**Indian Maritime University**

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

**End Semester Examinations – June 2023**

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

**Semester: III**

**Subject Code: UG21T5301**

**Subject Name: Celestial Navigation-1**

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Date: 06.06.2023 Max Marks: 70

Duration: 03 Hrs Pass Marks: 35

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General Instructions

(i) All Sections (A, B & C ) are to be attempted.

(ii) Options, if any, are specified in respective section.

(iii) Scientific Calculator, Norrie's Table, Nautical Almanac 08 are permitted.

## Section A

**Questions 1 to 10 are of 1mark each**

**Choose the most appropriate answer( 1 mark each)**

1. Lunar Eclipse occur when
   a. Moon is in between the Sun & the Earth
   b. The Earth is in between the Sun & the Moon
   c. The Sun , Moon & the Earth are in Quadrature
   d. The Sun , Earth & the Moon are in Conjunction.

2. The Closest approach of the Earth to the Sun is called
   a. Apogee
   b. Perigee
   c. Aphelion
   d. Perihelion

3. At the time of Meridian passage the azimuth of any heavenly body will be
   a. 090°
   b. 270°
   c. 000°
   d. 360° or 180°

4. While correcting Sextant Altitude to True Altitude Semi diameter correction is
   a. Positive Correction.
   b. Negative correction

c. Negative or positive correction
d. Neither positive nor negative.

5. What is the radius of Celestial Sphere?
   a. 100 nm
   b. 1000 nm
   c. 1 Light Year
   d. Infinity

**Fill in the Blanks ( 01 Mark each) .**

6. When Earth has Equal day & night duration, it is known as .....

7. Maximum Northerly Declination of the Sun is .....

8. If your DR is 12°30'N, 169°56'E the Zone is .....

9. Relationship between LHA star , GHA Aries, SHA star, & Longitude of an observer E is LHA Star = .....

10. GP of a heavenly body can be derived from ..... & .....

## Section B

**Five Questions of 02 Marks each.**

Give SHORT ANSWERS.

11. Find the Geographical position of star Sirius at GMT 21 15 30 on 04 May 2008.

12. Illustrate with suitable diagram Solar Eclipse.

13. For an observer in DR 45°30'N,148° 45'W LMT of a celestial observation was 20 42 54 on15 Jun08. What is the GMT of observation?

14. Differentiate between Standard time & ZT.

15. What is Rational Horizon

## Section C

**Answer all the questions. (Questions of10 Marks & marks for sub divisions are indicated against each)**

16. On 14 Sep 08 in DR longitude 116° 27' W the sextant meralt of Sun's UL North of the observer was 70° 29.8'. If IE was 3.2' off the arc and HE was 12m find the lat and state the direction of LOP.

17. What are Sextant Altitude Corrections? Why are they applied? Also describe the corrections and the sequence in which they are to be applied.

18. a. State Kepler's laws of planetary motion. (4 Marks)

b. Describe the Celestial Sphere and Equinoctial system of coordinates with the help of a neatly labelled sketch. (6 marks)

19. a. What is Phase of the Moon? Illustrate various phases of the Moon. (6 marks)

b. Derive the relationship between LMT, GMT & longitude when observer is East. (4marks)

20 What is the significance of IDL ? Describe timekeeping at sea. (10 marks)

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