NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2024

NAUTICAL SCIENCE: PAPER II

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.

IEB Copyright © 2024

SECTION A SEAMANSHIP

QUESTION 1

1.1 1.1.1 Vessel A & B (meeting/head-on situation)
- vessel A & B should each alter course to starboard
- pass each other port-to-port at a safe distance

1.1.2 Vessel A (has the other vessel on her own starboard side)
- vessel A should alter course to starboard
- pass astern of vessel B at a safe distance
- avoid passing ahead of vessel B unless it is safe to do so
- vessel A may slow down to allow vessel B to pass ahead

(Any three)

1.1.3 Vessel A (has wind on her port side)
- vessel A should alter course to port
- pass astern of vessel B at a safe distance

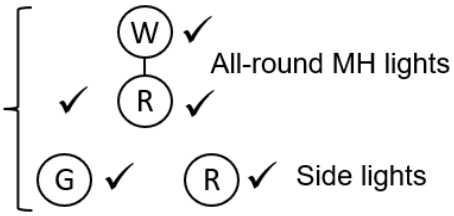
1.2 1.2.1 Underwater operation:
- dredging
- surveying
- picking up or laying submarine cables or pipelines
- maintenance, servicing of navigational aid

(Any one)

1.2.2 Safe side to pass contact: **port**

1.2.3 Manoeuvrability status: **restricted in ability to manoeuvre (RAM)**

1.3 1.3.1



1.3.2 Identity sound signal of a pilot vessel: **4 short blasts**

1.4 Owner master crew vessel

1.5 Maritime operations that may require RAM status include, but not limited to:
- underwater operations (dredging, surveying, etc.)
- diving operations
- mine clearance diving operations
- launch and/or recovery of aircraft
- picking up or laying submarine cables or pipelines
- towing operations that severely restrict manoeuvrability
- maintenance, servicing of navigational aid
- replenishment, transferring of cargo, personnel or equipment whilst underway

(Any three)

IEB Copyright © 2024

QUESTION 2 'SOLAS'

2.1 MOB procedure – priority OOW actions:
- turn wheel hard over towards side of MOB
- activate MOB button on the GPS
- plot position of MOB
- reduce to safe speed
- post lookouts
- activate the MOB alarm
- sound the general alarm
- inform master

(Any five – no particular order)

2.2 SAR items/equipment/apparatus:
- line throwing equipment
- scrambling nets
- ladders
- work/sea boat (lifeboat)
- crane and suitable basket or recovery rig (i.e. lifting gear).
- search light
- over-side lights
- additional first aid kits
- dry and warm blankets / thermal protective aid (TPA)
- dry and warm clothes
- hot foods and/or drinks / stores

(Any five)

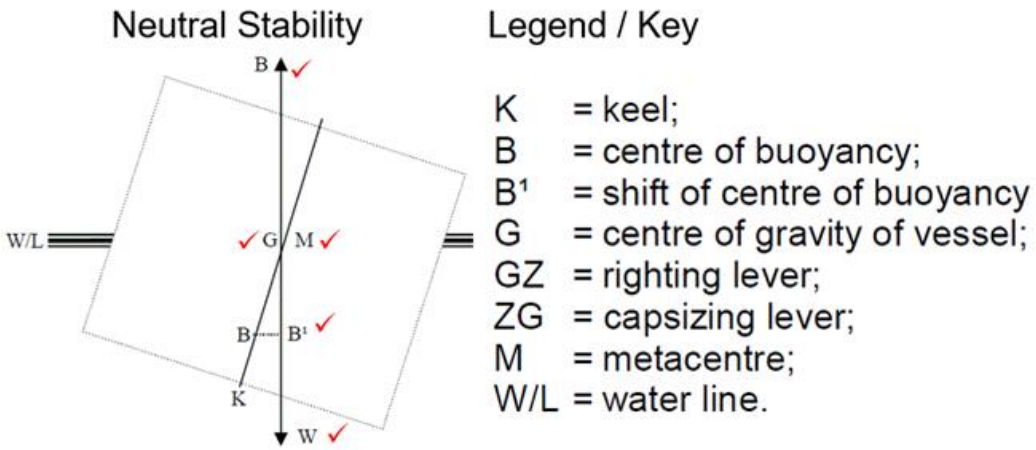
QUESTION 3 SHIP STABILITY

3.1 ***Lightweight Tonnage*** is the weight of a ship itself when completely empty.

