NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2020

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**. ✓✓✓ (3)

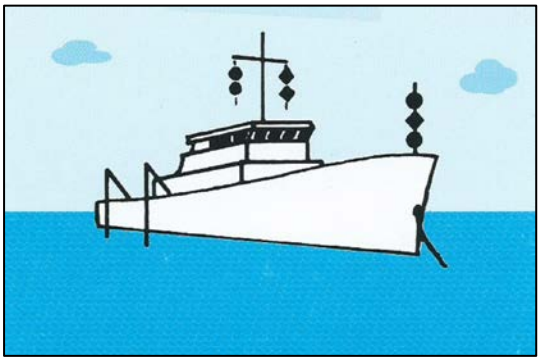
1.1.2 Rule 12 (a)(ii) – when both have the wind on the same side, the **vessel which is to windward shall keep out of the way of the vessel which is to leeward**. ✓✓✓ (3)

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**. ✓✓ (4)

1.2 Rule 35 (g) – A vessel at anchor shall **at intervals of not more than one minute ring the bell rapidly for about five seconds**. ✓ In a vessel of **100 metres or more in length** ✓ the **bell shall be sounded in the forepart** ✓ of the vessel and immediately after the ringing of the bell **the gong shall be sounded rapidly for about five seconds in the afterpart** ✓ of the vessel.

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. (5)

1.3



Vessel restricted by her ability to manoeuvre and engaged in underwater operations.

Obstructed on her starboard side, safe to pass on her port side. (10)

1.4 Rule 3(d) – 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 does not restrict manoeuvrability**. (5)

[30]

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QUESTION 2 IALA BUOYAGE SYSTEM

2.1 To the side of the channel which lies to starboard. ✓ (1)

2.2 2.2.1 Red and green ✓✓ (2)

2.2.2 Red and white vertical stripes ✓✓ (2)

2.2.3 Yellow ✓ (1)

2.3 2.3.1 Can or cone. ✓✓ (2)

2.3.2 'X' shape. ✓ (1)

2.3.3 Two black balls vertically disposed. ✓✓ (2)

2.4 On the eastern side. ✓ (1)

2.5 On the northern side. ✓ (1)

2.6 On either/any side. ✓ (1)

2.7 On either/any side. ✓ (1)

[15]

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 are involved.

3. If safe to do so, and only with back-up, attempt to extinguish the fire with portable equipment available in the location.

4. If deemed unsafe, abandon the area, taking with you and assisting where possible any other personnel in the vicinity.

5. Ensure as far as possible that all doors, access and ventilation are tightly closed.

6. Maintain communication with the bridge with regular updates.

[5]

50 marks

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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 ✓✓
Motor Vessel Madiba Madiba Madiba ✓
Lost overboard three (repeat three) 20-foot containers in the vicinity 50 miles north north east of Richard's 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." ✓✓✓ (13)

4.2 'A' flag for the divers ✓
'B' flag for the hazardous or dangerous cargo. ✓ (2)

4.3 Cancel the distress message.
Urgency message cancelled:
"Pan Pan Pan ✓✓
All ships all ships all ships ✓✓
This is Zulu Siera Tango Whisky ✓
Motor Vessel 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." ✓✓ (10)
[25]

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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**. ✓ (6)

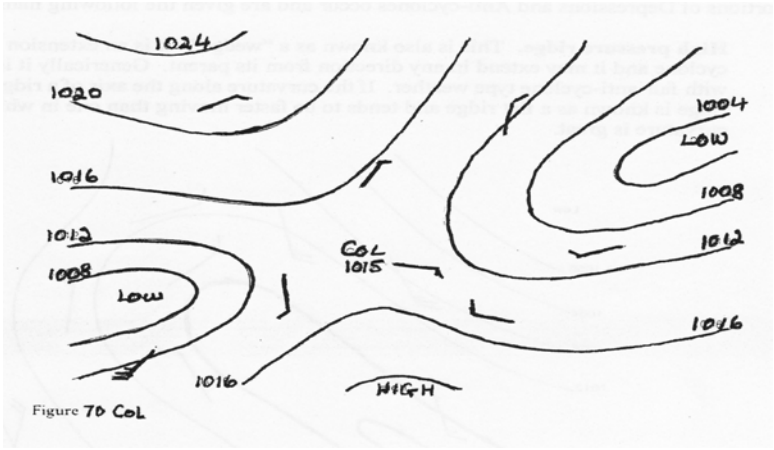


Figure 7D COL

(9)

5.2 The temperature slowly rises or remains steady, the atmospheric pressure steadily falls, the dew point rises, the wind increases and backs and light rain becoming steady occurs in advance of the warm front. (8)

5.3 The barometer and barograph. ✓✓ (2)

[25]

50 marks

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		= 5 081' W

(5)

Tan Course = D'Long ÷ DMP
= 5 081 ÷ 152,01
= 33,425
Course = N 88° W
= 272° (T)

Distance = D'Lat ÷ Cos Course
= 131 ÷ Cos 88°
= 3 753,6 miles

(5)

(5)

6.2

	Month	Day	Hour		Min.	
ETD Fremantle	12	28	18		00	Steam time = 3 753,6 ÷ 15 (2)
Zone (-8)			8	-		= 250,25 hrs
GMT	12	28	10		00	= 10d 10h 15m
Steaming Time		10	10		15	(2)
ETA Durban GMT	1	07	20		15	(2)
Zone (-2)			2	+	15	January 7th 2006 at 22:15
ETA Durban	01	07	22			(4)

[25]

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	(1)
Mid. Lat. =	33° 37,5'			(2)

Plane Sailing:

Dep = D.Long × Cos Mid. Lat. (1)
= 120 × Cos 33° 37,5'
= 99,931 W (2)

Tan Course = Dep. / D. Lat (2)
= 99,931 / 45
= 2,221 (4)

Dist. = D.Lat / Cos. Co (2)
= 45 / Cos 245¾°
= 109,6 miles (4)

Course = S 65¾° W
= 245¾° (4)

7.2 At 12 knots, distance 109,6 M

9h 08 m (2)
1 March 18 00
ETA 2 March 03h 08 m (2)
[20]

QUESTION 8

Plane sailing is used for small distances of less than 600 miles. (1)

Mercator sailing is used for greater distances using the difference in meridional parts (DMP) for the two latitudes. (1)

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. (3)
[5]

50 marks

Total: 150 marks

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