



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2016

NAUTICAL SCIENCE: PAPER II

MARKING GUIDELINES

Time: 3 hours

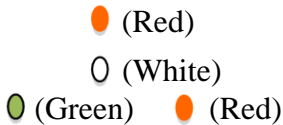
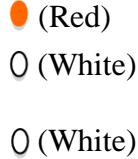

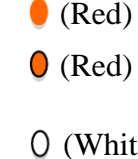
Marks: 150

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

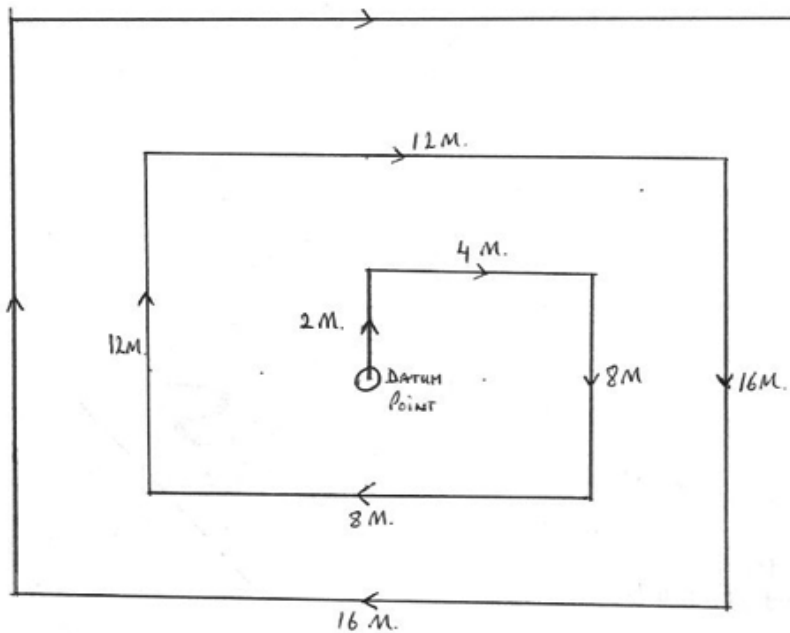
- 1.1 1.1.1 (i) A vessel not under command
 (ii) A vessel restricted in her ability to manoeuvre
 (iii) A vessel engaged in fishing
 (iv) A sailing vessel. (4)
- 1.1.2 (i) A vessel not under command
 (ii) A vessel restricted in her ability to manoeuvre. (2)
- 1.1.3 (i) A vessel not under command
 (ii) A vessel restricted in her ability to manoeuvre
 (iii) A vessel engaged in fishing. (3)
- 1.1.4 B A power-driven vessel (1)
- 1.2 1.2.1 (i) A vessel engaged in fishing under way
 (ii) Two all-round lights on the mast, the upper red and the lower white, side lights (red & green) and a stern light.
- | | |
|--|--|
|  |  |
| <i>Seen from ahead</i> | <i>Seen from astern</i> |
- (iii) One long blast followed by two short blasts at intervals of not more than 2 minutes. (10)
- 1.2.2 (i) A vessel Not Under Command
 (ii) Two all-round red lights in a vertical line where they can best be seen. In addition when making way, navigation sidelights and a stern light.
- | | |
|---|---|
|  |  |
| <i>Seen from ahead</i> | <i>Seen from astern</i> |
- (iii) One long blast followed by two short blasts at intervals of not more than 2 minutes. (10)

[30]

QUESTION 2

- 2.1 (i) Note the present weather and sea state as well as the upcoming forecasts for the area and prepare accordingly.
 (ii) Prepare the line throwing equipment and plan of action for the launching and recovery station.
 (iii) Preparation of scrambling nets, ladders and choose the best, most suitable rescue zone on board.
 (iv) Preparation of the fast rescue boat (FRC) and/or lifeboats.
 (v) Preparation of the crane and suitable basket or recovery rig.
 (vi) Preparation of the hospital or medical facility on board, dry blankets and clothes, and hot drinks/food.
 (vii) Accommodation for survivors or a trauma centre.
 (viii) Posting additional lookouts as required.
 (ix) Search lights and over-side lights.
 (x) Communications with the shore station, the ship owners and with other search vessels in the vicinity. (10)

