

02/12/2018

INDIAN MARITIME UNIVERSITY
(A Central University Government of India)
END SEMESTER EXAMINATIONS- DECEMBER 2018
DIPLOMA IN NAUTICAL SCIENCE
SEMESTER - I
NAVIGATION – I: TERRESTRIAL & CELESTIAL (UD11T4104)

Date: 29-12-2018

Max. Marks: 70

Time: 03 hours

Pass Marks: 35

Note: Use BA Chart 813 (South Coast of Sri Lanka) for Chart work. Use of Selected pages of Nautical Almanac 2008, Norie's Tables and Non-programmable type scientific calculator is allowed in the Exam Hall. Draw Sketches wherever required.

PART- A: TERRESTRIAL & CELESTIAL NAVIGATION

Note: Q.1 is compulsory. Attempt any 3 out of remaining four, they carry 10 marks each.

1. Write Short Notes on: (1 x 5 = 5 marks)
 - a. Longitude
 - b. Equinoctial
 - c. Rational Horizon
 - d. Parallax in Altitude
 - e. Nautical Mile
2. a. Explain advantages and disadvantages of Mercator Chart. (5 marks)
b. Find the rhumb line course & distance from starting position P $40^{\circ} 18'N$ $100^{\circ} 20'W$ to Q $68^{\circ} 00'N$ $140^{\circ} 10'E$. (5 marks)
3. a. A ship sailed from A $24^{\circ}51'S$ $179^{\circ} 28'E$ to B $24^{\circ}51'S$ $170^{\circ}19'W$. Find the course and distance steamed. (5 marks)
b. On 16th March 2008, the sextant altitude of the Sun's lower limb was $56^{\circ} 11.4'$. If the index error of the sextant was $2.8'$ off the arc and the height of the eye was 12m, find the true altitude. (5 marks)

4. On 5th July, the noon position was 20° 12'S 50° 36'W. The vessel then steamed as follows:

| Time | Co (G) | Gyro Error | Speed by log |
|--------------------------------|--------|------------|--------------|
| 1200 (5 th July) | 046° | 1° H | 14.0 knots |
| a/c 1800 | 153° | 1° L | 15.0 knots |
| a/c 2300 | 149° | 1° L | 15.0 knots |
| a/c 0500 | 206° | 0° | 14.5 knots |
| 1200 (6 th July) | 200° | 0° | 15.0 knots |

Find the DR position at noon on 06th July. (10 marks)

5. a. Fill in the blanks: (5 marks)

| True course | Variation | Magnetic course | Deviation | Compass course | Error |
|-------------|-----------|-----------------|-----------|----------------|-------|
| 097° | 5°E | | 3°W | | |
| 273° | | 280° | | 282° | |
| 343° | | 338° | 5°W | | |

b. Define the following with sketch: (5 marks)

- (i) Equinoctial
- (ii) Obliquity and Ecliptic

PART B: CHART WORK

Note: **Q. 6 is compulsory** and carries 5 marks. Attempt any 3 out of remaining four, they carry 10 marks each.

6. Identify the following Symbols and Abbreviations (1x5=5marks)

a) CD

b) MHWS



c)



d)



e)

7. Write Short Notes on:

(2x5=10 marks)

- a. Deviation
- b. Fix
- c. Transit Bearing
- d. Natural Scale of Chart
- e. Chart Folio

8. At 0500 hrs, a ship on the course of 030° (C) observed 'Great Basses Reef' [Fl.15s34m25M] bore 265° (C) & 'Little Basses Reef' [VQ(2)10s34m27M] bore 005° (C) at the same time.

- (a) Find the ship's position at 0500 hrs. (Variation 3° W);
Extract of Deviation card of the ship:

| Ships Heading by Compass | Deviation |
|--------------------------|-------------|
| 10° | 4° W |
| 20° | 3° W |
| 30° | 2° W |
| 40° | 1° W |

- (b) The Vessel continued the course of 030° (C) at the speed of 15kts. Find the bearing & distance off when 'Sangma Kanda Point' [Fl5s10M] will be abeam on the Port Side. (Variation 3° W)

- (c) Find the time when 'Sangma Kanda Point' [Fl5s10M] will be abeam. (10 marks)

8. At 1500 hrs the light near Colombo harbour [Fl(3)10s26m25M] was bearing 090° (T). The vessel was steering a course of 170° (T) at 8 knots. At 1800 hrs the Barbeyrn Light [Fl.20s46m27M] was observed bearing 110° (T). Find the vessel position: (i) at 1800 hrs, and (ii) at 1500 hrs.

(10 marks)

9. A ship observed Dondra Head Fl.5s47m28M and Nilewelli Point (approx. $05^\circ 57.5'N$ $80^\circ 43'E$) in transit, bearing 080° (C) & at the same time Dondra Head Fl.5s47m28M was 8 miles.

- (a) Find the position of the ship.
- (b) Find the Compass error & the deviation of the ships head if the variation was 3° W. (10 marks)
