

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 and Celestial Navigation

(UD11T 2201)

Date: 04-06-2018

Maximum Marks : 70

Time: 2 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) to the candidates Draw sketches wherever required.

Section A: Terrestrial & Celestial Navigation

Note: Q. No. 1 & 2 are compulsory. Answer any 2 out of remaining 3.

1. Write short notes: **(1 Mark x 5 = 5 Marks)**
 - a) Time Zones
 - b) Sidereal Hour Angle
 - c) Declination of a Heavenly body
 - d) Geographical Position of heavenly bodies
 - e) Amplitude of a Heavenly Body

2. On 1st May 2008 at 07h 56m 16s UTC, an observer in D/R position $05^{\circ} 27.0' N$ $098^{\circ} 43.0' E$, found the sextant altitude of Sun's lower limb as $50^{\circ} 43.5'$. If HE was 21m and IE was 3.1' off the arc, calculate the Intercept, direction of PL and a position through which it will Pass. **(10 Marks)**

3. **(5 Marks x 2 = 10 Marks)**
 - a) Derive the formula for calculating Amplitude of a heavenly body, given the observer's Latitude and Declination of heavenly body.
 - b) On 1st May 2008, in D/R Position $43^{\circ} 04' N$ $158^{\circ} 24' E$, the rising Sun bore $066^{\circ} (C)$. If variation was $1.2^{\circ} W$, find the deviation for the ship's head.

4. **(5 Marks x 2 = 10 Marks)**
 - a) Find the Geographical Position of Sun on 15th June $08^h 55^m 45^s$ UTC.

b) On 1st Sept 2008 early morning at Ship, in DR position $18^{\circ} 05' N$ $178^{\circ} 11' E$, at 31d 17h 22m 26s GMT, an observation of Pole Star gave a sextant altitude of $18^{\circ} 47.7'$. If the IE is 1.6' on the arc and Height of eye is 25 m, Find the direction of PL and a position through which it will pass?

5. A vessel started a Great circle course from position A $06^{\circ} 00' N$ $079^{\circ} 00' W$ to another position B $38^{\circ} 00' S$ $179^{\circ} 00' E$. Find the Initial Course and Great Circle Distance between the positions? **(10 Marks)**

Section B: CHART WORK

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

6. What are the objectives of Passage Planning? Describe the steps involved in the 'Appraisal' stage of passage planning. **(5 Marks)**
7. At 1300 hrs. a vessel steering a course 027° (T) at 12 knots speed observed Casquets Lt. bearing 080° (T). At 1400 hrs. same light was found bearing 128° (T). A current was known to be setting 346° (T) at 2 knots rate throughout.
 a) Find the ship's position at 1400 Hrs.
 b) Also find the Estimated position at 1600 hrs., if the vessel continued the same course and speed. [Given, Variation = $4^{\circ} E$] **(10 Marks)**
8. At 1200 hrs., Pte.d'Ailly Lt. Ho. was found bearing 184° (T) and 8.5 NM off. From this position, find the course to steer to pass C.d'Antifer Lt. Ho. 10 miles off. While on this course, at 1500 hrs., it was noticed that C.d'Antifer Lt. Ho. and C.De. La Heve Lt. Ho. are in transit and C.d'Antifer Lt. Ho. is 9 NM off. Find the set and rate of drift of current experienced by the vessel. (Given, vessel speed – 12 knots; Variation $7.50 W$)
(10 Marks)
9. Find the earliest time in the afternoon on 15th June when there will be 6 metres of water above a shoal patch off DARWIN with charted depth of 2 metres. Extracts from ATT are given below:

| | Time | Height |
|-----------------------|------|--------|
| 15 th June | 0550 | 6.6 m |
| | 1157 | 2.5 m |
| | 1743 | 6.3 m |

(10 Marks)

10.

(5 Marks x 2 = 10 Marks)

- a) Define, Luminous Range and Nominal Range of lights.
- b) From a vessel steering a course 304° (T) at 12 knots, Pte. de Barfleur Lt. was first sighted bearing 250° (T). If the meteorological visibility is estimated as 7 miles, find the ship's position?