NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2016

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.

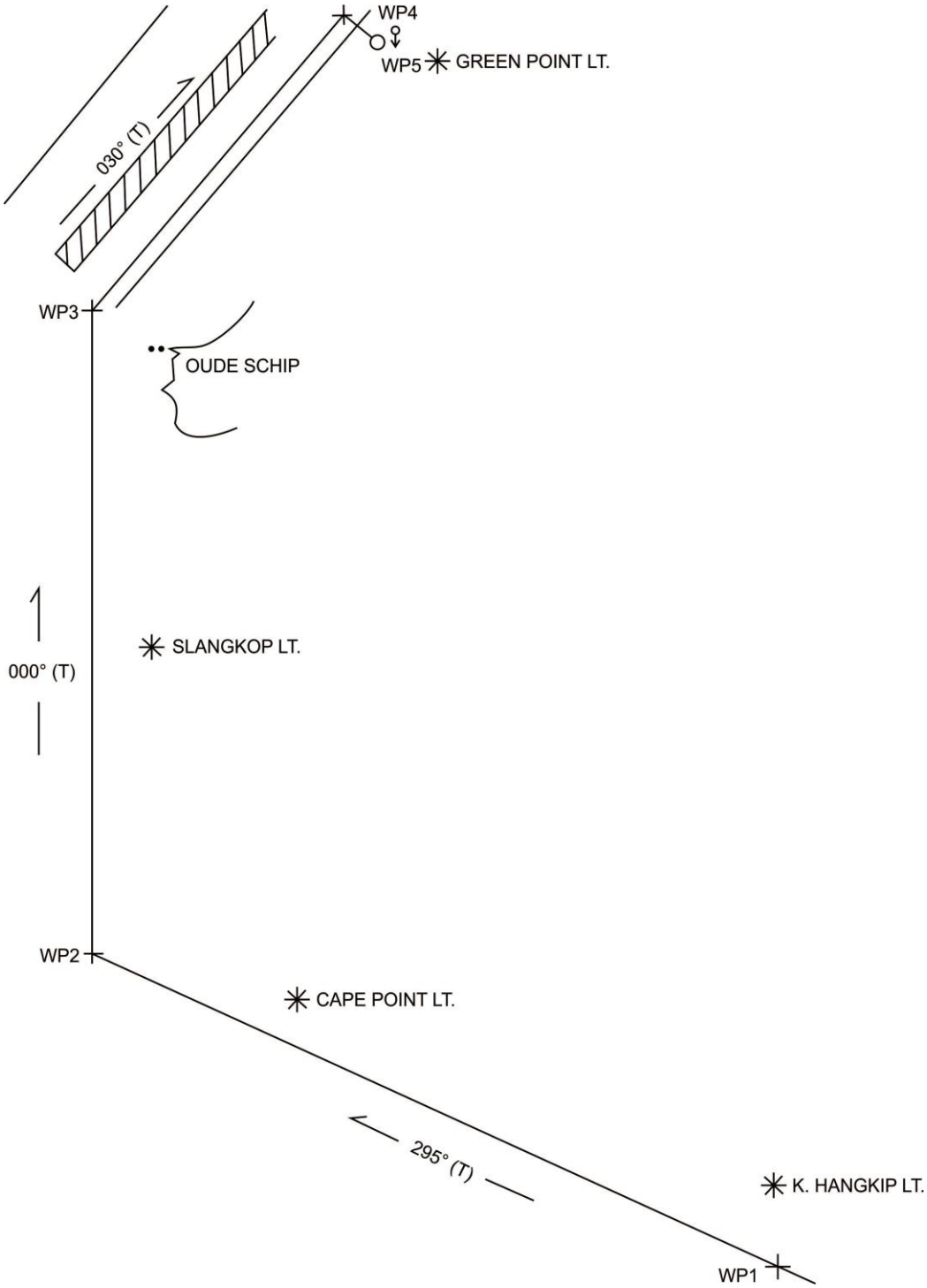
The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there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

SECTION A PRACTICAL CHART WORK

QUESTION 1

1.1 CHART

The candidate may choose different WPs & courses to the example below. The answer is correct provided it meets the criteria of the question and instructions.



