



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2011

NAUTICAL SCIENCE: PAPER II

MARKING GUIDELINES

Time: 3 hours

Marks: 150

These marking guidelines were used as the basis for the official IEB marking session. They were prepared for use by examiners and sub-examiners, all of whom were required to attend a rigorous standardisation meeting to ensure that the guidelines were consistently and fairly interpreted and applied in the marking of candidates' scripts.

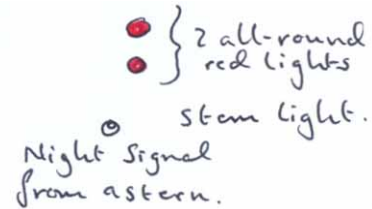
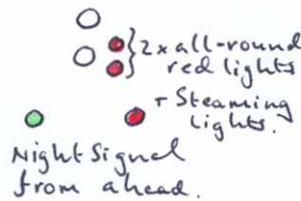
At standardisation meetings, decisions are taken regarding the allocation of marks in the interests of fairness to all candidates in the context of an entirely summative assessment.

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, and different interpretations of the application thereof. Hence, the specific mark allocations have been omitted.

SECTION A SEAMANSHIP

QUESTION 1

- 1.1 The vessel being overtaken is the stand-on vessel and so complies with Rule 17(a); (i) & (ii).
 (i) Where one of the two vessels is to keep out of the way the other shall keep her course and speed.
 (ii) The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these rules. (8)
- 1.2 All vessels upon the high seas and in all waters connected therewith navigable by seagoing vessels. (4)
- 1.3 A vessel engaged in fishing means any vessel fishing with nets, lines, trawls or other fishing apparatus which restricts manoeuvrability, but does not include vessels fishing with trolling lines or other fishing apparatus which do not restrict manoeuvrability. (7)
- 1.4
- Two all-round red lights in a vertical line where they can best be seen;
 - Two balls or similar shapes in a vertical line where they can best be seen;
 - The red and green sidelights and a stern light.



- 1.5 Rule 15 – When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel. (5)
- [30]**

QUESTION 2

1. Stop engines
2. Activate the general alarm and assemble crew
3. Inform the engine room
4. Prepare to transmit an emergency message and request assistance
5. Shut and secure all watertight doors and portholes
6. Prepare anchors and let go the seaward side anchor
7. Sound all compartments and monitor the ingress of water
8. Draw up a ballasting and fuel transfer plan
9. Prepare the lifeboats and rafts for launching
10. Inform the owners, charterers and coastal authorities.

[10]

QUESTION 3

3.1 New draft ÷ Old draft = Old density ÷ New density

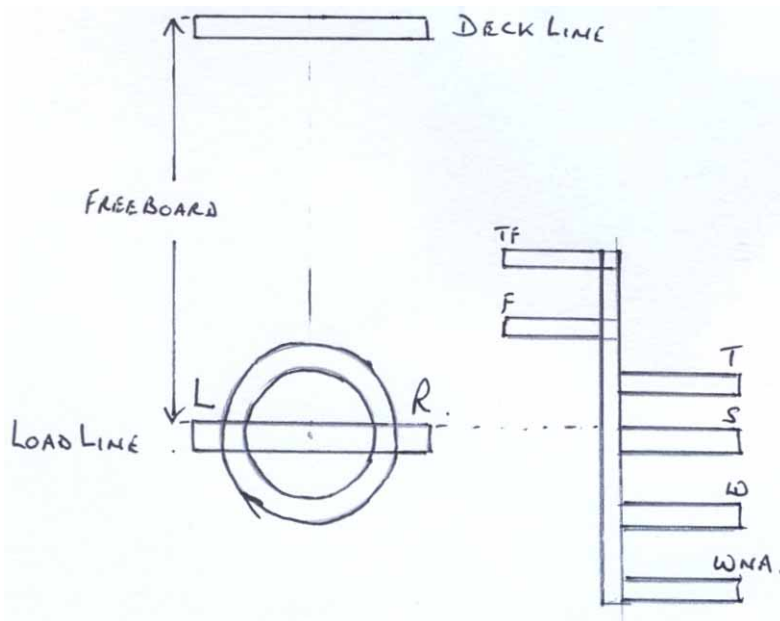
$$\text{New draft} = (2,1 \times 1\,020) \div 1\,025$$

$$= \underline{\underline{2,09\text{m}}} \quad (5)$$

3.2 3.2.1 The deadweight of a vessel is the total weight of the cargo, stores, fresh water, ballast, fuel and crew which a vessel can carry when loaded down to her marks, and it is measured in tons weight. (4)

3.2.2 Reserve buoyancy is defined as the volume of the enclosed spaces above the waterline. It may be expressed as a volume or a percentage of the total volume of the vessel. (3)

