

Name:

Index No.:

2504/204

Candidate's Signature:

NAVIGATION II

Oct/Nov. 2015

Time: 3 hours



Date:

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN NAUTICAL SCIENCE

MODULE II

NAVIGATION II

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.

Sign and write the date of examination in the spaces provided above.

You should have Drawing and Navigation instruments for this examination.

This paper consists of EIGHT questions in TWO sections; A and B.

Answer FIVE questions as shown below in the spaces provided in this question paper:

Any TWO questions from section A;

Any THREE questions from section B.

All questions carry equal marks.

Candidates should answer the questions in English.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1	20	
	2	20	
	3	20	
	4	20	
B	5	20	
	6	20	
	7	20	
	8	20	
TOTAL SCORE			

This paper consists of 20 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A: CELESTIAL NAVIGATION

Answer any TWO questions from this section.

1. (a) With the aid of a labelled sketch, explain the earth's elliptical orbit showing aphelion, perihelion and the equinoxes. (8 marks)
- (b) Explain each of the following terminologies as used in celestial navigation:
 - (i) celestial poles;
 - (ii) celestial meridian;
 - (iii) equinoctial;
 - (iv) oblique of the elliptic. (8 marks)
- (c) Differentiate between SHA and GHA. (4 marks)
2. (a) With the aid of a labelled sketch, explain **three** terminologies associated with celestial system of co-ordinates. (8 marks)
- (b) Differentiate between 'zone times' and 'standard times'. (6 marks)
- (c) Highlight **three** types of information obtained on the daily pages of the nautical Almanac (6 marks)
3. (a) With the aid of a sketch, indicate **six** stars found in 'URSA MAJOR'. (6 marks)
- (b) Explain the relationship between the altitude of polaris and the observer's altitude. (4 marks)
- (c) (i) Explain the 'intercept method' of calculating observer's position on earth. (4 marks)
- (ii) List **four** parts of a sextant. (2 marks)
- (ii) With the aid of a labelled sketch, show how to find sextant index error using the diameter of the sun. (4 marks)

SECTION B: ELECTRONIC NAVIGATION SYSTEM AND MARINE INSTRUMENTS

Answer any **THREE** questions from this section.

4. (a) With the aid of a sketch, explain the principles of speed measurement using the “doppler effect”. (8 marks)
- (b) (i) Differentiate between continuous wave mode (cw) transmission and pulse mode operation in depth sounding. (6 marks)
- (ii) List **six** factors that affect the accuracy of speed logs. (6 marks)
5. (a) With the aid of a labelled sketch, highlight the basic principle of marine echo sounder. (14 marks)
- (b) List **six** controls found on an echo sounder receiver panel (6 marks)
6. (a) Explain the process of using ‘Ras Serani’ transit to get compass error. (8 marks)
- (b) (i) With the aid of a labelled sketch, indicate true, magnetic and compass north. (6 marks)
- (ii) Differentiate between deviation and variation and highlight the mnemonics of remembering each. (6 marks)
7. (a) Explain the function of each of the following manual settings applied when setting auto pilot steering:
- (i) permanent helm;
- (ii) rudder control;
- (iii) counter rudder;
- (iv) weather control. (8 marks)
- (b) (i) Highlight **four** factors to be considered while changing over auto steering from manual steering to automatic steering and vice versa. (8 marks)
- (ii) List **four** modes used in steering. (4 marks)
8. (a) With the aid of a labelled sketch, illustrate the basic concept of “AIS’ Automatic Identification System. (8 marks)
- (b) List **six** data included in ships AIS data information. (6 marks)
- (c) Explain the general IMO performance standards required of VDR (Voice Data Recorder) on board ships. (6 marks)