2.2

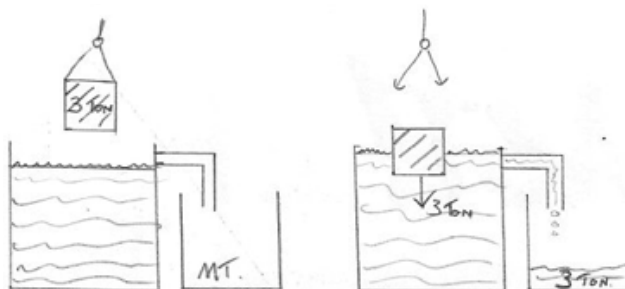


(5)
[15]

QUESTION 3

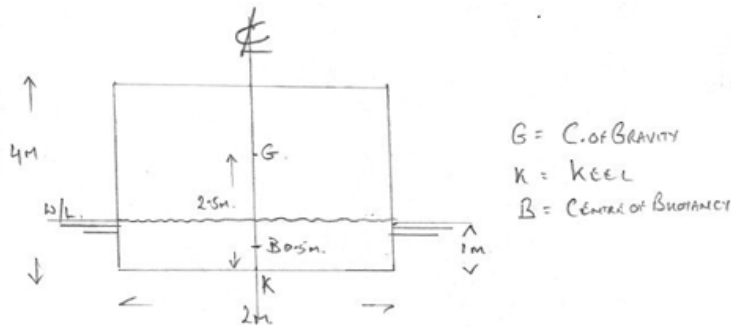
- 3.1 A floating object will displace the same volume of the liquid in which it floats as that of the volume of the object projecting below the level of the liquid in which it is floating (under water volume or draught). (5)

3.2



(10)

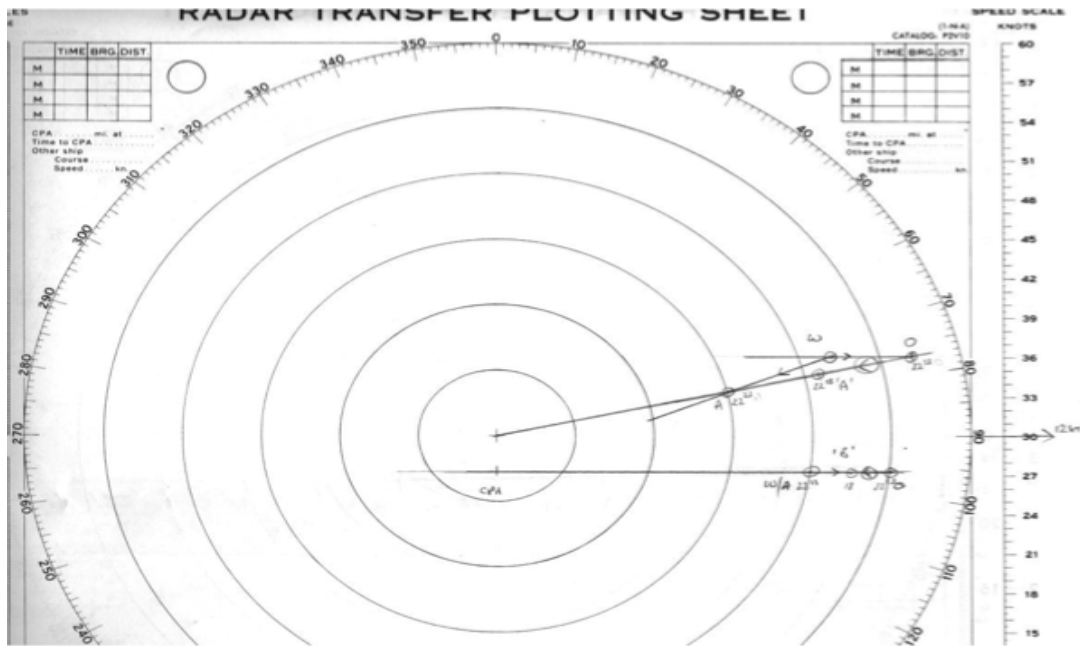
3.3



(5)
[20]

QUESTION 4

4.1



(10)

4.2

'A'	CPA	0', collision		'B'	CPA	1.0 miles (South)
	Time CPA	22:35			Time CPA	23:01
	Course	248° (T)			Course	Stopped
	Speed	17.8 (kt)			Speed	0
	Aspect	G 009°			Aspect	-

(10)

4.3

Own ship bold alteration of course to starboard 40° to 130° (T).
 When Target 'A' has passed clear then resume original course, keeping clear of Target 'B'.

