Indian Maritime University

(A Central University,
Govt of India)

B.SC (Nautical Science)
Celestial Navigation Paper II
UG21T4401

Time: 3 Hours Max Marks: 70
Date:02.06.2022 Pass Marks: 35

Notes:

1. Use of non-programmable scientific calculator, Nautical Almanac 2008 and Norie's Nautical Table are allowed.
2. Candidates must show the complete working (including rough work) and not answers alone.
3. Use diagram/sketches/figures for explanations where appropriate.

SECTION A

Answer all questions from section A

1. 1 mark each ... Total 10 marks

(a) Apparent Stellar Magnitude is the brightness of Celestial Body as seen from :
(i) Moon (ii) Sun (iii) Earth (iv) Venus

(b) What is the name of the brightest Star:
(i) Venus (ii) Sirius (iii) Polaris (iv) Sun

(c) Which is nearest planet to Earth:
(i) Jupiter (ii) Mercury (iii) Saturn (iv) Venus

(d) Our Solar system belongs to:
(i) Milky Way Galaxy (ii) Sun Galaxy (iii) Earth Galaxy
(iv)Galatica

(e) What is Apparent Magnitude of Full Moon?
(i) 20.0(Negative) (ii) 12.5(Negative) (iii) 26.5(Negative)
(iv) 10.5(Negative)

(f) What is Apparent Magnitude of Sun?
(i) 26.7(Positive) (ii) 12.5(Negative) (iii) 26.7(Negative)
(iv) 10.5(Negative)

(g) At Perihelion, Earth is …… to the Sun in its orbit.
(i) Farthest (ii) Closest (iii) Halfway (iv) Quarter

(h) What is the maximum Southerly Declination of Sun?
(i) $23^{\circ}26.7'S$ (ii) $23^{\circ}21'S$ (iii) $26^{\circ}23.7'S$ (iv) $21^{\circ}26.7'S$

(i) SHA is the ….. hour angle measured from First Point of Aries to the celestial meridian passing through the celestial body.

(i) Northerly (ii) Easterly (iii) Westerly (iv) Southerly

(j) Azimuth is the angle at the …..

(i) Elevated Pole (ii) Depressed Pole (iii) Equator (iv) Zenith

2. (a) Explain relationship between LHA and Local Apparent Time.

5 marks

(b) Explain Geographical Position. 5 marks

SECTION B

ANSWER ANY 5 QUESTIONS

3. In DR 32° 14'N 178° 18' W, on 5th March 2008, the Sun rose bearing 099°C. Find the deviation on the ship's compass if the variation was 2°E, find the deviation of the compass.

10 marks

4. In DR 23° 22'S 47° 17' W, on 13th Sept 2008, at GMT 13d 10h 01m 20s, the compass azimuth was 048 ° C Find the true azimuth of Sun. Var 2°W. Find the deviation of the compass.

10 marks

5. In 2008, at GMT Sept 23d 05h 21m 08s, in DR Long 160° 12' W, the sextant altitude of Pole star was 36° 17.6'. If the HE was 10.0 m and IE was 2.8' ON the arc, find the Latitude and the position line.
The Compass Azimuth was 003° C and Variation was 2.3° E. Find the deviation.

10 marks

6. In 2008, at GMT Nov 29d 09h 06m 01s, in DR 26° 27' N 130°27' W, the sextant altitude Suns UL was 28° 10', east of the merdian. If the HE was 10 m and IE was 2.3' OFF the arc. find the intercept and the LOP.

10 marks

7. In 2008, at GMT March 04d 22h 55m 40s, in DR 38° 11' S 151° 10' E, the sextant altitude Suns LL was 35° 59.1', east of the merdian. If the HE was 30 m and IE was 1.3' OFF the arc. Using Long by Chron method, find the direction of LOP and the longitude where it cuts the DR latitude. 10 marks

8 a. State conditions necessary with a diagram for Solar Eclipse to occur. 5 Marks

8.b. Explain all 3 Kepler's laws of Planetary motion. 5 Marks

9.a. Define Circumpolar bodies. Explain conditions necessary for a celestial body to be circumpolar. 5 Marks

9.b. A star when on the meridian above the pole, bore North with a true altitude of 72° 04' and when on the meridian below the pole bore North again with a true altitude of 24° 05'. Find observer's latitude and star's declination. 5 Marks