



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2009

**NAUTICAL SCIENCE: PAPER II**

Time: 3 hours

Marks: 150

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**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. Answer **ALL** the questions in Sections A, B and C.
  2. Begin each answer on a new page.
  3. The use of scientific calculators is permitted.
  4. Alphanumeric calculators and dictionaries are **NOT** permitted.
  5. Nautical tables may be used.
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**REQUIREMENTS**

Drawing instruments.  
Radar plotting sheet.

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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 another power-driven vessel 'B' 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 liferafts 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: (2)
- 3.1.1 the buoyant volume (2)
- 3.1.2 the buoyancy (2)
- 3.1.3 the reserve buoyancy (2)
- 3.1.4 the centre of buoyancy. (2)
- 3.2 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.

**[10]**

**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:

<b>TIME</b>	<b>BEARING</b>	<b>RANGE</b>
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]**

<b>90 marks</b>
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**SECTION B COMMUNICATIONS AND METEOROLOGY****QUESTION 6**

- 6.1 Describe what a SART is. (3)
- 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. (12)
- [15]**

**QUESTION 7**

- 7.1 There are two basic types of clouds namely 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. (5)
- [20]**

<b>35 marks</b>
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**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 at Lat. 26° 33' S Long. 006° 14' E.

- 8.1 What is the course to be taken and the distance to be travelled by the ship who received the distress call? (20)
- 8.2 What is the steaming time to reach the vessel at 25 knots? (5)
- [25]**

<b>25 marks</b>
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**Total: 150 marks**