Indicate your action with the whistle signal – one short blast. (Ref. Rule 34)

(5)
[25]

QUESTION 5

- 5.1 (i) Superstructure, bridge, accommodation and engine room positioned aft.
(ii) Pump room situated forward of ER bulkhead, low down above double bottoms.
(iii) Slop tanks or small overflow tanks situated forward of the pump room.
(iv) Cofferdams separate the cargo tanks from the rest of the ship.
(v) Manifold situated amidships with load/discharge pipes for connection to terminal.
(vi) Derrick or crane adjacent to manifold for handling hoses.
(vii) Catwalk above deck pipes and structures for easy safe access from aft to forward.
(viii) Firefighting manifolds (water and foam) situated on catwalk.
(ix) Tankers generally have a smaller freeboard compared to cargo vessels.
(x) All tankers required to have double hull.
(xi) Inert gas system generated from the ER exhaust for use in cargo tanks. (9)
- 5.2 (a) Large crude oil carriers 25–160 k DWT.
VLCC 160–320 k DWT
ULCC 320–550 k DWT
These tankers would typically trade worldwide from the oil fields to the refineries. (3)
- (b) General purpose or product carriers 10–50 k DWT.
These tankers would typically trade worldwide from refinery or supplier to the consumer market. They would carry parcels of semi-refined or refined products, or residue bunkers.
Or any other type of tanker the candidate may choose with similar description, e.g. gas or chemical tanker. (3)

[15]

105 marks

SECTION B COMMUNICATIONS AND METEOROLOGY**QUESTION 6**

- 6.1
- This is an area excluding Sea Area 1.
 - Within the radio telephone coverage of at least one MF Coastal Station with a continuous watch on 2182 kHz, and continuous DSC alerting on 2187.5 kHz.
 - The area extends up to 150 NM offshore, excluding A1 designated areas. (5)
- 6.2
- EPIRB stands for "Emergency Position Indicating Radio Beacon".
 - It is a sub-system of the GMDSS.
 - It is a requirement by IMO for all GMDSS compliant vessels to carry a float free EPIRB.
 - It is usually mounted on the Monkey Island, or Bridge Wing and fitted with an HRU capable of floating free should the vessel sink.
 - The battery output capability provides sufficient transmission power for 48 hours continuous operating (battery should be charged every 2 years).
 - EPIRB 406 transmits on 406 MHz, and the transmission is received by SARSAT &/or COSPAS satellites. It has an interface with the vessel's navigating system giving the ship's name and last recorded position.
 - Fitted with a homing signal on 121.5 MHz or 243 MHz as well as a visual strobe light to assist SAR vessels/aircraft.
 - It is portable and can be taken on board the survival craft. Easy, user-friendly operating facilities. (10)

[15]**QUESTION 7**

- 7.1
- Advection fog is caused by a pocket of relatively warm air being cooled when it moves or flows over a cooler sea surface.
 - The sea temperature will be below the dew point of the pocket of warm air.
 - The wind speed will be typically BF 2–4 (4–16 kt).
 - This condition may be found just off the West Coast of South Africa and Namibia when a warm offshore wind blows over the cold Benguela current. (9)
- 7.2
- Radiation fog is formed over the low-lying land when it loses heat due to the radiation cooling the air close to the ground below its dew point causing condensation.
 - This will normally occur early on a clear winter morning with little or no wind.
 - If there is any wind, it would be a light offshore breeze that may roll the fog out to sea and over harbours. This will affect visibility and restrict the movement of ships in and out. (7)
- 7.3
- The difference between fog and mist is the degree of visibility.
 - Fog constitutes visibility less than 1 000 m;
 - Mist constitutes visibility 1 000–2 200 m. (4)

[20]**35 marks**

SECTION C SAILINGS

QUESTION 8

Plain Sailing

Departure	=	d-Long × Cos Lat.		Long E	115°	13.0'
	=	413 × Cos 32°		Long E	108°	20.0'
	=	350.224		d-Long E	6°	53.0'
Distance	=	350.2 miles		d-Long E	413.0'	
Course	=	090° (T)				

10 marks

Total: 150 marks