NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY/JUNE 2021

NAUTICAL SCIENCE: PAPER II

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 SEAMANSHIP

QUESTION 1 RULE OF THE ROAD

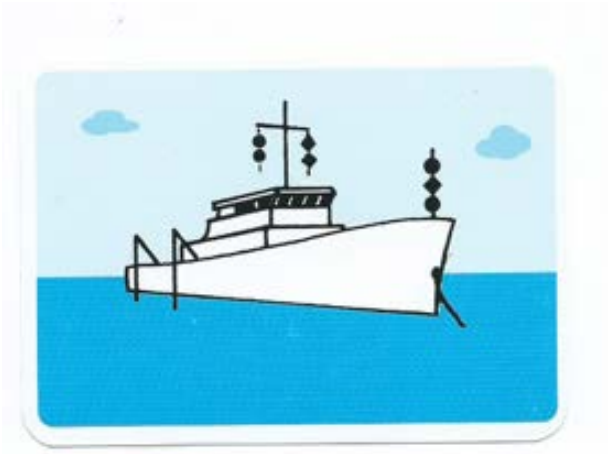
1.1 1.1.1 Rule 12 (a) (i) – When each has the wind on a different side, the **vessel which has the wind on the port side shall keep out of the way of the other**;

1.1.2 Rule 12 (a) (ii) – When both have the wind on the same side, the **vessel which is to windward shall keep out of the way of the vessel which is to leeward**;

1.1.3 Rule 12 (a) (iii) – If a **vessel with the wind on the port side** sees a **vessel to windward** and cannot determine with certainty whether the other vessel has the wind on the port or starboard side, she **shall keep out of the way of the other**.

1.2 Rule 35 (f) – A vessel at anchor shall **at intervals of not more than one minute ring the bell rapidly for about 5 seconds**.
A vessel at anchor may **in addition sound three blasts in succession**, namely **one short, one prolonged and one short blast**, **to give warning of her position** and of the possibility of collision to an approaching vessel.

1.3



A vessel engaged in dredging operations with the obstruction on her starboard side.

Safe to pass on her port side or the side with the two diamonds.

1.4 The term "vessel engaged in fishing" means any vessel fishing with nets, lines, trawls or other fishing apparatus which restricts manoeuvrability, but does not include a vessel fishing with trolling lines or other fishing apparatus which do not restrict manoeuvrability.

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QUESTION 2 IALA BUOYAGE SYSTEM

2.1 To the side of the channel which lies to starboard

2.2 2.2.1 Red and green
2.2.2 Red and white vertical stripes
2.2.3 Yellow

2.3 2.3.1 Can and cone.
2.3.2 'X' shape.
2.3.3 Two black balls vertically disposed.

2.4 On the eastern side.

2.5 On the northern side.

2.6 On either/any side.

2.7 On either/any side

QUESTION 3 SEAMANSHIP

1. Raise the alarm by calling for help or activating the nearest alarm button.

2. Inform the Bridge of the locality of the fire, what is burning if known, how many injuries/casualties or personnel involved.

3. If safe to do so and with backup if available, attempt to extinguish the fire with portable equipment found at the location.

4. If unsafe, abandon the area taking with you any other personnel in the area. Ensure, as far as possible, all doors and openings are closed as you exit.

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SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 4 COMMUNICATIONS

4.1 Safety signal:
"Securite securite securite
All ships all ships all ships
This is Zulu Siera Tango Whisky
Madiba Madiba Madiba
Lost overboard three (repeat three) 20 foot containers in the vicinity 50 miles north north east of Richards Bay.
Weather conditions strong gale force southerly wind. Visibility moderate.
Containers are semi-submerged and considered dangerous to navigation.
All ships to keep a good lookout and report sightings. – Out."

4.2 'A' flag for the divers;
'B' flag for the hazardous or dangerous cargo.