(12)

1.2

WP	Course	Co-ordinates	Position	Dist.	Dist. to go
1	---	34° 33,0' S 018° 49,7' E	K. Hangklip Lt. 000° (T) × 9,8'	0	75,3
2	295° (T)	34° 20,0' S 018° 15,5' E	Cape Point Lt. 096° (T) ×11.9' Slangkop Lt. 015° (T) × 11.5'	46,4	28,9
3	000° (T)	34° 01,2' S 018° 15,5' E	Slangkop Lt. 158° (T) × 8,2' Oude Skip Pt. 099° (T) × 2,8'	18,8	10,1
4	030° (T)	33° 53,3' S 018° 21,0' E	Green Point Lt. 106° (T) × 2,6'	9,1	1,0
5	119° (T)	33° 53,8' S 018° 22,0' E	Green Point Lt. 097° (T) × 1,6'	1,0	0
			At 14 kts avg. = 5,4 hrs	75,3	

(15)

1.3 Total distance = 75,3 miles

Estimate steaming time at 14 Kts = 5,4 hr (24 min) (3)

***Note**: Marks are awarded for correct markings and clarity of your answers on the chart.* **[30]**

QUESTION 2

Any five of the following:

1. Prepare and plan the safest and most economical route.
2. Monitor the ship's progress on passage and adjust as necessary to ensure the safety of the ship.
3. Ensure the vessel has all the necessary charts, publications, navigation warnings and corrections, stationary and navigation implements.
4. The charts and publications are corrected and up to date.
5. Ensure the navigation equipment and aids to navigation are operational and maintained.
6. Ensure the navigation data book and log books are filled in and kept up to date.
7. Send navigation warnings as and when required.
8. Receive weather forecasts/reports and monitor their interpretation and implementation.
9. Ensure the instruments for recording and monitoring the weather are operational, maintained, and that the data is recorded in the log book.
10. Ensure the whole crew complies with all safety conventions and obeys standing/ night orders.

[5]

QUESTION 3

3.1 Course to steer is 137° (T)
(*marks for chart work*) (5)

3.2 Set & drift over past hour = 349° × 2 miles
(*marks for chart work*) (5)

3.3 Answer on the chart. Course to make good 141° (T)
(*marks for chart work*) (3)

3.4 Course to steer to make good 141° is 147° (T)
(*marks for chart work*) (7)

***Note**: Marks are awarded for correct markings and clarity of your answers on the chart.* **[20]**

QUESTION 4

	Ship's Head		14:15 Brg.		14:30 Brg.		14:45 Brg.	
Compass	190°		211°		236°		280°	
dev.	3°	E	3°	E	3°	E	3°	E
Magnetic	193°		214°		239°		283°	
var.	24°	W	24°	W	24°	W	24°	W
True	169°		190°		215°		259°	

Position at 14:45 = 34° 21,4' S; 018° 32,0' E

***Note**: Marks are awarded for correct markings and clarity of your answers on the chart.*

[15]

QUESTION 5

5.1

HW	1,87 m	Draught	8,50 m
LW	0,49 m	Sounding	18,0 m
Range	1,38 m	UKC HW	9,50 m
		Tidal range	1,38 m
		UKC LW	8,12 m

(6)

5.2 5.2.1 Chart Datum – This is the plane from which tidal heights are measured, and to which soundings referred to on a navigational chart. (2)

5.2.2 Mean High Water Spring – is the average height of high waters occurring at spring tides throughout the year. (2)

[10]

QUESTION 6

6.1 6.1.1 The chart scale – 1 : 100 000 (34° 10' S) (1)

6.1.2 The chart number of the larger scale chart for Table Bay that is outlined on this chart – SAN1013 (1)

6.2 6.2.1 The transit bearings – 294° 45' (T) & 231° 45' (T) (2)

6.2.2 Examples of the use of a transit bearing in navigation (*any one of the following*):

- Check the compass error
- Obtain a position line
- Steer a course on that bearing (2)

6.3 6.3.1 The outer circle is based on true North, and the inner rose is based on magnetic North for that particular area.

