NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2011

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.

REQUIREMENTS

Drawing instruments
Radar Plotting Sheet

ANNEXURES

1. NIL
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 a risk of collision? (8)

1.2 What vessels are required to comply with the COLREGS? (4)

1.3 Define the term 'vessel engaged in fishing'. (7)

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? (5)

[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 A box-shaped vessel floats at a draft of 2,1 m in dock water density 1 020 kg/m³. What will the draft be for the vessel at the same displacement in salt water of density 1 025 kg/m³? (5)

3.2 Define the following terms:

3.2.1 Deadweight of a vessel (4)

3.2.2 'Reserve buoyancy' (3)

3.3 What is the statutory freeboard of a ship? Illustrate this by means of a sketch showing the load line and the deck line. (8) [20]
QUESTION 4

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

<table>
<thead>
<tr>
<th>Time</th>
<th>Bearing (T)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>10h06</td>
<td>030°</td>
<td>10,0 M</td>
</tr>
<tr>
<td>10h12</td>
<td>033°</td>
<td>8,0 M</td>
</tr>
<tr>
<td>10h18</td>
<td>038°</td>
<td>6,0 M</td>
</tr>
</tbody>
</table>

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 Container vessels have replaced many general cargo vessels.

5.1.1 List four advantages of containerisation. (4)

5.1.2 List four disadvantages of containerisation. (4)

5.2 Name two products that a reefer vessel will load out of Cape Town. (2)

[10]

90 marks
SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 6

6.1 How would you transmit a distress message by VHF (very high frequency) radio? Assume the name of your ship is 'Agulhas' and the call sign is ZSST. Use the phonetic alphabet where necessary. (10)

6.2 What flag signal is flown by a ship indicating "I am disabled; COMMUNICATE WITH ME"? Give the phonetic alphabet for this flag signal. (3)

6.3 Which is the most important flag flown by a ship in port, and where on the ship would this flag be displayed? (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 the deflection in the southern 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]

35 marks

SECTION C SAILINGS

QUESTION 8

On a passage from Cape Town to New York on the 27th August at noon (GMT – 2) the position of the vessel was fixed at Lat. 12° 06'N; Long. 037° 21'W.

The following day, 28th August the noon position was fixed at Lat. 16° 54'N; Long. 043° 12'W. During the night the ship's clocks were retarded 1 hour to GMT – 3.

Calculate the course made good and the average speed of the vessel for the 'days run' using the Plane Sailing Method.

25 marks

Total: 150 marks