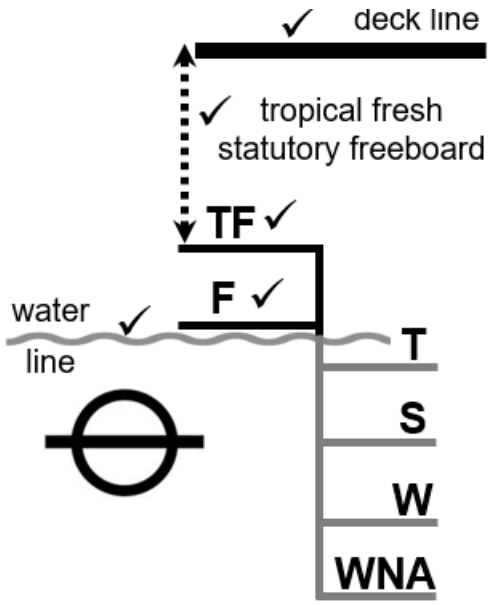
3.2 When a ship is inclined by an internal force.

3.3 ***Six degrees of freedom:***
Surge, sway, yaw, pitch, roll and heave.
(Any two)

3.4



3.5 ***Plimsoll mark:***



3.6.1 DECREASE

3.6.2 INCREASE

3.6.3 INCREASE / DECREASE

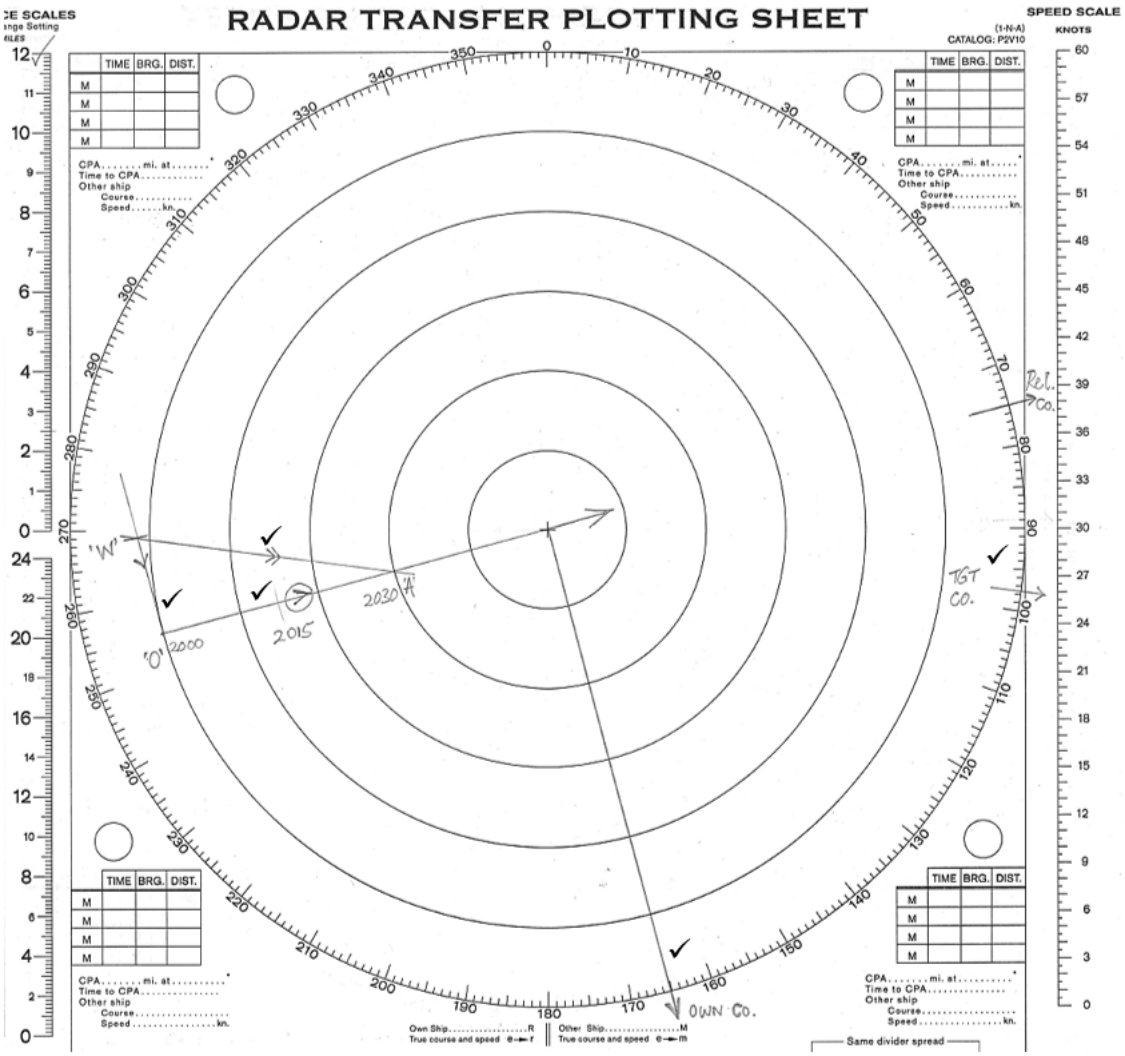
3.6.4 DECREASE

3.7 Ballast

IEB Copyright © 2024

QUESTION 4 RADAR

4.1



4.2

Target Report	
Target Identity	**'A'**
Initial Bearing & Range	255° (T) × 10 M
Relative Course	075°
True Course	098° (T)
Speed	13,0 Kn
CPA Bearing	255° (T)
CPA Range	0,0 M
CPA Time	20:50 (calculation)