6.3.2 The compass variation is different for each circle – 23° 22" W, 23° 32' W & 23° 35' W. (2)

6.4 Milnerton Lt.:

- Group 3x flash white light every 20 seconds;
- Height above MHWS is 25 m;
- Nominal range 25 n miles;
- Red sector has a fixed red light; height above MHWS is 25 m; nominal range 11 n. miles. (8)

6.5 Cape Point Lt. "Fixed Red Light" is visible in sector 204° to 299°. (2)

[20]

100 marks

SECTION B ASTRO-NAVIGATION

QUESTION 7

7.1

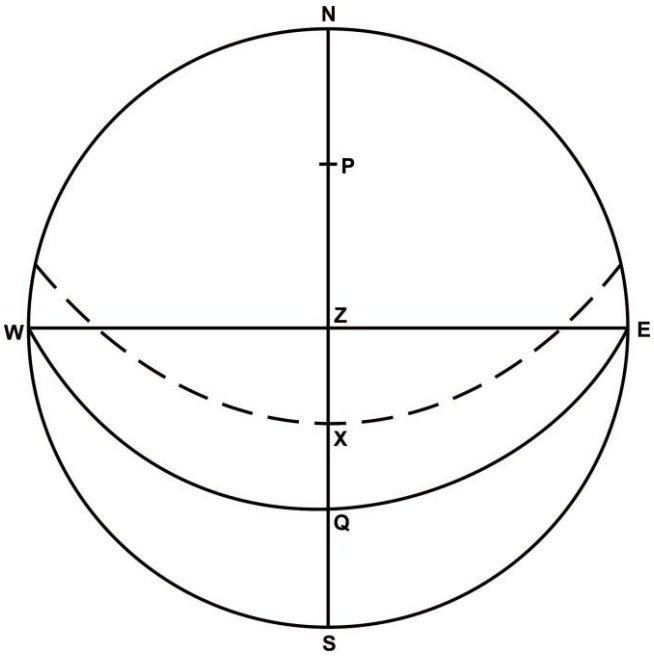
LMT Mer Pass	4^D	11^h	57^m	
Long. 002° 12' E			9^m	-
GMT	4^D	11^h	48^m	
Zone		00^h	00^m	
Ship's zone time	4^D	11^h	48^m	

Dec.	15°	52.9' N
d 0.7		0.6
Dec.	15°	53.5' N

Sextant Altitude	58°	01.9'	
i.e.		2.1'	on -
Observed Altitude	57°	59.8'	
dip		4.8'	-
Apparent Altitude	57°	55.0'	
Total Correction		16.4'	-
True Altitude	57°	38.6'	
	90°	00.0'	
TZX	32°	21.4'	
Dec.	15°	53.5'	N
Latitude of Observer	48°	14.9'	N

(16)

7.2



(4)
[20]

QUESTION 8

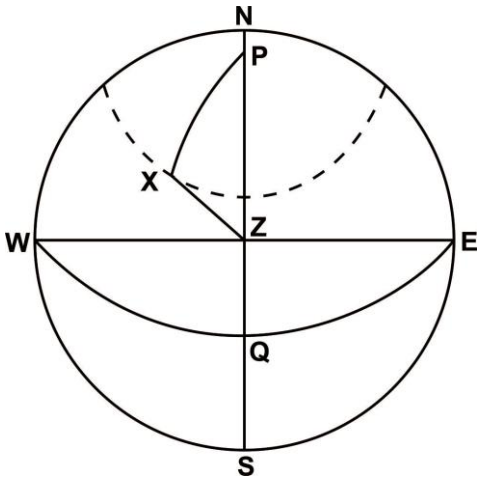
8.1

Chron	19^D	05^h	18^m	21^s				
error			06^m	09^s	-			
GMT	19^D	05^h	12^m	12^s				
GHA 05:00	254°	43.0'				Dec.	23°	25.1'
12:12	3°	03.0'				d	00	00
GHA	257°	47.0'				Dec.	23°	25.1'
Long E	104°	30.0'						
+								
LHA	002°	17.0'						

A	4.88 S
B	12.51 N
C	7.63 N
Az.	N 7.6° W
Az. T. Brg.	352 ½°
Comp. Brg.	352°
Compass error	½° E

(20)

8.2



(5)

8.3

True Brg.	352½°
var.	9° E
Mag. Brg.	342½°
Comp. Brg.	352°
Deviation	9½° W

(5)
[30]

50 marks

Total: 150 marks