NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2022

NAUTICAL SCIENCE: PAPER II

Time: 3 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 5 pages. Please check that your question paper is complete.
2. Answer **ALL** the questions in Sections A, B and C.
3. Begin the answer to each new question on a new page.
4. The use of scientific calculators is permitted.
5. Alphanumeric calculators and dictionaries are **NOT** permitted.
6. Nautical tables may be used.
7. It is in your own interest to write legibly and to present your work neatly.

REQUIREMENTS

Drawing instruments
Radar plotting sheet

ANNEXURES – Nil

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SECTION A SEAMANSHIP

QUESTION 1

1.1 In terms of the International Regulations for Preventing Collision at Sea, 1972 as amended (hereinafter referred to as the COLREGS), what is the required action of the following vessels in sight of one another in order to avoid a close quarter situation?

1.1.1 a sailing vessel having a vessel engaged in fishing four points on her port bow and crossing. (5)

1.1.2 a vessel engaged in fishing overtaking a vessel not under command (NUC) dead ahead. (5)

1.1.3 a power-driven vessel 'A' with vessel 'B', a tug and tow indicating "Restricted in ability to Manoeuvre" (RAM), two points off the port bow and crossing. (5)

1.2 The MV *Impala* is a power-driven vessel navigating in restricted visibility detects by radar another vessel two points forward of the starboard beam, the bearing of which is steady.

In terms of the COLREGS, Rule 19, "Conduct of Vessels in Restricted Visibility", what action should the *Impala* take? (15)

[30]

QUESTION 2

2.1 List six action points in preparing to abandon ship. (6)

2.2 What should be done with the boats and the life rafts immediately after they have been launched in the water? List four actions. (4)

[10]

QUESTION 3

3.1 Sketch the cross-section of a vessel illustrating:

- the buoyant volume
- the buoyancy
- the reserve buoyancy
- the centre of buoyancy (10)

3.2 By shifting cargo, or ballast within a vessel, the stability of the vessel can be affected advantageously and adversely. Explain five ways in which the vessel's condition can be affected. (10)

[20]

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QUESTION 4

You are the OOW on a power-driven vessel, navigating in clear visibility on a course heading 090° (T) and speed of 12 knots. You make a visual sighting of a vessel and plot it on your radar with the following bearings and ranges:

TIME	BEARING	RANGE
08H00	030° (T)	10,0 M
08h06	029° (T)	7,8 M
08h12	028° (T)	5,8 M

4.1 Plot the target's movements on the plotting sheet provided. (4)

4.2 Prepare a full target report, including the target's aspect. (6)

4.3 From the above report, and in compliance with the COLREGS, what action are you required to take? (10)

[20]

QUESTION 5

General cargo vessels are also referred to as break-bulk vessels. What is the difference between a break-bulk ship and a container ship?

[10]

90 marks

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SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 6

6.1 Describe what a SART is. (6)

6.2 On the plotting sheet provided, illustrate a typical SART signal for a target bearing 110° at 4 miles range. (3)

6.3 The GMDSS requires ships of 300 gross tons and above on international voyages to have a range of equipment capable of performing nine communication functions.

List six of these functions. (6)
[15]

QUESTION 7

7.1 There are two basic types of clouds – Cumulus and Stratus. Describe the formation of each of these two types of clouds. (15)

7.2 On a weather map the direction and speed of the wind is depicted by an arrow or feather. Draw a feather illustrating a SW wind with a speed of 25 knots. (2)

7.3 What is the equivalent Beaufort Scale for wind speed 25 knots? (3)
[20]

35 marks

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SECTION C SAILINGS

QUESTION 8

The Noon positions of a vessel on passage were plotted as follows:

Noon on day 1 was 30° 36' S 013° 25' E
Noon on day 2 was 25° 33' S 005° 54' E

8.1 Calculate the Day's Run. (23)

8.2 Calculate the average speed over the period. (2)

25 marks

Total: 150 marks

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