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

**December 2016 End Semester Examinations**  
**Diploma in Nautical Science - First Semester (2015 batch onwards)**

**Navigation- I : Terrestrial & Celestial (UD11T3104)**

**Date : 17.12.2016**

**Maximum Marks: 70**

**Time: 3 Hrs**

**Pass Marks : 35**

Note: Use BA Chart no 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.

**SECTION- A**  
**Terrestrial Navigation**

Note: 1. Q No 1 is compulsory and carries 5 marks.

2. Attempt any 3 out of remaining four, they carry 10 marks each.

1. Find the True Zenith distance of the Sun when the sextant altitude of the Sun's lower limb was  $33^{\circ} 41'$  on 22 February 2008. IE = - 2.2', HE = 12 m. (5 marks)
2. Write short notes on: (2x5 = 10 Marks)
  - (a) Sea Mile
  - (b) Obliquity of the Ecliptic
  - (c) Difference in Meridional parts
  - (d) Parallels of Declination
  - (e) True Altitude
3. (a) A ship in position  $24^{\circ} 41' S 177^{\circ} 50' W$ , steered along the parallel of latitude westward & covered 400'. What was her final position? (5 Marks)
- (b) A ship in position  $03^{\circ} 25' S 002^{\circ} 40' W$  steered  $050^{\circ}$  and covered a distance of 500'. Find her final position? (5 Marks)

4. (a) A ship departed the position  $31^{\circ}35'S$   $122^{\circ}20'W$  on a rhumb line track & arrived at position  $13^{\circ}22' N$   $125^{\circ}40'E$  . Find the course steered & distance covered. (5 Marks)

(b) Find the true course if the compass course was  $324^{\circ}(C)$  ( variation =  $1^{\circ} W$ ). Also find the true bearing if the compass bearing of a lighthouse observed from the ship steering the compass course  $324^{\circ}(C)$  was  $116^{\circ}(C)$  . (5 Marks)

Use the following deviation table:

Ship's head (C)	$310^{\circ}$	$320^{\circ}$	$330^{\circ}$	$340^{\circ}$
Deviation	$5^{\circ} W$	$2^{\circ} W$	$1^{\circ} E$	$4^{\circ} E$

5. On 15 April 2013 at 1200 h , a ship in position  $18^{\circ}33'N$   $105^{\circ}23' W$  steered the following courses :-

	Date	Time	Co(Gyro)	Leeway	Wind	Log
	15 April	1200	$315^{\circ}$	$3^{\circ}$	S	0
a/c	15 April	1900	$026^{\circ}$	$4^{\circ}$	E	86
a/c	16 April	0300	$135^{\circ}$	$5^{\circ}$	N	190
	16 April	1200				300

Gyro error was  $2^{\circ}$  high. Find the position at noon on 16 April 13. The current was  $240^{\circ}(T)$  at 2.5 kn throughout. (.a/c means 'Alter course' ) (10 Marks)

### SECTION- B (Chart work)

Note: 1. Q No 6 is compulsory and carries 5 marks.  
2. Attempt any 3 out of remaining four, they carry 10 marks each.

6. Draw the symbols of the following as per NP 5011 (1x5= 5 marks)

- a) Ebb tide stream with rate
- b) Submerged wreck depth known
- c) Established direction of traffic flow
- d) Obstruction, depth known
- e) Sounding of doubtful depth

7. Write short notes on the following: (2x5= 10 marks)

- a) Variation

- b) Folios
- c) Estimated position
- d) Natural scale of chart
- e) Fix

8. At 0800 h , from a ship, Little Basses Reef Light VQ(2)10s 34m 27M bore 320 °(T) at 12'. Find the position at 0800 h. From this position a course 240 °(T) was steered. (Ship's speed – 12kn. Current set 180 °(T) @ 2 kn). Estimate the position at 1000 h. Also find CMG .  
(10 Marks)
9. At 1100 h a vessel steering 160 °(T) at 10 Kn , observed Beruwala Point Fl 20s 46m 27M on bearing 120 °(T) and at 1200 h the same light house bore 050 °(T). Find the position at 1200 h.  
(10 Marks)
10. A ship observed Weligama F.R. 9m 5M & Mirissa Point in transit, bearing 310 °(C ) & at the same time the range of the Weligama F.R. 9m 5M was 5'. Find the position of the ship. Find the Compass error & the deviation of the ships head if the variation was 2 ° W.  
(10 Marks)

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