

**INDIAN MARITIME UNIVERSITY**  
(A Central University, Government of India)  
May-June 2018 End Semester Examinations  
**Diploma in Nautical Science (DNS)**

Semester : I

**NAVIGATION – I: TERRESTRIAL & CELESTIAL (UD11T 3104)**

Date: 07-06-2018

Maximum Marks : 70

Time: 3 Hrs

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 questions.

1. Define the following: (1x5=5 marks)
  - a) Knot
  - b) Prime Meridian
  - c) Departure
  - d) Deviation
  - e) Leeway
  
2. a) Write Short notes on 'Difference in Meridional Parts' (DMP). (3 marks)  
  
b) Find by Mercator Sailing, the position arrived on sailing from position  $38^{\circ} 18'S$   $005^{\circ} 11'W$  on a course of  $124^{\circ}(T)$  for a distance of 3256 Miles. (7 marks)
  
3. a) Explain 'Rhumb line' and its usefulness in navigation. (4 marks)  
  
b) On 20<sup>th</sup> Feb 2008, the sextant altitude of the Sun's lower limb was  $56^{\circ} 11.4'$ . If the index error of the sextant was  $2.8'$  on the arc and the height of eye was 20m, find the True Zenith distance. (6 marks)

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

Time	Co (C)	Deviation	Variation	Speed
1200 (14 <sup>th</sup> )	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 <sup>th</sup> )	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 on 15<sup>th</sup> Noon. (10 marks)

5. a) Draw a Celestial Sphere and label the following: (5marks)  
 Celestial Poles; Any one Celestial Meridian; Any One Declination Circle; Equinoctial; Ecliptic.
- b) A ship sailed from A 44°44'S 154° 30'E to B 44°44'S 179°50'E. Find the course and distance steamed. (5marks)

### 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.

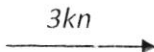
6. Identify the following Symbols and Abbreviations: (1x5=5 marks)

a. *PD*

b. MHWS

c. 

d. 

e. 

7. Write Short Notes on: (2 marks x 5=10 marks)

- Natural Scale of a Chart
- Estimated Position
- Transit Bearing
- Plan Charts
- Admiralty Chart Catalogue

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

(a) Find the ship's position at 0500 hrs. (Variation  $3^\circ$ W);

Extract of Deviation card of the ship:

Ships Heading by Compass	Deviation
$10^\circ$	$4^\circ$ W
$20^\circ$	$3^\circ$ W
$30^\circ$	$2^\circ$ W
$40^\circ$	$1^\circ$ W

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

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

9. At 1400 hrs, a ship observed Barbelyn Light [Fl.20s.46m27M] bearing  $050^\circ$  (T). The vessel was steering a course of  $156^\circ$  (T) at 11.5 knots. At 1600 hrs the Point De Galle Light [Fl.(2)15s28m25M] was observed bearing  $090^\circ$  (T).

(a) Find the vessel position at 1600 hrs.

(b) Find the vessel position at 1400 hrs.

(10 marks)

10. A ship observed 'Nilewelli Point' (approx. position  $05^\circ 57.5'N$   $081^\circ 43'E$ ) and 'Kolonna Point' (approx. position  $05^\circ 58.5'N$   $081^\circ 44'E$ ) in transit bearing  $060^\circ$ (C) & at the same time 'Dondra Head' [Fl.5s47m28M] was 9 miles off from the ship .

(a) Find the position of the ship.

(b) Find the Compass error & the deviation of the ships head if the variation was  $3^\circ$  W. (10 marks)

\*\*\*End\*\*\*

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