NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2023

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

The following questions are to be answered in terms of the International Regulations for Preventing Collisions at Sea, 1972, and as amended (COLREGS).

1.1 What does Rule 15 say about the responsibilities of two power-driven vessels crossing so as to involve risk of collision? (4)

1.2 Describe the fog signal and frequency of the following vessels:

(a) A power-driven vessel underway. (2)

(b) A power-driven vessel underway but stopped. (4)

(c) A vessel engaged in pushing or towing. (4)

(d) A vessel of less than 100 metres in length which is at anchor. (1)

1.3 What is the definition of '**restricted visibility**' (Rule 3)? (7)

1.4 What does Rule 5 say about lookout? (8)

[30]

QUESTION 2

List five action points that you would take on discovering a fire in a cabin during routine deck rounds during the early hours of the morning on board your ship.

[10]

QUESTION 3

Explain, with the aid of diagrams, the following terms:

(a) metacentre (5)

(b) the metacentric height (5)

(c) stable equilibrium of a vessel. (4)

(d) Diagrams (6)

[20]

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QUESTION 4

Your vessel is steering a course 336º (T) at 10 knots. Visibility is less than one mile.

The following observations were made of an approaching target detected on Radar:

TIME	BEARING	RANGE
22h22	270º (T)	11 miles
22h28	271º (T)	9 miles
22h34	272º (T)	7 miles

4.1 Plot the target on the plotting sheet provided. (8)

4.2 Compile a full target report including the target's aspect at 22h34. (5)

4.3 What action, if any, would you take based on the target report to avoid a close quarter situation? (7)

[20]

QUESTION 5

5.1 Describe the design features of a DRY BULK CARRIER. (6)

5.2 Illustrate your answer with a sketch of the cross-section of a typical bulk carrier. (4)

[10]

90 marks

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SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 6

6.1 What is a 'SAFETY' message? (4)

6.2 Give an example of a SAFETY message. (6)

6.3 List five good operating practices or protocols when making a radio call or transmission. (5)

[15]

QUESTION 7

7.1 List any five different resources of meteorological information available to the seafarer. (10)

7.2 The heat transferred from the earth to the atmosphere or troposphere has an effect on the weather.

How is this heat transferred? Explain briefly any three of the four mediums of transfer. (9)

7.3 Complete the following statement:

'Wind is the movement of air from … to … area'. (1)

[20]

35 marks

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SECTION C SAILINGS

QUESTION 8

8.1 Calculate the course and distance from the waypoint 'A' in Lat. 32º 16'S Long. 028º 10'E to the next waypoint 'B' in Lat. 34º 05'S Long. 027º 00'E. (15)

8.2 At a speed of 15½ knots, what is the steaming time between waypoints A & B? (5)

[20]

QUESTION 9

Explain the difference between 'Parallel Sailing' and 'Plane Sailing'.

[5]

25 marks

Total: 150 marks

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