



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2014

**NAUTICAL SCIENCE: PAPER II**

Time: 3 hours

150 marks

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**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.
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**REQUIREMENTS**

Drawing instruments  
Radar Plotting Sheet

**ANNEXURES**

1. NIL
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**SECTION A SEAMANSHIP****QUESTION 1**

- 1.1 In terms of the International Regulations for Preventing Collisions at Sea, 1972, as amended (the COLREGS), what action should a power driven vessel take when being overtaken by another vessel and there is risk of collision? (8)
- 1.2 What vessels are required to comply with the COLREGS? (2)
- 1.3 1.3.1 What is the meaning of the term 'vessel restricted in her ability to manoeuvre'? (4)
- 1.3.2 List 3 types of vessel operations that would restrict a vessel's ability to manoeuvre in terms of the COLREGS. (6)
- 1.4 Describe with the aid of a sketch, the lights and day shapes that a vessel not under command (NUC) is required to exhibit whilst under way. (6)
- 1.5 Two power-driven vessels making way through the water and crossing, are in risk of collision. What is the responsibility of each of these vessels in terms of the COLREGS? (4)
- [30]**

**QUESTION 2**

List ten action points the OOW would immediately take in the event of the vessel running aground. **[10]**

**QUESTION 3**

- 3.1 When proceeding outbound from a port in Region A down a buoyed channel, which side must you pass a red can buoy with a can shaped top mark? (1)
- 3.2 What colours are used for the following?
- 3.2.1 lateral marks (2)
- 3.2.2 safe water marks (2)
- 3.2.3 special marks (1)
- 3.3 What top marks do the following buoys have?
- 3.3.1 lateral (2)
- 3.3.2 special (1)
- 3.3.3 isolated danger (2)

- 3.4 If you see a cardinal mark painted with the horizontal bands black-yellow-black, on which side do you pass it (i.e. north, south, east or west)? (1)
- 3.5 If you see a cardinal mark with two conical top marks the apexes (tops) of which point downwards, on which side would you pass the buoy (i.e. north, south, east or west)? (1)
- 3.6 What does a buoy that is painted with red and white vertical stripes indicate? (1)
- 3.7 On which side would you pass a yellow spherical buoy? (1)
- [15]**

#### QUESTION 4

A container vessel proceeding in clear visibility on a course of  $170^\circ$  (T) and speed of 20 knots.

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

TIME	BEARING	RANGE
10:06	$170^\circ$ (T)	8.0 miles
10:12	$170^\circ$ (T)	6.0 miles
10:18	$170^\circ$ (T)	4.0 miles

- 4.1 Plot the target on the plotting sheet provided. (5)
- 4.2 Compile a full target report at 10:18. (10)
- 4.3 Standing instructions to the Officer of the Watch are that you are to maintain a safe minimum distance of 2 miles from other vessels and dangers.
- What action would you take to comply with this instruction, given the information from the target report? (5)
- [20]**

#### QUESTION 5

- 5.1 What are the design features of a Ro-Ro ship? (5)
- 5.2 What is a Reefer vessel? (5)
- 5.3 List five export commodities that would typically be loaded onto a reefer vessel in a South African port. (5)
- [15]**

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

- 6.1 What is an 'URGENCY' message? (5)
- 6.2 Your vessel's name is 'CORMORANT', call sign ZTOP, and you are on passage south of Cape Recife lighthouse (bearing  $355^\circ$  (T)  $\times$  8 miles), and you sight a semi-submerged white 6 m container in the water. The wind is East force 4, weather overcast and visibility is good.
- Prepare a safety signal (SECURITE) reporting this sighting to the local coastal station and ships in the vicinity. Use the phonetic alphabet where applicable. (6)
- 6.3 What is the distress frequency for radio telephony? (2)
- 6.4 When are the distress silence periods? (2)
- [15]**

**QUESTION 7**

- 7.1 What causes wind to blow in a particular direction? (2)
- 7.2 Near the equator the wind tends to move parallel to the isobars, but elsewhere it tends to be deflected. What is the deflecting force called? (1)
- 7.3 In which direction is this deflection in the northern hemisphere? (2)
- 7.4 Describe with the aid of a sketch what a 'Col' is. In your sketch show the relevant pressures of each of the isobars and wind direction, assuming this is in the southern hemisphere. (15)
- [20]**

<b>35 marks</b>
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**SECTION C SAILINGS****QUESTION 8**

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

- 8.1 What is the course and distance to the vessel in distress? (20)
- 8.2 If the vessel proceeds at full speed of 23 knots, what will the quantity of fuel consumed be to reach the distress position?  
The vessel burns an average of 75T of fuel per day at full speed. (5)

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