

INDIAN MARITIME UNIVERSITY
(A Central University Government of India)
END SEMESTER EXAMINATIONS – DECEMBER 2019
Diploma in Nautical Science
Semester I

UD11T1104-NAVIGATION I: TERRESTRIAL & CELESTIAL

Date: 12.12.2019
Time: 3Hrs

Max. Marks: 70
Pass Marks: 35

Note: Use of Norie's Tables and Nautical Almanac 1992 is permitted. Use BA chart-813. Non-programmable scientific calculator is allowed.

PART – A: NAVIGATION (35 Marks)
(Q1 is compulsory, Answer any three from Q2 to Q5)

- 1) Define the following: (5x1= 5 Marks)
- a. a) Departure
 - b) Latitude of a place
 - c) Great Circle
 - d) Local Hour Angle
 - e) Rational Horizon
- 2) a) A vessel in latitude $37^{\circ}12'N$, proceeds along the same latitude from longitude $013^{\circ}04'E$ to $005^{\circ}37'W$. Calculate the distance travelled. (5 Marks)
- b) Calculate the following: (2x2.5=5 Marks)
- Find the quadrantile course for $145^{\circ}(T)$.
 - Find the True course if compass course is $040^{\circ}(C)$, $Dev=15^{\circ}E$, $Var=10^{\circ}W$
- 3) On 4th March 2008, the sextant altitude of Sun's LL was observed to be $56^{\circ}19.8'$. $HE=12m$ and $IE=2.8'$ on the arc. Calculate the True Zenith distance using all corrections individually. (10 Marks)
- 4) Calculate the following: (5x2 = 10 Marks)
- a. Calculate the LHA of star Dubhe (GMT-31st Aug 1992, 17h 22m 26s; Long: $150^{\circ}00.0'E$).
 - b. Find GP of the Sun at GMT 21st July 1992, 08h 34m 45s.
- 5) A vessel sailed from Lat. $27^{\circ}12'N$, Long. $178^{\circ}42'E$ doing 15 Knots by engines. She steered $067^{\circ}(C)$, $Dev 3^{\circ}E$, for 10 hours. Course was then altered to $096^{\circ}(C)$ $Dev 1^{\circ}E$ and this course was maintained for 8 hours. Thereafter she steered $230^{\circ}(T)$ $Dev 3^{\circ}W$ for another 6 hours. Current was setting $324^{\circ}(T)$ at 2.5 knots throughout. Find the position arrived. (Given $Var-7^{\circ}W$ during this period). (10 Marks)

PART – B: CHART WORK (35 Marks)
(Q6 is compulsory, Answer any three from Q7 to Q10)

- 6) Define the following: (5 x 1 = 5 Marks)
- | | |
|-----------------------|------------------|
| a. Small scale chart. | d. Natural Scale |
| b. Variation. | e. Chart Datum |
| c. True course. | |
- 7) a) With neat sketch explain in details Dead Reckoning position (DR), Estimated Position (EP) and Fix. (5 Marks)
- b) List 5 information available on a Navigation Chart. (5 Marks)
- 8) a) Draw the Chart Symbols for the following: (5 x 1 = 5 Marks)
- WRECK not dangerous to navigation
 - Submarine cable
 - WRECK showing any part of HULL or superstructure at level of chart DATUM
 - Rock awash at chart DATUM
 - West cardinal mark PILLAR BUOY

b) From deviation table given below, convert: (2 x 2.5 = 5 Marks)

- (i) 155° (T) true course to compass course. (variation 5°E)
- (ii) Ship's course 153° (C), convert 225° (C) compass bearing on this course to true bearing. (variation 5°E)

Compass Heading	Deviation
140° (C)	1° W
150° (C)	3° W
160° (C)	6° W

- 9) At 1100 Hrs Hindel Nattu Peak (410) & Dondra head Lt. House were in transit & distance from Dondra head was 15 miles. From here a vessel steered a course of 069°(T). Find the ship's positions at 1100 Hrs. Also find course, time & distance off when Great Basses Lt. Ho. will be abeam. (Ship's speed=13.5 kts) (10 Marks)
- 10) (a) At 1500 hrs the light near Colombo harbour FI(3)10s26m25M bears 092° (G). The vessel steering a course of 172° (G) at 08 kn. At 1800 hrs the Berberyn light (FI20s46m27M) was observed bearing 112°(G). Find the vessels position at 1800 and 1500 hrs (Gyro error 02° High).
- (b) Find bearing & distance of Bombuwela peak (160) from the 1800 hrs position. (10 Marks)