

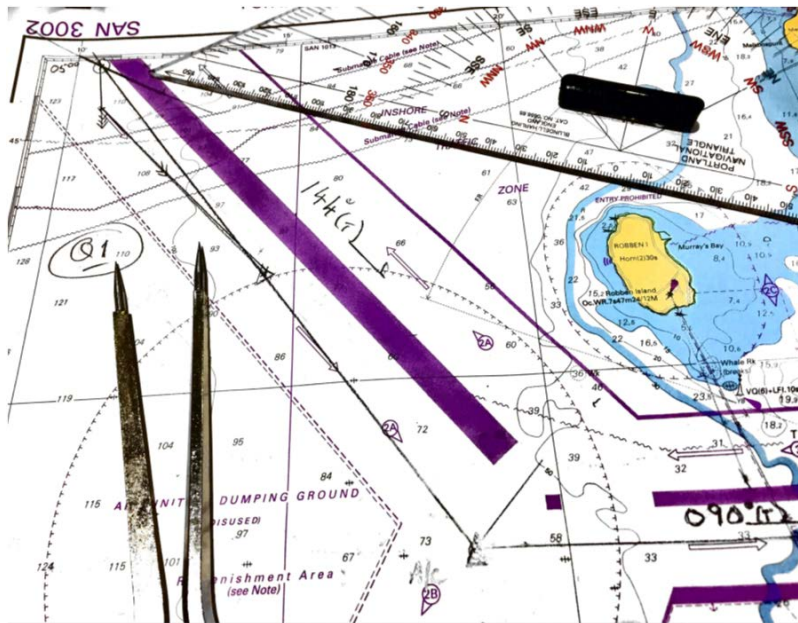
QUESTION 1

1.1

	Course	Brg. of Robben Isl. Lt.
	158° (C)	142° (C)
Deviation	<u>1° E</u>	1° E
	159° (M)	143° (M)
Variation	<u>24° W</u>	<u>24° W</u>
	135° (T)	119° (T)
Course to make good	144° (T)	
Course to counter current	139° (T)	
Leeway (W)	7° +	
Course to steer	146° (T)	
Var	<u>24° W</u>	
Magnetic course	170° (M)	
Dev	<u>2° E</u>	
Compass course to steer	<u>168° (C)</u>	

Chart

1.2 **Course to the pilot station 090° 4,6 miles.**

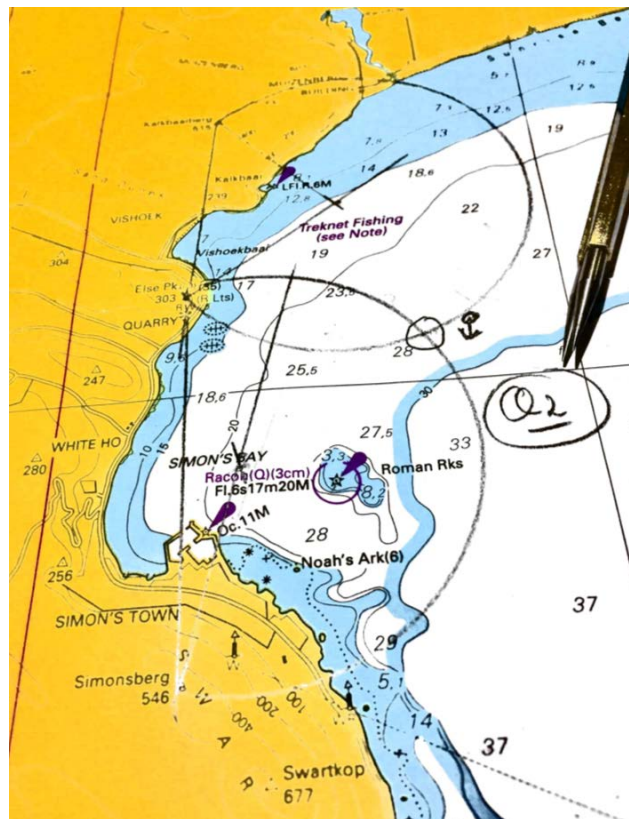


QUESTION 2

2.1	Simonsberg/Else Pk	$90^\circ - 75^\circ = 15^\circ$	brg $358^\circ/178^\circ$
	Simonsberg	$358^\circ + 15^\circ = 013^\circ$	
	Else Pk	$178^\circ - 15^\circ = 163^\circ$	
	Else Pk/Kalkbaaiberg	$90^\circ - 43^\circ = 47^\circ$	brg $185^\circ/005^\circ$
	Else Pk	$005^\circ + 47^\circ = 052^\circ$	
	Kalkbaaiberg	$185^\circ - 47^\circ = 138^\circ$	

Anchor position Roman Rocks Lt. brg. $211^\circ \times 1,5'$

CHART



- 2.2 Simon's Town breakwater light brg. $224^\circ \times 2,3'$
 Kalkbaai breakwater light brg. $330^\circ \times 2,2'$
 Nearest point of land Else Pk. Quarry radar range $1,7'$
 Seal Island nearest radar range $5,5'$
 Whittle Rock Racon $137^\circ \times 7,2'$
Or any three of the above

