

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**Dec'24 ESE**  
**DNS**  
**Navigation I: Navigation & Chartwork**  
**UD11T5104**

**Max. Marks: 70**

**Pass Marks: 35**

**Date: 13.12.2024**

**Time: 3 Hours**

**Note: Section A (20Marks)-Q1 & Q2 are compulsory.**

**Section B (50 Marks)-Answer any 5 questions from Q3 to Q9**

Use of Selected pages of Nautical Almanac 2008, Norie's Tables and Non-programmable type Scientific Calculator is allowed in the Exam Hall.

Draw Sketches wherever required

**Section A**

**MCQ Q1.**

(1 x 10 = 10 Marks)

		A	B	C	D
i	Pole around which Earth appears to rotate in Clockwise direction is named	NCP	North Pole	South Pole	SCP
ii	Length of 1 NM is	1852.3m	6080 m	1' arc of Latitude	1' arc of equator
iii	When we apply Dip correction to Observed Altitude, we get	Observed Altitude	True Altitude	Altitude measured at sea level	Sextant Altitude
iv	A line which intersects all Meridians at same angle is called	Great circle track	Rhumblines	Departure	Parallel of latitude
v	If the Compass Course is 359; Variation 4 W and Deviation 2 E, then True course is	005(T)	355(T)	001(T)	357(T)
vi	f) During dark hours Buoys are identified by	Lights - Rhythm & colour	By shape & top marks	By colour code	By number marked on the buoy
vii	Chart datum (CD) on a chart is	Level at MSL	Level at MHWS	Level at LAT	Level at HAT

viii	Cardinal marks are used	For both region A & B	For region A only	For region B only	Only within a channel
ix	Departure is	Dist. Measured along arc of equator	Dist. Measured along arc of meridian	D'long on Mercator chart	E-W distance measured along mean lat. Between two place
x	Compass Error is zero when	Devn. & var. is zero	Devn. & var. is same in value but different in name	Variation is zero	Deviation is Zero

## 2. Short Answer Questions - (2 x 5 = 10 Marks)

- Explain relationship between Departure and D Long.
- What do you understand by Obliquity of Ecliptic
- While obtaining True Altitude of a celestial body, what is Semi diameter correction.
- Explain briefly the natural scale of the chart.
- What are the advantages of ECDIS over paper charts.

### **Section B (Answer any five questions)**

Q3. (2 x 5 = 10 Marks)

- State limitations of Plane sailing formula.
- Describe the shape, colour, light characteristics and features of Cardinal marks as provided under IALA buoyage system.

Q4. (2 x 5 = 10 Marks)

- Calculate Course and Distance from A  $60^{\circ}11.6'N$   $076^{\circ}44.3'W$  to B  $55^{\circ}10.3'N$   $080^{\circ}16.8'W$
- Enumerate the differences between ENC and RNC.

5. (2 x 5 = 10 Marks)

- Find position arrived if a vessel sails from position  $06^{\circ}10'S$   $176^{\circ}47'W$  on Rhumb line course  $333^{\circ}$  for a distance of 4450 NM
- Describe briefly the WEND principle as promoted by IHO.

6. (2 x 5 = 10 Marks)

- On 01 May 2008, Sextant Alt of Sun LL was  $45^{\circ}10'$ , Index Error  $2.1'$  on the arc, Height of eye 16 m. Find Zenith Distance.

b) Draw the symbols as per NP5011 for the following :

- i Lighted oil production platform.
- ii Pilot Boarding position
- iii Precautionary Area
- iv Radio reporting point
- v Wreck showing any part of superstructure or hull at the level of chart datum

7. Choose your scale, say  $1' = 1\text{cm}$ . Plot Lt Ho X and 4' east of X, plot Lt Ho Y. At 0700 hours Lt ho X and Y were in transit, transit bearing taken as  $095^\circ$  (C). At the same time, the ship was at 10' distance from Lt Ho X.

- a) Plot the position of the ship at 0700Hrs. **(7 Marks)**
- b) Find the Compass error & Variation if the Deviation was  $3^\circ$  W. **(3 Marks)**

8 Choose your scale, say  $1' = 1\text{cm}$ . Plot a Lt Ho on your answer sheet. At 1500 hrs, a ship observed this Lt Ho bearing  $035^\circ$  (T). At 1600 hrs the same Lt Ho. Bore  $090^\circ$  (T). The vessel was steering a course of  $330^\circ$  (T) at 10 knots.

- a) Plot the vessel position at 1600 hrs. **(7 Marks)**
- b) Plot the vessel position at 1500 hrs. **(3 Marks)**

9. Plot on answer sheet, Lt Ho X. 6' NE( $045^\circ$ T) of X, plot Lt Ho Y. Plot Lt Ho Z 10' North of Lt Ho Y. Choose your scale such as  $1'=1\text{cm}$ . At 0500 hrs, a ship on the course of  $025^\circ$  (T) observed Lt Ho X bearing  $270^\circ$ (T) & Lt Ho Y bearing  $000^\circ$ (T).

- a) Plot the ship's position at 0500 hrs. **(2 Marks)**
- b) The Vessel continued the course of  $025^\circ$ (T) at the speed of 10kts. Find the bearing & distance off when Lt Ho Z will be abeam on the Port Side. **(4 Marks)**
- c) Find the time when Lt Ho Z will be abeam. **(4 Marks)**

