



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2018

## 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 6 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** – Nil

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**SECTION A SEAMANSHIP****QUESTION 1**

In compliance with the International Regulations for Preventing Collision at Sea, 1972 as amended (hereinafter referred to as the COLREGS), answer the following questions:

- 1.1 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 does the term "vessel engaged in fishing" mean? (8)
- 1.3 What does the word "underway" mean? (2)
- 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 underway. (8)
- 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 officer of the watch would immediately take in the event of the vessel running aground.

**[10]**

**QUESTION 3**

- 3.1 When inbound to a port in Region A down a buoyed channel, on which side must you pass a green conical buoy with a green cone-shaped top mark? (1)
- 3.2 What colours are used for:
- 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 a west cardinal buoy (2)
  - 3.3.2 an east cardinal buoy (2)
  - 3.3.3 a south cardinal buoy (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 What does a buoy that is painted with red and white vertical stripes indicate? (1)
- 3.6 On which side would you pass an ISOLATED DANGER MARK? (1)
- [15]**

**QUESTION 4**

A container vessel proceeding in clear visibility on a course of 020° (T) and speed of 20 knots.

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

TIME	BEARING	RANGE
10:06	342° (T)	12,0 miles
10:12	341° (T)	10,4 miles
10:18	340° (T)	8,7 miles

- 4.1 Plot the target on the plotting sheet provided. (10)
- 4.2 Compile a full target report at 10:18. (5)
- 4.3 Standing instructions to the Officer of the Watch are that you are to maintain a safe minimum distance of two miles from other vessels and dangers. If in doubt, call the Master.

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)

(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 southern hemisphere? (2)
- 7.4    Describe, with the aid of a sketch, an anticyclone. In your sketch show the relevant pressures of each of the isobars and wind direction, assuming this is in the northern hemisphere. (15)
- [20]**

**35 marks**

**SECTION C          SAILINGS****QUESTION 8**

A vessel in GPS position Lat.  $31^{\circ} 06' S$  Long.  $013^{\circ} 35' E$  receives a distress call from another vessel in Lat.  $26^{\circ} 34' S$  Long.  $006^{\circ} 14' E$

8.1    What is the course and distance to the vessel in distress? (20)

8.2    If the vessel proceeds at full speed of 22 knots, what quantity of fuel will be consumed to reach the distress position?

The vessel burns an average of 74 tons of fuel per day at full speed. (5)

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