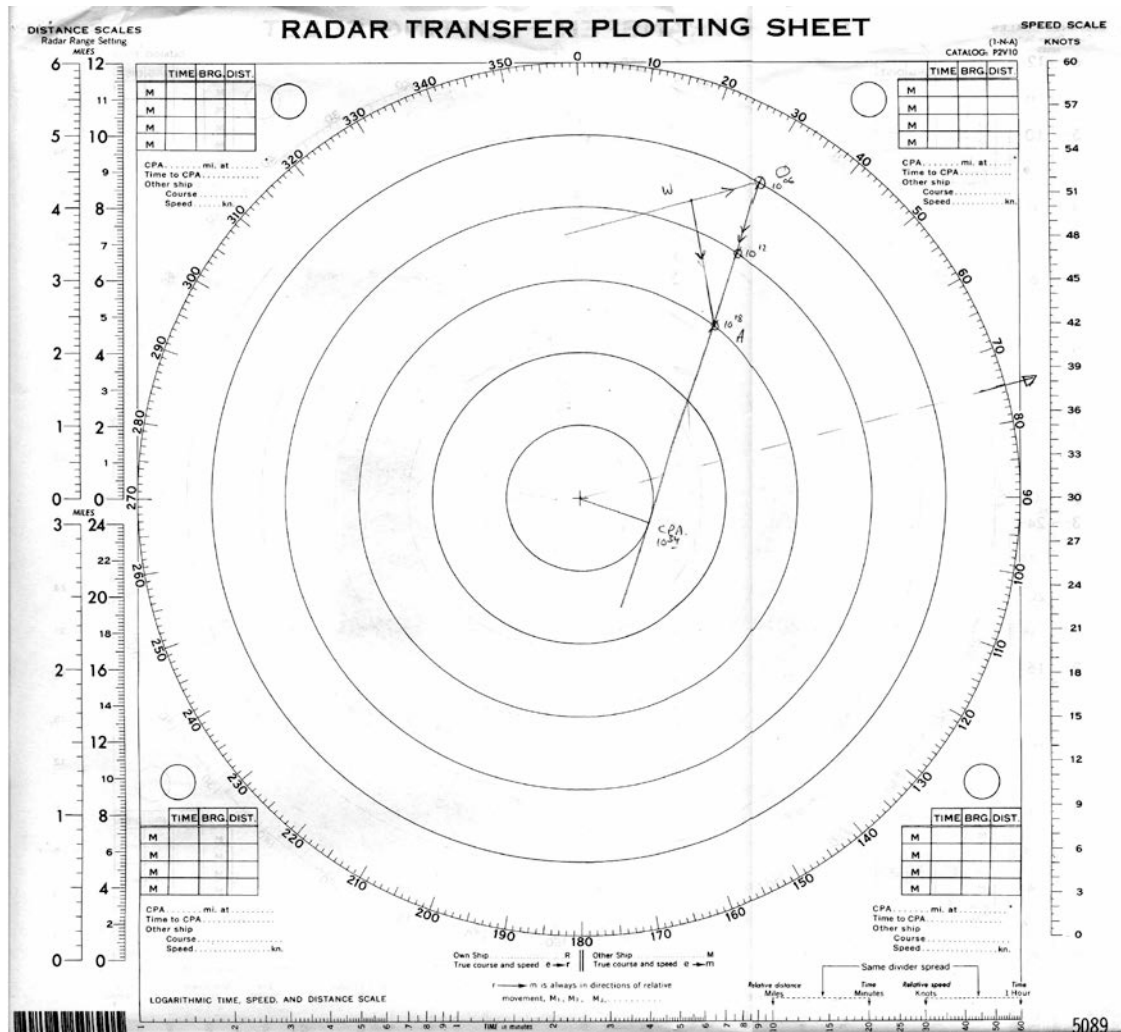
3.3 The statutory freeboard of a ship is the vertical distance between the upper edge of the deck line and the upper edge of the respective load line.



(8)
[20]

QUESTION 4

4.1



(5)

- | | | | |
|-----|---|---|------|
| 4.2 | Target identification
Time of initial plot
Initial range & bearing
CPA
Time of CPA
Target's true course
Target's true speed | 'A'
10:06
030° (T) x 10 miles
2,0 miles bearing 109° (T)
10:33
169°
17,5 knots. | (10) |
|-----|---|---|------|

4.3 If 2 miles is considered a safe distance then maintain course and speed.

If 2 miles is not considered a safe distance under the circumstances then reduce speed to 5 knots to maintain steerage until 'A' has passed ahead and clear.

In any case continue to monitor the vessel's course and speed till she has passed clear. (5)
[20]

QUESTION 5

5.1 5.1.1 The advantages of containerisation are:

- The speed of loading and discharging giving the vessel a quicker turnaround in port;
- Universally accepted dimensions of containers simplifies stowage and transport systems world-wide;
- Efficient and safe handling of cargoes minimizing breakages and pilfering;
- Reduced packaging of some cargoes;
- A door-to-door service from producer to consumer reduces handling of the cargo;
- The ability to continue working cargo in most inclement weather such as rain and snow;
- Less cargo sheds or covered storage required;
- Versatility of containers allows for their use in carrying many dry and liquid bulk cargoes.

