**INDIAN MARITIME UNIVERSITY**
(A Central University, Government of India)
**END SEMESTER EXAMINATION Dec 2019**
**B.Sc (Nautical Science)**
**Semester: V**
**Celestial Navigation Paper-II (UG21T3503)**

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Date: 13-12-2019 Maximum Marks: **70**
Time: **3 hrs** Pass Marks: **35**

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Note-Question no-1 is compulsory.
Answer any six out of the remaining eight questions.
Use of Norries Nautical Table, Nautical Almanac and Non-Programmable Scientific Calculator is permitted. Graph sheet may be provided by the Examination Centre.

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Q.1 Define the following terms **(5 x2 =10 marks)**

(a) Mean Sun
(b) Sidereal Day
(c) Theoretical Sunrise
(d) Steller Magnitude
(e) Twilight

Q2. (a) Using Nautical Almanac 2008, find out the following details with respect to star Bellatrix Approximate SHA (round off to nearest degree); Approximate Declination (round off to nearest degree); Allotted Number; Stellar Magnitude; Constellation of star. **(5 marks)**

(b) Compare Relative Brightness of star A (Antares 0.2) Star B (Sirius -1.6). **(5 marks)**

Q3. Explain with suitable diagram the system of zone time in respect of advancing & retarding Clocks including advancing & retarding of day, for time keeping at sea on board ship. **(10 marks)**

Q4. (a) State the difference between Amplitude & Azimuth with suitable diagram. **(5 marks)**

(b) Derive the formula Sin( Amplitude )= Sin ( Declination )x Sec ( Latitude) **(5 marks)**

Q5. On March 05, 2008 on ship DR position $32^0$ 12'N $178^0$ 16'E the sun rose bearing $100^0$ (C). If the variation was $3^0$ E, find the deviation of the compass. **(10 marks)**

Q6. On 30th Apr 2008, GMT 17H 30M 30S in DR Long $150^0$E, the observed altitude of Polaris Was $50^0$ 46.8' bearing $005^0$ (C) and HE 14m, variation $1^0$E. Find the deviation of compass, he direction of the LOP & a position through which to draw it. **(10 marks)**

Q.7. On 22nd Sept 2008 PM at ship in DR $48^0$ 20' N $085^0$ 40' E the sextant altitude of the Sun UL Was $20^0$ 14.8' when GMT showed 22nd 10H 09M 38S. If IE was 2.2' ON the arc & HE was 25M, find the direction of position line & a position through which it passes BY Intercept method.

**(10 marks)**

Q8. At 0600 in DR $010^0$ 20'N $179^0$ 52'W a stellar observation gave an observation gave an observed Longitude $179^0$ 54'E bearing $062^0$ (T).Vessel then steamed $131^0$ (T) at 14 kts. At 1600 hrs using Latitude $00^0$ 11.8'S Sun gave an observed Longitude $178^0$ 12.7'W bearing $323^0$ (T). Find the position of the vessel at 1600 hrs. **(10 marks)**

Q.9. (a) Explain circumpolar bodies. State the condition for celestial body to be circumpolar. **(5 marks)**

(b) A Star when on the meridian above the pole, bore North with a true altitude of $70^0$ 04', And when on meridian below the pole, bore North with true altitude $22^0$ 05'. Find the observer's latitude and the star's declination. **(5 marks)**

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