



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2019

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.

SECTION A SEAMANSHIP**QUESTION 1**

- 1.1 1.1.1 The two cones, apexes pointing towards each other, indicate a vessel engaged in fishing or trawling.

The single cone, with apex pointing upwards, indicates that the outlying fishing gear extends more than 150 metres horizontally astern or on the side of the vessel to which the gear extends.

The diamond shape indicates a vessel towing where the length of the tow is longer than 200 metres, and diamonds are displayed on both the towing vessel and the vessel being towed.

- 1.1.2 Responsibility of the towing vessel:
- In respect of the trawler, the tug must keep clear of the vessel engaged in fishing [Rule 18(a) (iii)].
 - The tug should, if possible, reduce speed, if not, make a bold alteration to starboard to allow the trawler to pass ahead.

Responsibility of the power-driven vessel:

- As an overtaking vessel, she must keep well clear of the tug and tow (Rule 13).
- In respect of the trawler, the "stand-on vessel," the power-driven vessel must keep out of the way [Rule 18(a) (iii)].
- The power-driven vessel should make a bold alteration to starboard astern of the tow, and pass well ahead of the trawler.

Responsibility of the trawler (engaged in fishing):

- Maintain her course and speed (Rule 17a), but she may take action to avoid collision by her manoeuvre alone as soon as it becomes apparent to her that either one or both of the other vessels are not taking appropriate action in compliance with the rules [Rule 17(a)(ii), (b) & (c)]. In which case she should give five short and rapid blasts on the whistle (Rule 34 (d)).

- 1.2 1.2.1 Tug – sound, at intervals of not more than two minutes, three blasts in succession, namely one prolonged followed by two short blasts [Rule 35 (c)].

Vessel towed – the last vessel in the tow, if manned, shall, at intervals of not more than two minutes, sound four blasts in succession, namely one prolonged followed by three short blasts. Where practical, this signal shall be made immediately after the signal made by the towing vessel [Rule 35(d)].

- 1.2.2 A power-driven vessel making way through the water shall sound, at intervals of not more than two minutes, one prolonged blast [Rule 35(a)].

1.2.3 A vessel engaged in fishing shall sound at intervals of not more than two minutes three blasts in succession, namely one prolonged followed by two short blasts [Rule 35 (c)].

1.3 Vessel constrained by her draught viewed from astern –

-
- 3 Red all-round lights
-
- White stern light

- 1.4
- One short blast – alter course to starboard;
 - Two short blasts – alter course to port;
 - Three short blasts – going astern;
 - Five short and rapid blasts – if a vessel fails to understand the intentions of the other vessel, or is in doubt of the other's actions, then she shall immediately sound five short and rapid blasts on the whistle (Rule 34(d)).

QUESTION 2

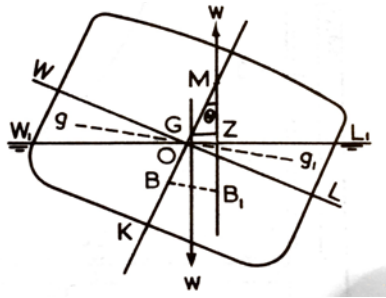
Person overboard (MOB) procedure:

1. Release the lifebuoy with light and smoke signal;
2. Put wheel over towards the side the person went overboard;
3. Sound the alarm;
4. Call Master;
5. Activate the MOB button on the GPS;
6. Engines on stand-by and reduce speed;
7. Post lookouts;
8. Hoist signal flag "O";
9. Engage hand steering;
10. Note vessel position, the time, and the wind direction and speed;
11. Complete "Single Turn" or "Williamson Turn" manoeuvre;
12. Muster rescue boat crew;
13. Prepare to launch boat;
14. Prepare recovery of personnel;
15. Inform other shipping and local authority, "SECURITE" message or Navigation Warning;
16. Inform the owners, operators and/or charterers.
17. Keep accurate records.

