

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
End Semester Examinations Dec 2019
DIPLOMA IN NAUTICAL SCIENCE (DNS)

Semester: II

UD11T3201 - Navigation III-Terrestrial, Coastal and Celestial Navigation

Date: 09-12-2019

Max Marks: 70

Time: 3 Hrs

Pass Marks: 35

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 permitted in the Exam Hall.
Exam Centres to provide 'Luminous Range Diagram' and 'Tide Curve Diagram' (from ATT 3) to candidates (if required)
Draw Sketches wherever required.

PART – A: TERRESTRIAL AND CELESTIAL NAVIGATION

Note: Q.No.1 is compulsory and carries 5 marks. Answer any 3 out of remaining 4.

1. Define the following (5 x 1 = 5 marks)

- (a) Vertex
- (b) Amplitude
- (c) Prime vertical circle
- (d) Right Ascension
- (e) Geographical position of a heavenly body

2 (a) Explain the causes of season. (5 Marks)

- (b) On 03 March 2008 in DR $19^{\circ}58'N$ $033^{\circ}15'W$ at Sunrise the gyro bearing of the Sun when it was approximately semi diameter above the visible horizon was $096^{\circ}(G)$. Find the gyro error.

(5 Marks)

3. (a) On 16 January 08, in DR position $32^{\circ} 18' N$ $032^{\circ} 15'E$ the sextant altitude of Sun's Upper Limb on the meridian was $36^{\circ} 52'$. HE = 12.8 m and IE = + 2.6' off the arc. Find the latitude. (5 Marks)

- (b) On 04 March 2008, in DR position $40^{\circ} 10' N$ $058^{\circ} 40' E$, the sextant altitude of the Polestar was $40^{\circ} 42'$ at GMT 160428. IE = - 1' on the arc & HE = 11 m. Find the latitude. (5 Marks)

4. On 30 April 2008 AM, in DR position $20^{\circ} 12' N$ $050^{\circ} 42' E$, the sextant altitude of the Sun's Lower Limb at GMT 061236 was $55^{\circ} 38'$. IE = - 2' on the arc & HE = 12 m. Find the intercept, the direction of the Position line.

(10 marks)

5. A ship sailed along a great circle track from $15^{\circ} 12' N$ $122^{\circ} 16' W$ to $52^{\circ} 45' N$ $S 046^{\circ} 04' W$. Find the great circle distance & the initial course. (10 Marks)

PART – B: CHART WORK

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

6. (a) Name the colour, shape, topmark if any, colour & rhythm of light if fitted of Preferred channel to Starboard in Region B. (2 marks)
- (b) Name the colour, shape, topmark if any, colour & rhythm of light if fitted of South Cardinal Mark. (3 marks)
7. At 0800 h, a ship steering $295^{\circ}(T)$ found Bill of Portland Lt. bore $320^{\circ}(T)$. The same light bore $050^{\circ}(T)$ at 1000 h. Current $300^{\circ}(T)$ at 2.5 knots. Ship's speed = 10 Knots. Find the ship's position at 0800 h & 1000 h. (10 Marks)
8. At 1200 h from a ship steering $065^{\circ}(T)$ at 12 kn, Ile Vierge bore $225^{\circ}(T)$ & Ile de Batz bore $135^{\circ}(T)$. Find the ship's position at 1200 h. At 1400 h, Les Sept bore $150^{\circ}(T)$ & Les Triagoz bore $195^{\circ}(T)$. Find the ship's position at 1400 h. Find CMG. Estimate set & rate of the current. (10 Marks)
9. Find the depth of water a vessel drawing 5.4 m will have under her keel when crossing 3.4 m patch at Port Santa Barbara on 02 December 2008 at 0615 Standard Time. Draw a diagram.

Use the Tide curve diagram. Use the following predictions: -

Port	Santa Barbara			
	02 December 2008			
Time(ST)	0312	0915	1516	2122
Height(m)	1.6	6.5	1.6	6.4

(10 Marks)

10. (a) Define Geographical range & Luminous range. (4 Marks)
- (b) An observer on board a ship with H.E. = 4 m, raised the Cap d'Antifer light FI W 20s 128m 29M at 2100 h on bearing $130^{\circ}(T)$ at Met visibility 10'. Find the position of the ship. (6 Marks)
