INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

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

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

Date : 14.12.2016 **Maximum Marks: 70**
Time: 3 Hrs **Pass Marks : 35**

Notes: Use BA Chart 2675 or INT 5049 (English Channel) for Chart work
Use of Non-Programmable Scientific Calculator, Norie's Tables, Selected Pages from Nautical Almanac 2008 are permitted
Tidal graph and 'English Channel' Chart to be provided by the Exam Centre

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SECTION– A
(Terrestrial and Celestial Navigation)

Note: Question No.1 is compulsory. Answer any 3 out of remaining 4 questions from this section)

1. Write short notes on (5 Marks)
   a. Solstices and Equinoxes
   b. Sidereal Hour Angle
   c. Geographical Position of heavenly bodies
   d. Amplitude of a heavenly body
   e. Vertex of a Great Circle

2. a. Explain how and why we are advancing or retarding the dates while crossing the International Date Line.

   b. Prove that "Sin (Amplitude) = Sin (Declination) x Sec (Latitude)" (5 x 2 = 10 Marks)

3. On 1st Oct 2008, early in the morning, a ship in DR Longitude 178^0 11' E observed Pole Star at sextant altitude 18^0 47.4' at GMT 17h 22m 26s. If the IE is 1.6' on the arc and Height of Eye is 12.5 m, find the direction of PL and the position through which it passes? (10 Marks)

4. On 23rd Aug 2008, at 10h 56m 12s GMT, a ship in DR Position 36^0 02' N 016^0 07' W, found the sextant altitude of Sun's Lower Limb, east of the meridian as 51^0 21.0'. If the Index error was 2.6' off the arc and Height of Eye was 19.5m, calculate the obs. Longitude through which the LOP will pass and its direction? (10 Marks)

5. A vessel started from a position off Santiago, Chile (33^0 33' S; 074^0 10' W) and decided to follow a great circle track till a position off Shanghai, China (30^0 28' N; 123^0 00' E). Find the Initial Course and Great Circle Distance between the two positions? (10 Marks)

SECTION – B

(Chart Work)

(Q. No. 6 is compulsory and carries 5 marks. Answer any 3 out of remaining 4 questions)

6. How many volumes of 'Admiralty List of Radio Signals' can you find on a Ship? Write briefly about the contents of each volume? (5 Marks)

7. On a voyage from Le Havre to Antwerp, a ship steering a course 043^0 (C), C.de Antifer Lt. bore 183^0 (C) at 1640 Hrs. and at 1800 Hrs. Pte. D'Ailly Lt. bore 124^0 (C). Find the ship's position at 1800 Hrs. Given Ship's speed as 12 knots, Variation 6.6^0 E. Use Deviation Card II. (Chartwork – S K Puri) (10 marks)

8. a. On 29th June at 1900 Hrs. vessel's position was found with Start Point Lt. Ho. bearing 259^0 (C) and Berry Head Lt. Ho. bearing 331^0 (C). If Variation = 8^0 W and Deviation = 2^0 E, find the ship's position?
   a. From the above position, find the compass course to steer to pass Pte. de Barfleur Lt. 10 miles off when abeam to starboard counteracting a current setting 220^0 (T) at 3 knots. [Given, Variation = 8^0 W; Use Deviation Card I; Ship's speed = 14 knots]
   b. Find the time when Pte. de Barfleur Lt. will be abeam. (10 Marks)

9. a. Explain the following:
      i. Spring and Neap Tides
      ii. Chart Datum (2 x 2 = 4 Marks)
   b. From the following extracts from the Tide Table, find the standard time during the afternoon on 19th March at which there will be 7 Metres of water over a shoal patch with charted depth 4 Metres off the Port of Darwin, Australia (6 Marks)

	Extracts from A.T.T.	
	Time	Height
19 March	0018	2.7 m
	0557	6.2 m
	1223	1.5 m
	1832	7.0 m

10. At 2000 Hrs. Les Sept. Iles Light (Ht 20m) dipped bearing 175^0 (T). From this position find the compass course to steer to pass Casquets Lt. 5 Miles off when abeam, counteracting a current setting 120^0 (T) x 3 knots. A NW'ly wind was causing a Leeway 3^0. Find the time when Casquets light will be abeam. [Given, Ship's speed – 15 Knots; Height of Eye – 12.2 m; Variation – 6^0 E] (10 Marks)

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