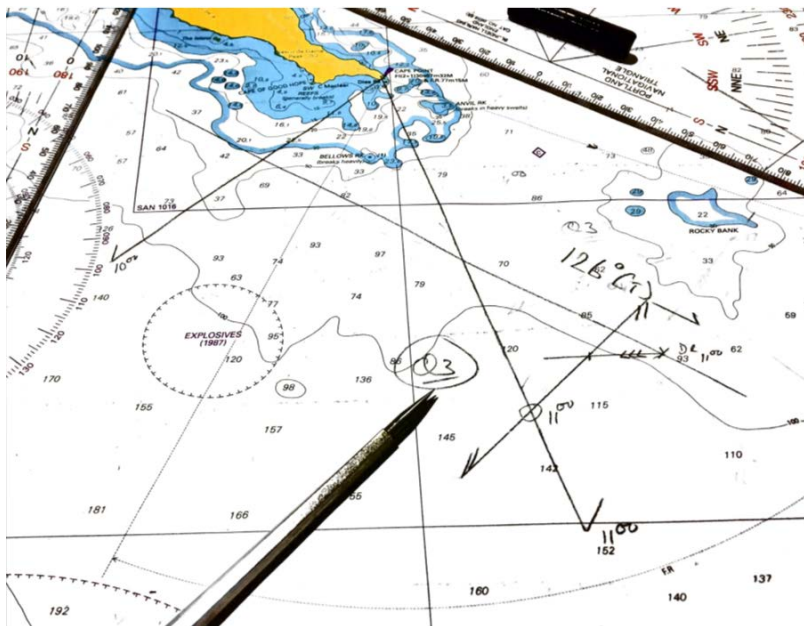
- 2.3 Radar, compass bearings, echo sounder, GPS.
Any two of the above

QUESTION 3

	Course	10:00	11:00
Compass	150°	070°	010°
Dev	0°	0°	0°
Magnetic	150°	070°	010°
Var	24° W	24° W	24° W
True	126°	046°	346°

Position at 11:00

Cape Point Lt brg 346° (T) x 7.1'
Lat 34° 28,3' S Long 018° 31,9' E



Chart

QUESTION 4

4.1	Draught	=	2,62 m
	Clearance	=	<u>1,50</u>
	Depth required	=	4,12
	Chart depth	=	<u>2,50</u>
	Height of tide	=	1,62 m

From the Tide Tables, cross at 15h 30m on 25 December

- 4.2 4.2.1 Spring tide occurs at: Full moon when the attractive forces of the sun and moon combine.
New moon when the sun and moon are in conjunction.
- 4.2.2 Neap tide occurs at: Moon's 1st quarter when the gravitational forces are acting at 90°.
Moon's 3rd quarter when the sun and moon are in quadrature.

QUESTION 5

- 5.1 Kaap Hangklip Lt. (Fl. 10s 34m 25M)
Flash white light with a frequency of 10 seconds
Height of light 34 meters above MHWS
Range of visibility 25 miles
- 5.2 Cape Point light southern range shows (F. R. 77m 15M)
Fixed red light
Height of light 77 meters above MHWS
Range of visibility is 15 miles
- 5.3 No. 4 Anchorage Hazardous Block
e.g. Breakwater Lt. brg 177° x 3,7'
Or similar position within the limits of No. 4 Anchorage + water depth



5.4 1 852 metres

5.5 0,9 miles

SECTION B ASTRO-NAVIGATION

QUESTION 6

LMT	09h 52m	GHA	= 299° 04,0'	Dec	= 12° 54,9' N
		08:00			
Long 15° 10' E	<u>01 01</u>	Inc 51 m	= <u>12° 45,0'</u>	'd'	= 0,7'
	-				
GMT	08h 51m	GHA	= 311° 49,0'	Dec	= 12° 54,2' N
		08:51			
		Long	= <u>15° 10,0'</u>		
		15°10'			
		LHA	= 326° 59,0'	(5)	

A	= 0.819 N
B	= <u>0.421 N</u>
C	= 1.240 N
Az.	= N 42 1/2° E
	042 1/2°

True brg	042 1/2°
Compass brg	<u>069°</u>
Error	26 1/2° W

6.1

Compass Hdg	340°
Compass error	26 1/2° W
True heading	<u>313 1/2°</u>

6.2

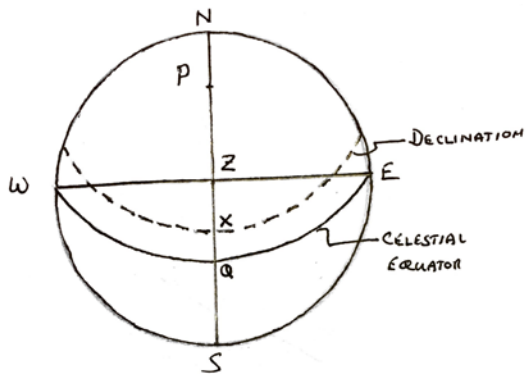
Compass error	26 1/2° W
Var	<u>23° W</u>
Deviation	<u>3 1/2° W</u>

QUESTION 7

7.1	7.1.1	LMT Mer Pass	12h 04m	
		Long	<u>4 38</u> +	
		069°30'W		
		GMT Mer	<u>16h 42m</u>	(7.1.1)
		Pass		
		Zone	<u>5 00</u> -	
		Zone time MP	<u>11h 42m</u>	(7.1.1)

7.1.2	Sext Alt	=	72° 51,2'	Dec	13° 07,9' N
	i.e. (off)	=	<u>1,5'</u> +	'd'	<u>0,6'</u> -
	Obs Alt	=	72° 52,7'	Dec	13° 07,3' N
	dip (12,5m)	=	<u>6,2'</u> -		
	App Alt	=	72° 46,5'		
	Total corr	=	<u>15,6'</u> +		
	True alt	=	73° 02,1'		
			<u>90° 00,0'</u>		
	ZX	=	16° 57,9'		
	Dec	=	13° 07,3' N		
	Lat.	=	<u>30° 05,2' N</u>	(7.1.2)	

7.2



Total: 150 marks