Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2023

Programme Name: BSc (NS)

Semester: 3

Subject Code: UG21T5301

Subject Name: Celestial Navigation I

Date: 04.12.2023 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 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 True Altitude.

12. State Kepler's 1st 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 GMT (Greenwich 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 earths elliptical orbit and state approximate aphelion and perihelion distance and date. (5 Marks)

    b) Determine Geographical Position of Moon on 09th Oct 2008 / 19H 40M 24S GMT. (5 Marks)

18. Explain in details about the Seasons, Solstice and Equinoxes.

19. a) State the optical principle of the Sextant and show that Sextant measures double the angle though which the Index Bar is moved? (5 Marks)

    b) Describe the navigational triangle PZX & its components. (5 marks)

20. On 16 June 2008 in DR position 720 30' N 0380 45' E, the sextant altitude of the lower limb of the sun during meridian passage was 400 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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