

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

June 2017 End Semester Examinations
Diploma in Nautical Science – First Semester

Navigation – I: Terrestrial & Celestial – UD11T 1104)
(Aug' 2009 to Feb' 2012 batches only)

Date: 19.06.2017
Time: 3 Hrs

Maximum Marks : 70
Pass Marks : 35

Notes:-

1. All Questions are compulsory.
2. Use of non-programmable scientific calculator, Nautical Almanac 1992 and Noorie's Nautical Table are allowed.
3. Candidates must show the complete working (including rough work) and not answers alone.
4. Use diagram/sketches/figures for explanations where appropriate.
5. BA chart 813 to be provided by the Exam centre.

SECTION I

1. Define following with sketch:-

- a) Great circle b) Parallel of Latitude c) Departure d) Local Hour Angle
e) Equinoctial (5 Marks)

2. Using plane sailing find the course and distance from Lat $56^{\circ} 12.5'S$ Long $046^{\circ} 12.5'W$ to Lat $50^{\circ} 11.3 S$ Long $044^{\circ} 14.8' W$ (5 Marks)

3. Using Mercator sailing, find the position arrived if the starting position of the ship was Lat $44^{\circ} 11'N$ Long $140^{\circ} 20'W$, course was $056^{\circ} T$ and distance covered was 2222 M. (5 Marks)

4. On 24th Sept 1992 at noon, a ship in DR posn $14^{\circ} 44' N$ $124^{\circ} 49'E$, set courses as follows:-

	Time	Compass Co.	Dev	Var	Leeway	Wind	Log
	1200	174°	$2^{\circ} E$	$1^{\circ} E$	2°	SW	0
A/C	2300	218°	$1^{\circ} W$	$2^{\circ} E$	2°	S	162
A/C	0600	224°	$3^{\circ} W$	$1^{\circ} E$	2°	S	266
A/C	1200	264°	Nil	$1^{\circ} E$	3°	S	348

During the above period the ship experienced a current setting 125° T at 1.0 Knots

Find :- (5Marks)

- a) estimated position next noon
- b) Course and speed made good from noon to noon

5. On 16th March 1992, the sextant altitude of the Sun's lower limb was $62^{\circ} 24.5'$. If the index error of was $3.0'$ on the arc and height of eye was 16 m. Find the true altitude. (10 Marks)

6. a). Explain how the ship's clocks will be altered while on a course due east
- b). Prove the formula: $\sin \text{amplitude} = \sin \text{Dec} \times \sec \text{Lat}$ (2+3=5Marks)

SECTION II

7. a) Find the True course, if the compass course was 048° (C) and Var 4° W. (Use Dev card given below) (2 Marks)
- b) Find the Compass course, if the True course was 063° (C) and Var 4° W. (Use Dev card given below) (2 Marks)
- c) Find the gyro course to steer, if the true course is 143° (T) and gyro error is 2° Low. (2 Marks)

8. Draw the following Chart Symbols:- (4Marks)

- i. No bottom found at 120 m
- ii. Pilot boarding area
- iii. Anchoring prohibited
- iv. Fishing Stakes

9. Explain the following:- (4x2 = 8 marks)
- a. Mercator chart
 - b. Routeing Chart
 - c. Compass error
 - d. Set and Drift

10. a) At 0800 hrs Colombo Lt bore 097° T distance by radar 9 mile. Find the position.
- b) From the above position find the course to steer to pass Beruwala Point Lt. 8 miles off counteracting a current setting in the direction 210° T at 2 knots.
- c) Find the speed made good and time when Beruwala Point Lt will be abeam.
(Ship's speed 13 Knots.) (10 Marks)

11. While steering a course of 260° T at 13 knots, at 1000 hrs Dondra Head Lt. bore 285° T. Same light bore 340° T at 1100 hrs. Find the position of the ship at 100 hrs and 1100 hrs. (5 Marks)

Dev Card

Ship's head By compass	Dev
040°	3°E
050°	5°E
060°	6.5°E
070°	4.5°E
080°	2.5°E
