DIPLOMA IN NAUTICAL SCIENCE

Term-End Examination

June, 2006

BNA-014 : NAVIGATION–I (TERRESTRIAL AND CELESTIAL)

Time : 2 hours   *Maximum Marks : 70*

Note : *All questions are* **compulsory**. *Noories tables and Nautical Almanac is allowed. Non-programmable scientific calculator is allowed.*

SECTION I

1. Define the following :   5

   (i)   Nautical mile

   (ii) Departure

   (iii) GHA (Aries)

   (iv) Nadir

   (v)   Vertical circle

2. Explain the procedure for calculating Gyro compass error by taking Amplitude of the Sun.   5

3. State the Mercator sailing formula and explain when and why should it be used.   5

4. Calculate as indicated —

   (i) Given departure Lat. 05° S and mean Lat. 01° S, calculate arrival Lat. *2*

   (ii) Given course 295° T and distance 75 miles, calculate Departure. *3*

5. (a) Given GMT 2000 hr, Long. of observer 062° E and LHA (Aries) 310°, calculate RA (Mean Sun). *5*

   (b) Sextant altitude of Sun's UL 45° 20′, I.E. 1·5′ on the arc, H.E. 25 m and semi diameter 16·2′. Calculate the True altitude by applying each correction separately. *5*

6. Departure position 02° 05′ S, 085° 28′ E, Course 325° T and Distance 250 miles. Calculate the arrival position. *5*

SECTION II

7. (a) Define the following :   6

   (i) Natural scale of a chart

   (ii) Variation

   (iii) Leeway

   (b) Draw the following symbols used on charts :   4

   (i) Coastline unsurveyed

   (ii) Fishing stakes

   (iii) Cathedral

   (iv) Wreck swept by wire drag to a depth of 10 m

8. Calculate as indicated —   5

   (i) Given Deviation 1° E and Variation 3° W, calculate Compass error.

   (ii) Given Variation 3° E and Compass error 2° E, calculate Deviation.

   (iii) Given Deviation 2° W and Compass error 1° W, calculate Variation.

   (iv) Given Course 280° C, Variation 2° E and Deviation 1° W, calculate True Course.

   (v) Given Course 142° T, Variation 3° W and Deviation 5° E, calculate Compass Course.

9. From a position with Dondra Head light bearing 055° C, Deviation 2° E, Variation 1° W and Distance 7 miles, calculate the True Course Made Good to pass Great Basses Reef light 4 miles when abeam. Also calculate the Compass Course to steer and speed Made Good allowing for a current setting 000° T at 1·5 knots and Leeway of 5° due to NWly wind. Deviation and Variation remain same and ship's speed is 12 knots. *10*

10. Whilst steering 320° C, Deviation 1° E, Variation 4° W and speed 11 knots, the Galle light bore 005° C. After 1·5 hours the same light bore 060° C. Calculate the final position allowing for expected current setting 070° T at 1·5 knots. *10*