NAUTICAL SCIENCE: PAPER II

Time: 3 hours   150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1.   This question paper consists of 4 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

1.   NIL

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 distance 4 miles apart?   (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 another power-driven vessel 'B' two points off the port bow and crossing distance 6 miles apart?   (5)

1.2   The MV 'Sardinops', a power-driven vessel navigating in restricted visibility, detects by sound the fog signal of another power-driven vessel forward of the starboard beam. In terms of the COLREGS, Rule 19, 'Conduct of Vessels in Restricted Visibility', what action should the 'Sardinops' 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   State Archimedes' Law.   (4)

3.2   Sketch the cross-section of a vessel illustrating:

3.2.1   the buoyant volume   (2)

3.2.2   the buoyancy   (2)

3.2.3   the reserve buoyancy   (2)

3.2.4   the centre of buoyancy.   (2)

3.3   By shifting cargo, or ballast about within a vessel, the stability of the vessel can be affected advantageously and adversely. Explain four ways in which the vessel can be affected.   (8)

[20]

QUESTION 4

You are the OOW navigating in restricted visibility on a course heading 075° (T) and at reduced speed of 10 knots. You detect a Radar target which you have been plotting with the following bearings and ranges:

TIME	BEARING	RANGE
10h06	030° (T)	10,0 M
10h12	033° (T)	8,0 M
10h18	038° (T)	6,0 M

4.1   Plot the target's movements on the plotting sheet provided.   (5)

4.2   Prepare a full target report.   (10)

4.3   From the above report, what action would you take to avoid a close quarter situation?   (5)

[20]

QUESTION 5

5.1   General cargo vessels are also referred to as break-bulk vessels. What is the difference between a break-bulk ship and a container ship?   (5)

5.2   What are the design features of a general cargo ship? List five features.   (5)

[10]

90 marks

SECTION B   COMMUNICATIONS AND METEOROLOGY

QUESTION 6

6.1   Describe what a SART is.   (6)

6.2   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.   (9)

[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.   (16)

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. Wind likely to change anti-clockwise (to the left).   (2)

7.3   Define 'isobar'.   (2)

[20]

35 marks

SECTION C   SAILINGS

QUESTION 8

A vessel in GPS position Lat. 31° 06' S Long. 013° 35' E receives a distress call from another vessel in Lat. 26° 33' S Long. 006° 14' E.

8.1   What is the course and distance to the vessel in distress?   (21)

8.2   What is the steaming time to reach the vessel at 25 knots?   (4)

25 marks

Total: 150 marks