

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

May/ June 2017 End Semester Examinations
Diploma in Nautical Science- Second Semester
(AY 2015 batch onwards)

Navigation - III Terrestrial, Coastal and Celestial Navigation
(UD11T3201)

Date : 15.06.2017

Maximum Marks: 70

Time: 3 Hrs

Pass Marks : 35

- Note: 1. Use BA Chart2675 or INT 5049 (English Channel) for Chart work*
2. Use of Selected pages of Nautical Almanac 2008, Norie's Tables and Non-programmable type Scientific Calculator is permitted in the Exam Hall.
3. Exam Centres to provide 'Tide Curve Diagram' & Luminous Range Diagram to candidates (if required)
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Section - A
Terrestrial and celestial navigation

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

1. Write Short Notes (5 Marks)
 - a) International Date Line
 - b) Polar Distance
 - c) Vertex
 - d) Geographical Position of heavenly body
 - e) SHA

2. (a) Describe how different seasons are formed in Northern Hemisphere. (5 Marks)
(b) Explain why latitude of observer is same as 'Altitude of Pole' (5 Marks)

3. (a) On 1st May 2008 , in DR Longitude $179^{\circ}50'$ 'E, the observed altitude of the Sun's LL on the meridian was $65^{\circ} 35.6'$ South of the observer. If HE was 15m, find the latitude and the LOP. (5 Marks)

- (b) On the 6th March 2008 at 0200 ships time in DR $20^{\circ} 37' N$, $000^{\circ} 00'$, the pole star bore $358^{\circ}(C)$. If variation was $1.7^{\circ} W$, find the deviation for the ships head. (5 Marks)
4. On 30th April 2008 in DR $00^{\circ}20'N$, $060^{\circ} 12'W$, the sextant altitude of Sun's UL East of meridian was $44^{\circ}13.4'$ when the GPS clock showed 13h 00m 52s. If height of eye (HE) was 20m, and IE was 3.1 ' off the arc, calculate the direction of the position line (LOP) and intercept. (10 Marks)
5. Find the great circle distance and initial course from
A $10^{\circ} 00.0' S$, $150^{\circ} 00.0' W$ to B $40^{\circ} 00.0' N$, $160^{\circ} 00.0' E$ (10 Marks)

Section – B **Chart work**

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

6. a) With respect to making Voyage planning effective, What important markings would you make on a navigational chart. List any six important ones. (3 Marks)
b) Explain characteristics of Isolated danger Mark buoy. (2 Marks)
7. At 1800 hrs a vessel steering $030^{\circ}(C)$,observed Casquets light bearing $083^{\circ}(C)$ and again at 1900 hrs it bore $131^{\circ} (C)$.The current was known to be setting $342^{\circ}(M)$ at 2 knots through out. Required Ship's position at 1900 hrs and also estimate the ship's position at 2100 hrs.
(Ship's speed 12 knots. Variation $4^{\circ}E$ Deviation $7^{\circ}W$) (10 Marks)
8. Anvil point and Bill of Portland light houses bore $020^{\circ}(C)$ & 310° at 1000 hrs. Ship's course was $063^{\circ}(C)$. Dev of the compass was $4^{\circ} (E)$. Variation in region was $2^{\circ} (W)$. This course was steered for next 1.5 hrs at 13 knots. If SE'ly wind caused a leeway of 5° and current set $310^{\circ}@$ 2 knots through out find position of ship at 1130 hrs. Also the CMG and SMG. (10 Marks)
9. a) Define following
1. Ebb tide 2. Range of tide 3. Chart datum 4. Neap tide
(4 Marks)

- b) Find the height of tide and depth of water at 1430 hrs standard time on 2nd March at Position off Singapore. Depth at chart datum is 4.0 m .Extracts from Tide tables for day under reference are as under:

Zone Time	-0800
Time	Height
0014	2.7m
0603	0.8 m
1209	2.9m
1830	0.6m

(6 Marks)

10. From a vessel steering 310° (C) following compass bearings were observed at 1930 hrs.

C ` De Antifer Lt Fl 20s 26M brg 108° (C)
C de la heve It Fl 5s 24 M brg 165° (C)
Le Havre It Fl (2) R 10s 20 M brg 205° (C)

Find the vessel's position. The vessel continued on her course and at 2130 hrs Pte de Barfleur was first sighted in meteorological visibility of 7 miles bearing 256° (C) .Find the ship's position and set and drift of current experienced. Also find the course and speed made good. (Use deviation 6.5° E , Variation 12.5° W . Engine speed 12 knots.)

(10 Marks)