4.3 Make a BOLD alteration to PORT
Continue to sound 1 prolonged blast at intervals of not more than 2 minutes
Post extra lookouts
Continue to monitor the target until pass and clear

IEB Copyright © 2024

QUESTION 5 SEA TRANSPORT

5.1 ***General design features of dry bulk carrier:***

- Superstructure usually located down aft.
- Engine room usually located down aft.
- Have a double bottom.
- Have lower and upper hopper tanks.
- Bulk carriers are single deck, multi-hold (4–9 hatches/holds) designed to normally carry one commodity (e.g. iron ore, coal, grain) loaded in bulk.
- Holds are designed with large hatch openings through which the cargo is tipped or poured into the hold, and discharged using grabs, or in some cases for light cargoes (grain) by evacuators or suction.
- Holds are designed for easy loading, self-trimming and minimum manpower or mechanical stowage. On discharge, grabs or conveyor systems remove almost all the cargo with minimum manpower (shovelling) or mechanical means (Bobcats) for final sweeping or cleaning.
- Vessel may be 'geared' or 'gearless', meaning it will either be equipped with cranes and grabs for loading/discharge, or it will have no equipment and rely entirely on terminal equipment to handle the cargo.
- Vessel designed to have a comprehensive ballast system for trim and stability purposes. The ballast will also be used to manage the draft and air-draft requirements at the ports and terminals.

(Any five)

5.2 ***General design features of Ro-Ro:***

- Cargo can be loaded on and off on wheels by trailers or in trucks and can be moved around within the vessel to be stowed on or off the wheeled transport.
- Usually has a ramp on the stern or quarter for driving cargo on and off the vessel. On some vessels the ramps may be at the bow and/or on the side.
- Multi-decked interlinked by ramps. In some cases, there may be lifts or hoists to move from one deck to the next.
- Have internal fixed and/or folding ramps to access different deck levels.
- Have many securing points on all cargo decks.
- Have scuppers on all decks.
- 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.
- 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 or abnormal size cargo.

(Any five)

IEB Copyright © 2024

SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 6 MARITIME COMMUNICATION

6.1 Co-ordination of the search and rescue effort under the direction of MRCC.
Interconnectedness and/or synchronisation of subunits into one system.
Automation (minimised human intervention).
Inclusion of satellites into the maritime communication system.
(Any three)

6.2 6.2.1 **Distress Call**:
MAYDAY, MAYDAY, MAYDAY
THIS IS SPONOPONO, SPONOPONO, SPONOPONO
(or **Z**ulu **S**iera **A**lpha **R**omeo × 3)
OVER

Distress Message:
MAYDAY
SPONOPONO (or **Z**ulu **S**iera **A**lpha **R**omeo)
POSITION NORTH-WEST COAST OF SEAL ISLAND
MY VESSEL IS AGROUND
REQUIRE IMMEDIATE ASSISTANCE
WEATHER – WIND NORTH-WEST, FORCE 7, POOR VISIBILITY
(THIS IS SPONOPONO/**Z**ulu **S**iera **A**lpha **R**omeo)
OVER

6.2.2 156,8 MHz Channel 16

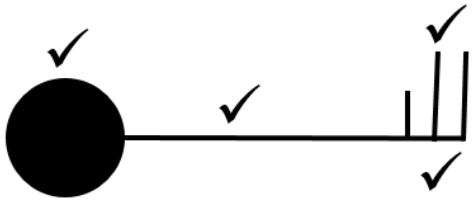
6.3 6.3.1 '**A**' ~~(at the dip)~~ = I have a diver down;
keep well clear at slow speed

6.4 **National flag** (at half-mast) = mourning death of prominent person(s)
(or memorial of a national tragedy)

