



NAUTICAL SCIENCE: PAPER I

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 4 pages and an Annexure Booklet of 7 pages (i – vii). Please check that your question paper is complete.
2. Answer **ALL** the questions in Sections A and B.
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. Use Variation 24 °W and the attached Deviation card throughout.

REQUIREMENTS

Drawing instruments
Graph paper
Chart SAN 3002

ANNEXURES

1. Annexure 1 – Examination notes and Deviation Card
2. Annexure 2 – Predicted Hourly Heights – Knysna – December 2007
3. Annexure 3 – Altitude Correction Tables
4. Annexure 4 – Conversion of Arc to Time
5. Annexure 5 – Nautical Almanac – page 163 – 17 to 19 August 1987
6. Annexure 6 – Increments and corrections pages xxvii and xxviii 50^m to 53^m

SECTION A PRACTICAL CHARTWORK**QUESTION 1**

A vessel approaching Cape Town from the South fixed its position at 10:00 hrs by the following observed compass bearings:

Slangkoppunt Light House bearing 125° (C)

Hangberg Δ 330 beacon 089° (C)

Using the chart SAN 3002 provided, plot the 10:00 hrs position and determine the following:

1.1 The compass course to steer to the next alter course position, Lat. $33^{\circ} 52,4' S$, Long. $018^{\circ} 18,5' E$, given that –

- Speed through the water is 10 knots.
- Current is estimated to be setting 180° (T) at 2 knots.
- Estimated leeway from a Southerly wind is 5° . (15)

1.2 The course to steer from the above alter course position to the intended anchor position 2 miles North of the Cape Town Harbour Breakwater Light (Fl.G. 2s 5M). (5)
[20]

QUESTION 2

Your vessel is at anchor west of Green Point, and the following observations were made:

The horizontal sextant angle between Green Point Lt. and Robben Island Lt. is 78° ;

The vertical sextant angle of Green Point Lt. is $0^{\circ} 14,9'$;

The bearing of Milnerton Lt. is 080° (T).

Plot the anchor position of your vessel and state the coordinates of this position on your answer sheet.

[20]

QUESTION 3

At 16:30 hrs a vessel entering Valsbaai steering 018° (C) and making 3° leeway in a W'ly wind, observed Kaap Hangklip Lt, bearing 073° (C).

At 17:00 hrs Kaap Hangklip Lt. was observed bearing 122° (C).

The vessel maintained an average engine speed of 18 knots during this period. The current was estimated to be setting 140° (T) at 2,5 knots.

Plot the vessel's position at 17:00 hrs.

[20]

QUESTION 4

- 4.1 Your vessel is due to sail from Knysna on the rising tide during the morning of 1 December 2007. The channel depth through Knysna Heads is 5,4 m. You are required to have a minimum clearance at all times of 2,5 m beneath the keel, and the draught of your vessel is 4,2 m.
- 4.1.1 If the steaming time from where your vessel is berthed to the Heads is 45 minutes, what is the latest time that you may depart in order to cross through the Heads on the rising tide? (15)
- 4.1.2 Define Mean High Water Springs (MHWS). (5)
- [20]**

QUESTION 5

- 5.1 What are the characteristics of the following navigation lights:
- 5.1.1 Fl.G.2s5M? (3)
- 5.1.2 VQ(6) + L Fl.10s? (4)
- 5.1.3 Q(3) 10s. Bell? (3)
- 5.2 If you are in position Lat. 34° 30' S; Long. 018° 30' E at night, what would be the visible characteristics of Cape Point lighthouse? (5)
- 5.3 North of Robben Island there is a submarine cable. How far either side of it is anchoring or trawling prohibited? (3)
- 5.4 What is the height of the upper cable station on Table Mountain? (2)
- [20]**

100 marks
