

**Indian Maritime University**  
**(A Central University, Govt of India)**

**Supplementary Examinations – September/October 2024**

**Programme Name: B Sc (NS)**

**Semester: 3**

**Subject Code: UG21T5301**

**Subject Name: Celestial Navigation I**

Date: 18.09.2024	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Use of 2008 Nautical Almanac, Norrie's Table Scientific Calculator is permitted.

**Section A**

**Objective Type Questions (10 x 1 Mark = 10 Marks)**

1. The plane of rational Horizon passes through -----
  - a. Nadir
  - b. Centre of earth
  - c. Zenith
  - d. Pole
2. What is the radius of Celestial Sphere?
  - a. 100 nm
  - b. 1000 nm
  - c. 1 Light Year
  - d. Infinity
3. Which of the following planets is a Superior planet?
  - a. Venus
  - b. Mars
  - c. Moon
  - d. Mercury
4. What is the value of eccentricity of earth's orbit around the Sun?
  - a. Zero
  - b. 0.0167
  - c. 1.000
  - d. 23.5
5. DIP correction on the sextant altitude correction varies with-----?
  - a. Latitude
  - b. Height of eye
  - c. size of objects
  - d. refraction
6. True altitudes are measured at -----
  - a) Equator
  - b) Meridian
  - c) Vertical circle
  - d) Rational horizon
7. Longitudes are not measured at -----
  - a) Centre of earth
  - b) poles
  - c) arc of equator
  - d) Arc of meridian
8. If Latitude of an observer is same value and name as the Declination of celestial body, the body would be at Observers Zenith at Upper Meridian Passage the body. True / False
9. What is the assumed hourly rate of change of Moon's hour Angle in increment table of Almanac?



- a. 10 Deg 30 min   b. 14 Deg 19 Min   c. 15 Deg 00 Min   d. 15 Deg 30 Min
10. In Nautical Almanac, how frequently is 'v' corn for Moon given?  
a. Once in 3 Days   b. Once in 2 Days   c. One per day   d. Every Hour

**Section B**  
**SHORT ANSWER TYPE QUESTIONS (5 x 02 Marks = 10 Marks)**

11. Define Amplitude.
12. State Kepler's 1<sup>st</sup> Law of planetary Motion. Draw a neat sketch supporting it.
13. State the GP of the Moon, when its GHA=242° and Dec22°S
14. Define LMT (Local Mean Time)
15. Find the Observed Altitude, when sextant altitude of Mars is 42°54.3', IE 0.7' on the arc

**Section C**  
**Answer all the questions. (10 Marks Each)**

16. Discuss the concept of the time of the meridian passage of Sun and its significance in the context of Latitude by Meridian Altitude.
17. a) Describe the earth's elliptical orbit and state approximate aphelion and perihelion distance and date. (5 Marks)
- b) Determine Geographical Position of Moon on 09<sup>th</sup> Oct 2008 / 19H 40M 24S GMT. (5 Marks)
18. Explain in details about the Seasons, Solstice and Equinoxes.
19. State the optical principle of the Sextant and show that Sextant measures double the angle through which the Index Bar is moved? (10 Marks)
20. On 16 June 2008 in DR position 72° 30' N 038° 45' E, the sextant altitude of the lower limb of the sun during meridian passage was 40° 38.6', IE 1.4' Off the arc, height of eye was 8.3 meters. Find the Latitude of the observer and the direction of the position line.

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