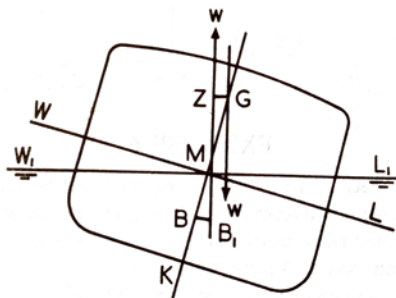
Any or all of the above. Marks awarded for prioritising the most immediate or urgent actions.

QUESTION 3

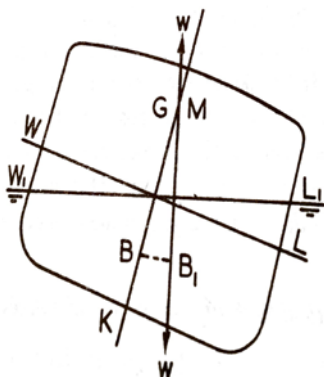
3.1 3.1.1 Stable (+ GM)



3.1.2 Unstable (- GM)



3.1.3 Neutral (Ø)



- Legend:
- K = keel;
 - B = centre of buoyancy;
 - B¹ = shift of centre of buoyancy when heeled;
 - G = centre of gravity of vessel;
 - GZ = righting lever;
 - ZG = capsizing lever;
 - M = metacenter;
 - W/L = water line.

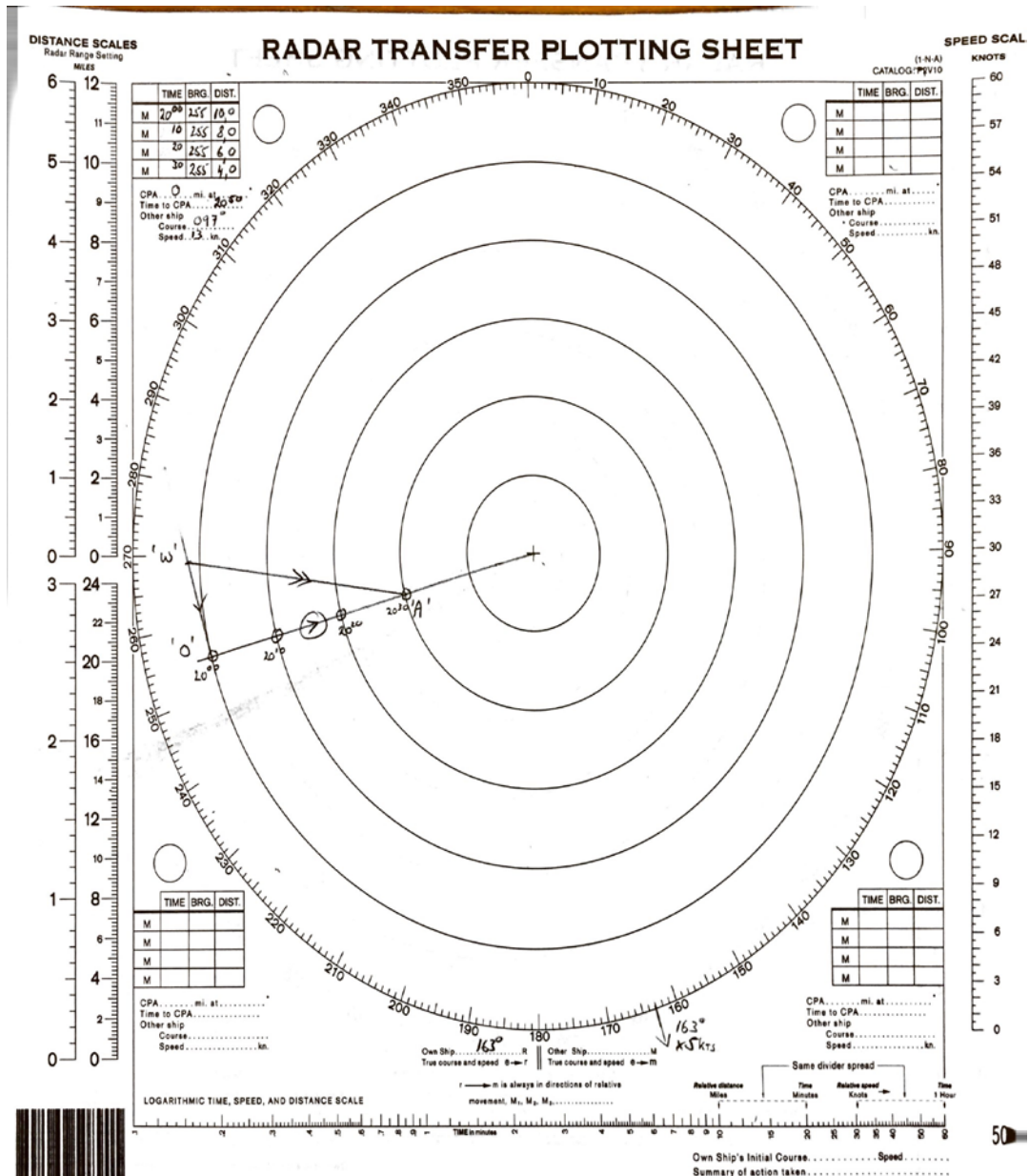
3.2 A vessel "heels" to starboard due to external forces such as wind, waves, etc.

