

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

**NAVIGATION – III: TERRESTRIAL, COASTAL & CELESTIAL NAVIGATION**  
**(UD11T 3201)**

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Date: 04-06-2018

Maximum Marks : 70

Time: 3 Hrs

Pass Marks : 35

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**Note: Use BA Chart 2675 or INT 5049 (English Channel) 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. Exam Centers to provide 'Luminous Range Diagram' and 'Tide Curve Diagram' (from ATT3) to candidates (if required) Draw Sketches wherever required.**

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**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) Local Hour Angle
  - b) Azimuth
  - c) Declination
  - d) Elevated Pole
  - e) Right Ascension
  
2. On GMT 30<sup>th</sup> April 13h 00m 52s, in DR 00° 20'N 60°12'W, the sextant altitude of the Sun's UL East of meridian was 44° 13.4'. If IE was 3.1' off the arc and HE was 20m, find the direction of the LOP and the longitude where it cuts the DR Latitude. (10 marks)

3. a) Explain the concept of International Date Line. (5 marks)
- b) On Jan 20<sup>th</sup> 2008, in DR 54° 20'S 46° 27'W the Sun Set bearing 234°(C) , if variation was 3°W, find the deviation of the compass. (5 marks)
4. a) Find the Geographical Position (GP) of Sun on GMT 04<sup>th</sup> March 2008 23h 14m 44s (5 marks)
- b) On GMT 30<sup>th</sup> April 2008 17h 30m 30s, in DR longitude 150°E, the observed altitude of Polaris was 50° 46.8'. If the Height of eye was 14m, find the direction of the LOP and the position through which to draw it. (5 marks)
5. Find the initial course and distance on a great circle track from position A 10° 00'S 150° 00'W to B 40° 00'N 160° 00'E (10 marks)

### Section B: CHART WORK

Note: Q. No. 6 is compulsory and carries 5 marks. Attempt any 3 out of remaining 4 questions.

6. Write Short Notes: (3+2=5 marks)
- a) Admiralty Sailing Directions
- b) Ocean Passages for the World
7. On a voyage from Southampton to Avonmouth, a vessel steering 260°(C), at 2000 hrs. St. Catherine Pt. Lt. bore 295°(C) and at 2100 hrs. it bore 027°(C). During this time the current was setting 209° (T) at 3 knots. Wind was blowing from South (Force 6) creating a leeway of 3°.
- a) Find the ship's positing at 2100 hrs and also at 2000 hrs.
- b) Find the Course and speed made good.

(Variation 10°W. Engine Speed 14 knots)  
Extract of Deviation card of the ship:

Ships Heading(C)	Deviation
240°	11.0° E
250°	12.0° E
260°	13.0° E
270°	12.5° E

(10 marks)

8. a) At 1600 hrs Start Point Lt Ho. bore  $256^{\circ}(C)$  and Berry Head Lt Ho. bore  $328^{\circ}(C)$ . Variation  $8^{\circ}W$ , Deviation  $5^{\circ}E$ , find the ship's position.
- b) From the above position, find the compass course to steer to pass Pte. De Barfleur Lt. 10 miles off to starboard counteracting a current setting  $220^{\circ}(T)$  at 3 knots. (Ship Engine speed 14 knots) (10 marks)

Extract of Deviation card of the ship for question 8(b):

Ships Heading(C)	Deviation
$90^{\circ}$	$12.5^{\circ} W$
$100^{\circ}$	$11.5^{\circ} W$
$110^{\circ}$	$10.5^{\circ} W$
$120^{\circ}$	$9.0^{\circ} W$
$130^{\circ}$	$7.0^{\circ} W$

9. Find the height of tide off Singapore harbour at 1100 hours on 3<sup>rd</sup> February. The following extract from the tables for the date under reference are given below:

Extracts from A.T.T.	
Zone Time -0800	
Time	Height
0123	2.7m
0703	0.9m
1302	2.9m
1930	0.5m

(10 marks)

10. a) Draw a diagram showing various types of cardinal marks indicating navigable waters. (5 marks)
- b) Elaborate the element of "Appraisal" in passage planning. (5 marks)

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