

INDIAN MARITIME UNIVERSITY

Time Bound Assignment September/October 2020

B Sc (Nautical Science) Arrear Examinations

Celestial Navigation Paper- II

UG21T3503

Date: 25/09/2020

Maximum Marks: 70

Time: 3 Hrs

Pass Marks: 35

Note: Question No. 1 is compulsory.

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

Scientific Calculator is permitted if required.

- Q.1 Define the following **(2 x 5 = 10 marks)**
- (a) Stellar Constellation (b) Local Apparent Time
(c) Amplitude (d) Geographical Position
(e) Nautical Twilight
- Q2. (a) Using Nautical Almanac 2008, find out the following details with respect to star **Procyon** for the month of July: SHA; Declination; Allotted Navigation Star Number; Stellar Magnitude; Constellation of *Procyon*. **(5 marks)**
- (b) Compare the magnitude of stars *Markab* & *Vega*. Which of them is brighter and by how many times? **(5 marks)**
- Q3. (a) Is Actual Sun an accurate timekeeper? Explain, with help of a drawing, the concept of Mean Sun and how does Mean Sun help us keep accurate time? **(5 marks)**
- (b) Your vessel sails from Port of Mumbai on 18th Jun / 1500 LT (IST = UTC + 05H 30M) for Singapore. If the sailing time of the voyage is expected to be 6 D 05H 30M, and Singapore Time Zone is UTC + 08H 00 M, find Estimated Time of arrival of your ship in LT at Singapore. How many hours you would advance / retard prior arrival Singapore? **(5 marks)**
- Q4. (a) Explain Theoretical and Visible Sunrise & Sunset **(5 marks)**
- (b) On 30th Nov 2008, Calculate GMT of Sunrise at DR 15° 00'N 100° 00'E **(5 marks)**
- Q5. On 04th May 2008, in DR 32° 30' N 012° 45' W, the setting Sun bore 285° (C). If Var = 9° E, find the deviation of the compass at that heading. **(10 marks)**

- Q6. On 25th Feb 2008 at GMT 18h 26m 45s, in DR Long 030°E, the observed altitude of Polaris was 30° 28.9' bearing 003°(C). HE = 20m, Var = 6°W. Find the compass Dev, the direction of the LOP and a position through which to draw it. **(10 marks)**
- Q.7. On 22nd Sept 2008, GMT 11H 18M 30 S at ship in DR 45° 40'N 067° 45'E, the sextant altitude of the sun's UL was 22° 03.5' (West of Meridian). If IE was 3.5' ON the arc & HE was 28 m, find the direction of the LOP and the longitude where it cuts the DR latitude. **(10 marks)**
- Q.8. On 19th Jan 2008, at GMT 03h 48m 00s at ship in DR 20°22' N 106° 20'E, the sextant altitude of the sun's LL was 44° 49.5'. If IE was 2.5' OFF the arc & HE was 22 m, find the intercept & the direction of the LOP. **(10 marks)**
- Q.9. (a) Explain Circumpolar Body. State the condition for a Celestial Body to be circumpolar for a given observer. **(4 marks)**
- (b) The true altitude of a star at upper meridian passage and lower meridian passage were 72° 54' and 09° 50' respectively, to an observer in the Southern hemisphere. At both transits, the star bore South. Find latitude of the observer and the declination of the star. **(6 marks)**
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