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**Indian Maritime University**

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

**End Semester Examinations – December 2022**

**Programme Name: BSc (NS)**

**Semester: 3**

**Subject Code: UG21T5301**

**Subject Name: Celestial Navigation I**

Date: 12.12.2022

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. In a Rational Horizon diagram, which of the following does Prime Vertical **NOT** pass through?  
a. East                      b. North                      c. Zenith                      d. West
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 an INFERIOR planet?  
a. Mercury                      b. Mars                      c. Jupiter                      d. Saturn
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. Which of the following Sextant Altitude correction is applicable to the Star's altitude?  
a. Refraction                      b. Parallax                      c. Semi-Diameter                      d. None of the above.
6. Due to the effect of Terrestrial Refraction, distance of Visible Horizon is **LESS** than Geographical Horizon. True / False.
7. For an Observer in Southern Hemisphere, **Depressed Pole** is North Pole. True / False.
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 Moons 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. State Kepler's 2<sup>nd</sup> Law of Planetary Motion. Draw a neat sketch supporting it.
12. Calculate the True Zenith Dist for Mars on 18<sup>th</sup> Jan 2008 if App Alt of Mars is 20 Deg 40 Min.
13. What is Rational Horizon?
14. What is the Elevated Pole? Describe with the help of a neat sketch for Northern Hemisphere.
15. Find LHA of Star Rigel on 16<sup>th</sup> Jan 2008 at 12H 45M 32S UTC for an observer in Long 20 Deg E.

### Section C

#### Answer all the questions. (10 Marks Each)

16. Describe the Celestial Sphere and Equinoctial system of coordinates with the help of a neatly labelled sketch. (10 Marks)
17. a. Describe the earths elliptical orbit and state approximate aphelion and perihelion distance and date. (5 Marks)  
 b. Describe the significance of tropic of Cancer and Capricorn. (5 Marks)
18. a. List conditions necessary for occurrence of Solar Eclipse. Draw a sketch to show Solar Eclipse. (5 Marks)  
 b. Determine Geographical Position of Moon on 09<sup>th</sup> Oct 2008 / 19H 40M 24S GMT. (5 Marks)
19. (a) Define Dip & Refraction and explain in brief their causes on Sextant Altitude Corrections. (5 marks)
- (b) For an observer in DR 45°30'N, 148° 45'W LMT of a celestial observation was 20 42 54 on 15 Jun 08. What is the GMT of observation? (5 marks)
20. On 12th Sept 2008, DR 67 Deg 00 Min N, 045 Deg 15 Min W, the sextant Meridian altitude of the Sun's UL was 27 Deg 18.6 Min. If IE was 2.2 Min ON the

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arc and Height of Eye was 28m, find out the Observed latitude and the direction of LOP. (10 marks)

