

INDIAN MARITIME UNIVERSITY
(A Central University Government of India)
END SEMESTER EXAMINATIONS – DECEMBER 2019

Diploma in Nautical Science

Semester I

UD11T2104-NAVIGATION I: TERRESTRIAL & CELESTIAL

Date: 12.12.2019

Max. Marks: 70

Time: 3 Hrs.

Pass Marks: 35

Note: All questions are compulsory.

Use Chart 813 (Colombo to Sangama Kanda Point) for Chart work

Use of Selected pages of Nautical Almanac 2008, Norie's Tables and Non-programmable type Scientific Calculator is permitted in the Exam Hall.

1. Define the following:

(5x2 =10 marks)

- (a) Greenwich Hour Angle
- (b) Declination
- (c) D'LAT
- (d) D'LONG
- (e) Great Circle

2. (a) A ship in position $10^{\circ} 45' N$ $178^{\circ} 50' E$, steered along the parallel of latitude eastward & covered 500' M. What was her final position? (5 Marks)

(b) A ship in position $17^{\circ} 29' N$ $103^{\circ} 15' W$ steered along the rhumb line $053^{\circ}(T)$ & covered 300' M. Find the final position. (5 Marks)

3. A ship sailed from $18^{\circ} 45' S$ $136^{\circ} 55' W$ along a rhumb line track & arrived the position $25^{\circ} 48' N$ $138^{\circ} 48' E$. What was the distance run & course to steer? (Use DMP table) (5 Marks)

4. On 22 May 2019 at 1200 h , a ship in position $24^{\circ} 40' S$ $45^{\circ} 43' W$ steered the following courses :-

	Date	Time	Co(Gyro)	Leeway	Wind	Log
	22 May	1200	215°	2°	S	0
a/c	22 May	2200	306°	5°	E	104
a/c	23 May	0600	035°	4°	SE	195
	23 May	1200				270

Gyro error was 1° low. Find the position at noon on 23 May 15. The current was $150^{\circ} (T)$ at 3 kn throughout. (a/c means 'Alter course')

(10 Marks)

5. On 15 February 2008 at GMT 1000 h, the sextant altitude of Sun's Upper Limb was $65^{\circ} 25'$. HE = 10 m and IE = 2' off the arc. Find the true altitude by applying each correction independently. (5 Marks)
6. At 0900 h, a ship steering 160° (T) found Little Basses Reef light bore 240° (T). The same light bore 330° (T) at 1000 h. Current 270° (T) at 2 knots. Ship's speed = 10 Knots. Find the ship's position at 0900 h & 1000 h. (10 Marks)
7. At 1200 h from a ship steering 200° (T) at 10 kn, Colombo light bore 060° (T) at $10'$. Find the ship's position at 1200 h. The set & rate of the current was 120° (T) at 2.5 Knots. Find CMG, SMG. Estimate the ship's position at 1300 Hrs. (10 Marks)
8. Draw the symbols of the following :- (5x1=5 marks)
- (i) Flood tide stream with rate known
 - (ii) Established direction of traffic flow
 - (iii) Fish haven, depth known
 - (iv) Rock awash at the level of Chart Datum
 - (v) Pilots transferred by Helicopter
9. a) Find the true course if the compass course was 214° (C) & variation is 3° W.
 b) Find the True bearing if the compass bearing of a light house was 335° (C) (observation was taken when ship's head was 214° (C))

Use the following deviation table

Ship's head (C)	200° (C)	210° (C)	220° (C)	230° (C)
Deviation	7° W	3° W	1° E	4° E

(5 Marks)