3.3 A vessel "lists" due to internal forces such as the shifting of weight off the centre line to port or starboard, or the imbalance of weights on either side of the centre line, etc.

3.4 Gross tonnage is the internal volume of the ship below the tonnage deck plus the tween deck tonnage which includes the volume of any closed-in spaces on or above the tonnage deck.

QUESTION 4

4.1



4.2	Time initial plot	20:00	
	Initial range and bearing	255° (T) x 10,0 miles	1
	CPA	0 miles, collision	1
	Time of CPA	20:50	2
	Target's true course	097°	3
	Target's speed	13,0 knots	3

4.3 Make a bold alteration of 90° to port, course 073° and continue to monitor the target till the danger has passed.

QUESTION 5

5.1 Design features of a Ro-Ro ship:

- Has a ramp on the stern or quarter for driving cargo on and off the vessel. On some vessels the ramps are on the side.
- Internal fixed and/or closing ramps to access different deck levels.
- Equipped with a set of mobile cargo-handling equipment such as forklifts, container stackers, low-bed trailers and mechanical horse or tractors for towing the trailers.
- Multi-decked interlinked by ramps. In some cases there may be lifts or hoists to move from one deck to the next.
- The vessels are normally self-supporting and not reliant on equipment or infrastructure from ashore.
- Capable of handling large or small parcels of cargo including containers and heavy lifts for abnormal-size cargo.

Any five of the above, or other pertinent information specifically about Ro-Ro ships.

5.2 Reefer vessel:

- A vessel designed to carry refrigerated cargo such as perishable fruit and meat.
- It is a multi-hatch/hold (usually 4 or 5) and multi-deck vessel designed for palletised cargoes.
- May also carry refrigerated containers.
- Fitted out with cranes with capacity of up to 25 tons.
- Holds are insulated. Each deck and each hold temperature-controlled from -20°C to ambient temperature.
- A central refrigerant plant normally situated in the engine room will supply air pre-cooled to the required temperature to individual compartments.

Any five of the above, or other pertinent information specifically about Reefer ships.

SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 6

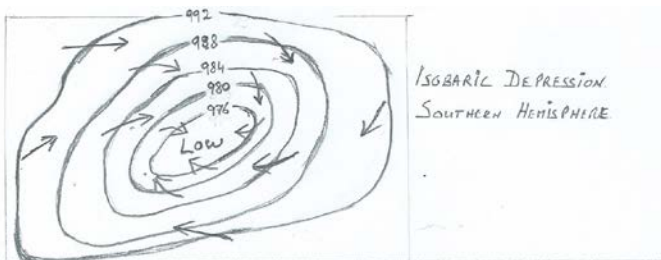
6.1 Sea Area A1 is within radio telephone coverage of at least one VHF coast station from which continuous DSC (digital selective calling) alerting is available. It extends up to 50 nautical miles from the coast station.

