

INDIAN MARITIME UNIVERSITY
(A Central University Government of India)
DIPLOMA IN NAUTICAL SCIENCE
Semester: I
NAVIGATION – I: TERRESTRIAL & CELESTIAL
Subject Code: UD11T3104

Date: 27/06/2019

Max. Marks: 70

Time: 3 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 Exam Hall. Draw Sketches wherever required.

Section A: TERRESTRIAL & CELESTIAL NAVIGATION

Note: Q. No. 1 & 2 are compulsory. Answer any 2 out of remaining 3.

1. Define the following: (1x5=5 marks)
 - a) Great Circle
 - b) Longitude
 - c) Departure
 - d) Deviation
 - e) Nautical Mile

2. a) Write Short note on 'Mercator Chart'. (3 marks)

b) Find by Mercator Sailing, the position arrived on sailing from position 18° 58'N 072° 52'E on a course of 265°(T) for a distance of 7126 Miles. (7 marks)

3. a) Draw a label parts of a plane sailing triangle. Elaborate on the limitations of plane sailing. (5 marks)

b) On 20th Sep 2008, the sextant altitude of the Sun's lower limb was 56° 11.6'. If the index error of the sextant was 2.4' off the arc and the height of eye was 16 m, find the True Altitude. (5 marks)

4. On 14th Sep. a ship in position 40°12'N 76°46'W steamed as follows:

Time	Co (C)	Deviation	Variation	Speed
1200 (14 th)	249°	3°W	6°W	16 kts
1600	287°	2°E	6°W	14 kts
2200	349°	4°W	5°W	14 kts
0600	273°	2°E	5°W	15 kts
1200 (15 th)	289°	3°E	4°W	16 kts

An estimated current was setting at 027° (T) at 2 kts throughout the day. Find the estimated position of 15th Noon. (10 marks)

5. a) Explain the term 'Ecliptic' and its obliquity with relevant diagram. (5 marks)

b) Ship A in lat 42°S, steers due West at 20 knots. Ship B in lat 30°S, also steers due West. They commenced from the same longitude. If after 24 hours, they remained due North & South of each other, calculate B's speed.

(5 marks)

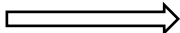
Section B: CHART WORK (Chart No. BA 813)

Note: Q. No. 6 is compulsory and carries 5 marks. Attempt any 3 out of the remaining four, they carry 10 marks each.

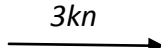
6. Identify the following Symbols and Abbreviations: (1x5=5 marks)

a. *LAT*

b. MSL

c. 

d. 

e. *3kn* 

7. Write Short Notes on: (2x5=10 marks)

- Natural Scale of a Chart
- Course Made Good
- Fix
- Plan Charts

e. Chart Folio

8. At 1000 hrs., 'Point De Galle' [Fl(2)15s28m25M] bore 030° (C) at a distance of 12 Nm. The vessel was steering a course of 100° (C) at a speed of 10 knots.

- a) Find the Ships' Position at 1000 hrs.
- b) Find the bearing and distance off when 'Dondra Head' [Fl5s47m28M] will be abeam on port side.
- c) Find the time when 'Dondra Head' [Fl5s47m28M] is abeam.

(Variation 3° W); Extract of Deviation card of the ship:

Ships Heading by Compass	Deviation
30°	8.5° W
40°	8° W
50	7° W
60°	6° W
70°	5° W
80°	4° W
90°	3° W
100°	2° W

(10 marks)

9. At 1500 hrs, a ship observed Great Basses Reef [Fl.15s34m25M] bearing 260° (T). The vessel was steering a course of 230° (T) at 13 knots. At 1600 hrs the same light was observed bearing 030° (T).

- (a) Find the vessel position at 1600 hrs.
- (b) Find the vessel position at 1500 hrs. (10 marks)

10. A ship observed 'Hambantota Point' (approx. position $06^\circ 07'N$ $081^\circ 07.5'E$) and 'Patirajja Point' (approx. position $06^\circ 10'N$ $81^\circ 13.5'E$) in transit bearing 070° (C) & at the same time Hambantota Point' was 10 miles off.

- (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)

End