

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
End Semester Examination Dec 2019/Jan 2020
B.Sc (Nautical Science)
Semester -III
UG21T4301- Celestial Navigation Paper-I

Date: 09.12.2019

Max Marks: 70

Time: 3 Hours

Pass Marks: 35

Note: Question No. 1 is compulsory.

Answer any 6 questions from remaining 8 questions (each of 10 marks).

Use of Nautical Almanac & non-programmable Scientific Calculator is permitted if required.

- Q1. Define the following: (5 x 2 = 10 marks)
- (a) Geographical position of a heavenly body
 - (b) Ellipse
 - (c) Sidereal Hour Angle (SHA)
 - (d) Declination
 - (e) Greenwich Hour Angle
- Q2. (a) Explain with diagram the obliquity of the ecliptic. (5 Marks)
(b) What do you mean by equinoctial system of units? Write the position of Spica at 1000 GMT on 22 Sep 08 in terms of equinoctial system of units. (5 marks)
- Q3. Explain with diagram various types of solar eclipses. (10 marks)
- Q4. Describe with diagram the various phases of the moon. (10 marks)
- Q5. (a) Find the Geographical position of the Sun on 01 Mar 08 at GMT 08h42m14s. (5 marks)
(b) Convert LMT 03h04m05s to ZT in position $33^{\circ}15' S$ $066^{\circ} 05' W$. (5 marks)
- Q6. Find the True Zenith distance of the moon, if the sextant altitude of the moon's upper limb was $32^{\circ} 18'$ on 14 Sep 2008 at GMT 073314. Index error = $-2.0'$. H.E. = 11.5 meters. (10 marks)
- Q7. (a) Define "Sensible horizon", "Visible horizon" & "Dip". (2+2+1=5 Marks)
(b) Find the True Altitude of the Sun, if the sextant altitude of the Sun's upper limb was $30^{\circ} 05'$ on 12 Sep 2008. Index error = $+2.5'$. H.E. = 18 meters. (5 marks)
- Q8. On 30 Nov 08, in DR position $09^{\circ} 50' S$ $032^{\circ} 45' W$ the sextant altitude of Sun's lower Limb on the meridian was $77^{\circ} 48'$. HE = 12 m and IE = $+ 2.0'$ off the arc. Find the latitude and the direction of the Position line. (10 Marks)
- Q9. Draw the Plane of the meridian and indicate observer's Zenith, Nadir, rational horizon, equinoctial, elevated pole, depressed pole, altitude of heavenly body, Azimuth of heavenly body. (10 marks)