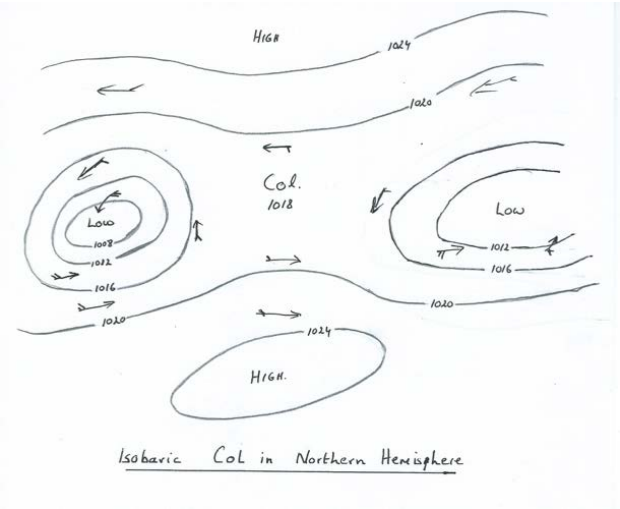
4.3 Cancel the distress message.
Urgency message cancelled:
"Pan Pan Pan
All ships all ships all ships
This is Zulu Siera Tango Whisky
Madiba Madiba Madiba
Urgency message cancelled.
No further assistance required. Repeat, no further assistance required. The vessel has regained power and proceeding on passage.
Repeat, urgency message cancelled.
This is Zulu Siera Tango Whisky – Out."

4.4 4.4.1 Bravo
4.4.2 Delta
4.4.3 Mike
4.4.4 Quebec
4.4.5 Whisky

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QUESTION 5 METEOROLOGY

5.1 A Col is a region **between two depression** (Low) systems and **two diametrically opposed anti-cyclone** (High) systems. The **pressure** at the Col is **generally lower than around the high pressures and higher than around the low pressures**.
The **pressure gradients tend to be small** and hence there will be **light and variable winds or airs**.
The **associated weather** will depend on the nature and interaction of the various surrounding systems. But in general the **relative humidity is high and there may be fog, or thunderstorms**.



5.2 When a warm front approaches –
the temperature slowly increases;
the atmospheric pressure falls barograph trend shows a steady fall;
the dew point slowly rises leading to light rain;
the wind increases and will back in the southern hemisphere and veer in the northern hemisphere;
begin with light rain becoming continuous and slowly increasing.

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SECTION C SAILINGS

QUESTION 6

6.1

	Lat.	M. P.	Long.
Fremantle	32˚ 03' S	2019.50	115˚ 44' E
Durban	29˚ 52' S	1867.49	031˚ 03' E
Dif.	2˚ 11' N	152.01	84˚ 41'W
	= 131' N		= 5081' W

Tan Course = D'Long ÷ DMP
= 5081 ÷ 152.01
= 33.425
Course = N88,3˚W
= 272˚ (T)

Distance = D'Lat ÷ Cos Course
= 131 ÷ Cos 88,3˚
= 4410,8 miles.

6.2

	Month	Day	Hour	Min.	
ETD Fremantle	12	28	18	00	Steam time = 4410,8÷15
Zone (-8)			8 -		= 294,05 hrs
GMT	12	28	10	00	= 12d 6h 03m
Steaming Time		12	06	00	
ETA Durban GMT	1	10	16	00	
Zone (-2)			2 +		
ETA Durban	01	10	18	00	January 10th 2006 at 18:00.

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QUESTION 7

7.1

	Latitude			**Longitude.**
	33° 15,0' S			028° 00,0' E
	34° 00,0' S			026° 00,0' E
D. Lat. =	0° 45,0' S		D. Long. =	2° 00.0' W
Mid. Lat =	33° 37,5'			20,0' W

Plane Sailing:	Dep =	D.Long × Cos Lat. 120 × Cos 33° 37,5' 99,931		
	Tan Course =	Dep. / D. Lat 99,931 / 45 2,221 S 65¾° W 246°	Dist. =	D.Lat / Cos. Co 45 / Cos 245¾° 109,6 miles

7.2

At 12 knots, distance 109,6M	
Steaming time	9h 08 m 0,375 days
Consume 25 m^3/day	9,4 m^3

QUESTION 8

Plane sailing is used for small distances of less than 600 miles.

Mercator sailing is used for greater distances using the difference in meridional parts (DMP) for the two latitudes.

The reason for this is because the meridians are projected on a flat Mercator chart as perpendicular to the lines of latitude, when in fact they should converge. Therefore the scale on a Mercator chart is increasingly distorted moving away from the Equator.

Total: 150 marks

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