

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – June 2025
Programme Name: B Sc Nautical Science
Semester: 4
Subject Code: UG21T5401
Subject Name: Celestial Navigation II

Date: 30.05.2025

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.
- (iii) Non-Programmable Scientific Calculator can be used.
- (iv) 2008 Nautical Almanac / Nories table permitted.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. What is name of the Constellation of Star Procyon?
 - a. Canis Minoris
 - b. Geminorium
 - c. Procyinium
 - d. Pollux

2. What is the value of Equation of Time on 04th May 2008 / 1200 Hrs GMT?
 - a. 11h 57m
 - b. – 03m 13s
 - c. + 03m 15s
 - d. – 03m 15s

3. Your vessel is heading on an easterly route for 7 days in Western Hemisphere? How would you adjust your ships clock as vessel is progressing on her route?
 - a. Advance Clock
 - b. Retard clock
 - c. Maintain Same time
 - d. Go back by One day when approaching Greenwich Meridian

4. What is the True Zenith Distance when celestial body is Theoretically Rising?
 - a. Zero
 - b. 90 Deg

- c. 180 Deg
- d. 270 Deg

5. When doing Polaris Calculation, sign of a_0 can be Negative depending on value of LHA Aries. (True / False)
6. If 2 stellar Position Lines are obtained at different times, vessel fix is resolved using Staggered PL Method. (True / False)
7. In the Northern Hemisphere, for a Circumpolar observation, bearing of Lower Merpass is always
- a. North
 - b. East
 - c. South
 - d. West
8. Direction of LoP would be North-South when the Celestial body is on observer's prime vertical (True/False)
9. Theoretical sunrise occurs when Upper limb of the sun appears 1 semi-diameter above visible horizon (True/False)
10. Equation of Time become zero ----- times in a year

Section B

Five Questions of 02 Marks each

11. Find the SHA & Decl. of star Elnath in the month of December 2008. Also name the constellation it belongs to.
12. Calculate the Sunrise time (in GMT) at an observer on 48 Deg N, 120 Deg E, on 22nd Sep 2008.
13. State the relation between Altitude of Star Polaris and Observers Latitude in Northern Hemisphere.
14. Define Circle of Position in Astronomical position fixing methods. Why is Circle of Position considered as a Position Line?
15. Find the Local Sidereal time for an observer at 30°00'N & 60°00'W if GHA Aires = 180°

Section C

Five Questions of 10 Marks each.

16. a) Describe Sidereal Day and how is it different from Solar Day. State exact duration of Sidereal Day. (6 Marks)

b) Jan. 20th 2008, in DR $55^{\circ} 00' S$ / $46^{\circ} 26' W$, the Sun set bearing $230^{\circ}(C)$. If variation was $3^{\circ}W$, find deviation of the compass. (4 Marks)

17.a) On 15th Jun 2008, a vessel in Sea of Japan (DR $36^{\circ} 00' N$ $135^{\circ} 00' E$, the rising Sun bore $069^{\circ} (C)$. If Var = $9.5^{\circ} W$, find the deviation of the compass at that heading. (4 Marks)

17.b) On 31st Aug 2008 / 23H 13M 15S GMT, a vessel off Sagar Heads (DR $19^{\circ} 30' N$, $088^{\circ} 00' E$, observes Sext Alt of POLARIS at $20^{\circ} 18.5'$. If Height of Eye is 25 mtr, Index error was 3.2' ON the arc, find the direction of LOP and the position from where to draw it. (6 Marks)

18. On 27th Apr 2008 / 11H 03M 05S GMT, a vessel in North Atlantic Ocean (DR $40^{\circ} 46' N$, $041^{\circ} 23' E$, observes Sext Alt of Sun's UL at $35^{\circ} 51.5'$. If Height of Eye is 37 mtr, Index error is 2.5' OFF the arc, find the direction of LOP and INTERCEPT from DR. (10 Marks)

19. On 30th Nov 2008 / 10H 12M 36S GMT, a vessel off Mumbai (DR $18^{\circ} 40' N$, $070^{\circ} 10' E$), observes Sext Alt of Sun's LL to be $29^{\circ} 15.7'$ in the afternoon. If Height of Eye is 40 mtr, Index Error is 3.1' OFF the arc, find the direction of LOP and the LONG where it cuts the DR Lat. (10 Marks)

20.a) Define Circumpolar Body. State the conditions necessary for a celestial body to be circumpolar. (4 Marks)

20.b) In Southern hemisphere the Lower & Upper meridian altitude of a star was 15° (bearing South) & 79° (bearing North) respectively. Show by a diagram on the plane of ORH that the star was Circumpolar. (6 Marks)