6.2 Distress call:
 MAYDAY, MAYDAY, MAYDAY
 THIS IS ASTOR, ASTOR, ASTOR

Followed by distress message:
 MAYDAY
 ASTOR, CALL SIGN **Z**ulu **S**iera **A**lpha **R**omeo
 POSITION NORTH WEST COAST OF DASSEN ISLAND
 MY VESSEL IS AGROUND
 REQUIRE IMMEDIATE ASSISTANCE
 WEATHER – WIND NW FORCE 7, POOR VISIBILITY OVER.

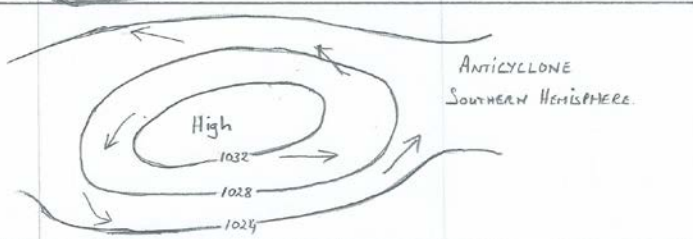
QUESTION 7

7.1



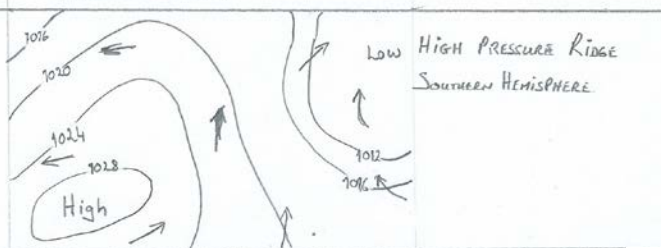
ISOBARIC DEPRESSION
 SOUTHERN HEMISPHERE

7.2



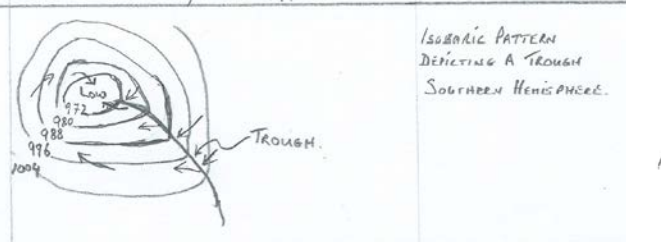
ANTICYCLONE
 SOUTHERN HEMISPHERE

7.3

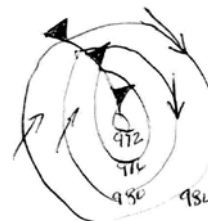


LOW HIGH PRESSURE RIDGE
 SOUTHERN HEMISPHERE

7.4



ISOBARIC PATTERN
 DEPICTING A TROUGH
 SOUTHERN HEMISPHERE.



SECTION C SAILINGS

QUESTION 8

	LAT	Meridional Parts	LONG
Noon 13 Feb	31° 06' S	1952.93 S	013° 35' E
W P	18° 55' N	1148.62 N	063° 25' W
D.Lat/DMP/D.Long	50° 01' N 3001	3101.55	77° 00' W 4620

8.1 Tan Co. = D.Long / DMP
 = 4620 / 3101.55
 = N 56° W
 Course = 304° (T)

8.2 Distance = D.Lat / Cos Co.
 = 3001 / Cos 56°
 Distance = 5 384.1 miles

8.3 St time @ 18 knots	= 5384.1 / 18	Date	13 d 12 h 00 m
	= 299.117 hrs	@ 18kts	12 11 07
	= 12 d 11 h 7 m	ETA (GMT + 1)	<u>25 23 07</u>
		Time dif.	05 – 00
		ETA	<u>25 th 18 h 07 m</u>

Total: 150 marks