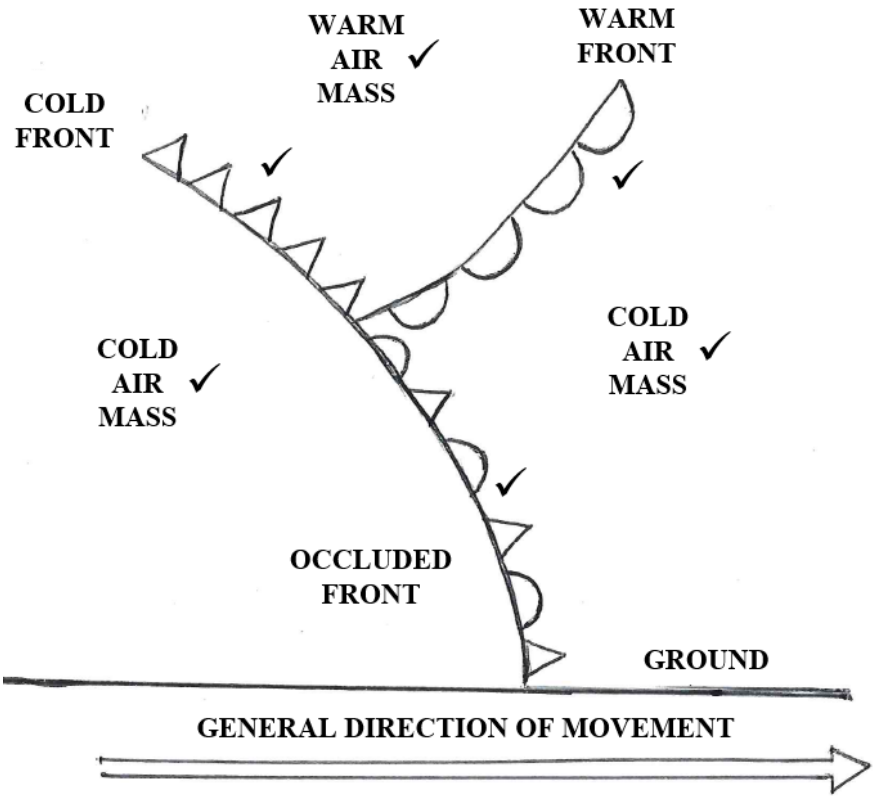
IEB Copyright © 2024

QUESTION 7 METEOROLOGY

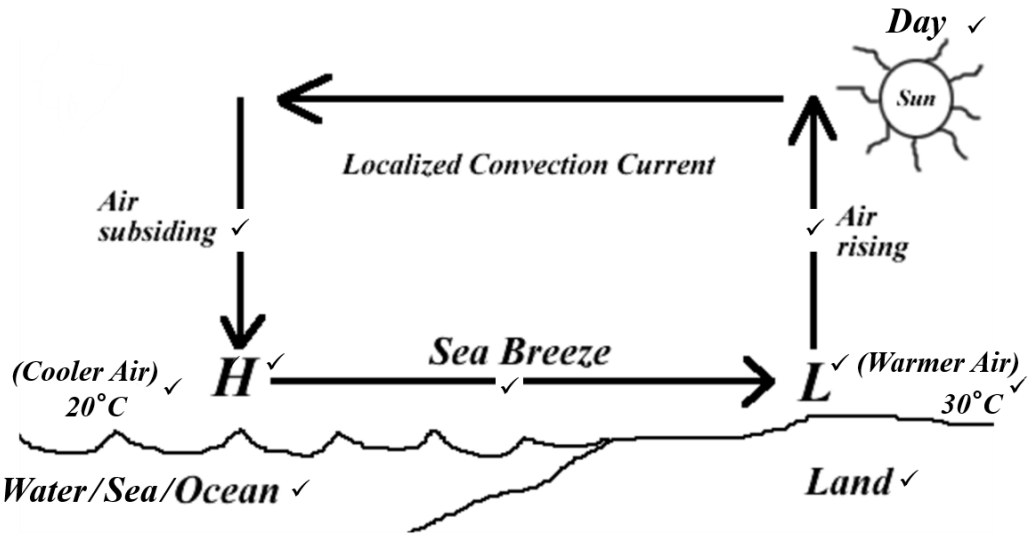
7.1



7.2



7.3



SECTION C SAILINGS

QUESTION 8

8.1

	Lat		**Long**		**MP**
From:	13° 15' N		072° 10' E		796,82
To:	22° 55' S		009° 56' E		1404,09
D'lat	= 36° 10' S	D'long	= 62° 14' W	DMP	= 2200,91
	= 2170' S		= 3734' W		

Tan Co. = D'long / DMP
= 3734 / 2200,91
= 1,696570…
Course = Tan^{-1} 1,696570
= 59,483°
= 59°
= **S** 59° **W**

True Co. = 180° + 59° (T)
= 239° (T)

Distance = D.lat / cos course
= 2170 / cos 59, 483°
= 4273,386 M

8.2 An east-west distance is (equals) 'departure'
D'Long = Departure / cos Lat
= 400 / cos 45°
= 565,685′
= 9° 25,7′ E

Longitude = 50° 00′ E + 9° 25,7′ E
= 59° 25,7′ E

Thus, arrival position: 045° 00' S 59° 25,7′ E

Total: 150 marks

IEB Copyright © 2024