(4)

5.1.2 The disadvantages of containerisation are:

- Large capital investment required in suits of containers, handling equipment, specialized ships, docks and quays;
- Each vessel requires 2½ suits of containers;
- Not always suitable for heavy lift cargoes, bulk cargoes and cargoes not easily unitized or paletised;
- Imbalance of trade requires empty containers to be repositioned;
- Containerisation presents a security problem, being more convenient for criminal elements to take advantage of for smuggling illegal cargoes and human trafficking;
- Containers landed in remote or some third world regions are often difficult to track and recover as they are stolen for other uses such as shelters and homes.

(4)

- 5.2
- Fish, meat;
 - Deciduous fruit – apples, pears, grapes;
 - Citrus fruit – oranges;
 - Avocado Pears.

(2)

[10]

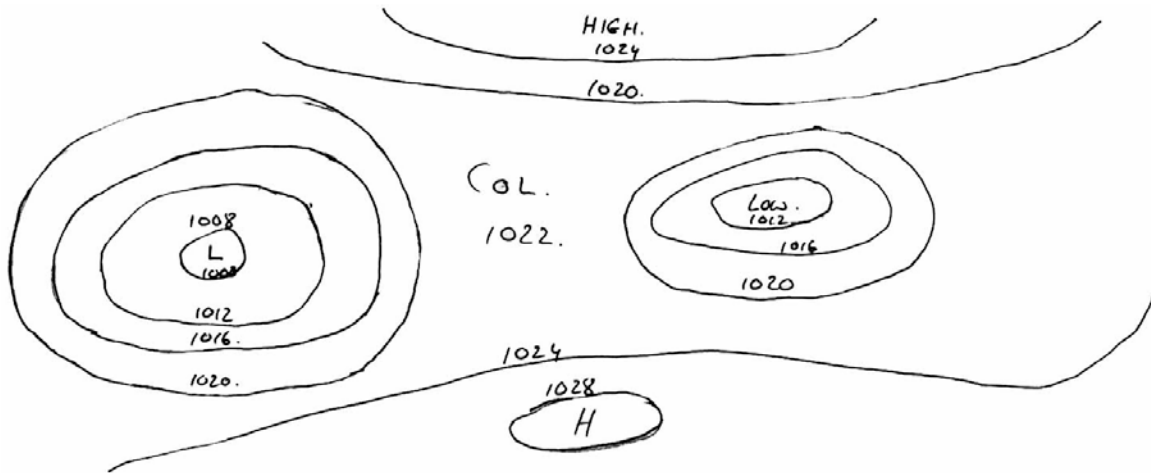
90 marks

SECTION B COMMUNICATIONS AND METEOROLOGY**QUESTION 6**

- 6.1 • Distress call:
 'Mayday, Mayday, Mayday,
 This is the vessel AGULHAS, AGULHAS, AGULHAS.'
- Followed by the distress message:
 'Mayday;
 Agulhas / ZULU SIERRA SIERRA TANGO (ZSST);
 Position Latitude 34° 15' S, Longitude 22° 10' E, Cape Point bearing 000° x
 10 miles;
 Vessel is on fire;
 Require immediate assistance;
 Weather – wind SE force 5, visibility good;
 OVER.' (10)
- 6.2 Flag = FOXTROT. (3)
- 6.3 The ensign or national flag of the vessel's registration flown from the flagstaff at the
 stern. (2)
- [15]**

QUESTION 7

- 7.1 Wind is the movement of air from a high pressure to a low pressure. (2)
- 7.2 Geostrophic or Coriolis. (1)
- 7.3 Left or anti-clockwise from the high pressure centre. (2)
- 7.4 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.



(15)
[20]

35 marks

SECTION C SAILINGS

	Lat.	Mid. Lat.	Long.
N/N 27 th (GMT-2)	12° 06' N	12° 06' N	037°21' W
N/N 28 th (GMT-3)	<u>16° 54' N</u>	<u>16° 54' N</u>	<u>043°12' W</u>
Dif. / Mid.	4° 48' N	29° 00'	5°51' W
	288' N	14° 30' N	351' W

Dep. = D'Long x Cos Lat.
 = 351 x Cos 14° 30'
 = 339,82 miles

351 = 0.54531
 Cos 14°30' = 9.98594
 339.82 = 0.53125

Tan course = dep ÷ D'Lat
 = 339.82 ÷ 288
 = 1,180

Dist = D'Lat/Cos Co.
 = 288/Cos 49,7°

Dist = 445,3 miles

Course = N49,7°W
Made good = 310¼° (T)

Distance = 445,3 miles

Time 24 + 1 = 25 hrs

Avg. speed = 117,81 knots

25 marks

Total: 150 marks