INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
December 2017 End Semester Examinations
B.Sc. (Nautical Science) - Third Year
Navigation Paper – III (T 1301)

Date: 27 .12.2017 **Maximum Marks: 75**
Time: 3 Hrs **Pass Marks: 52**

Note: Use of non-programmable Scientific Calculator is permitted.

Part-A Principles of Navigation (Marks: 30)

Attempt any THREE questions from this section.
All questions carry equal Marks.

1. Define the following terms (sketch where necessary):
   (a) Twilight
   (b) SHA
   (c) Penumbra
   (d) Elongation
   (e) Superior Conjunction

2. What are the types of Lunar eclipses? What are the conditions necessary for a lunar eclipse to occur? Why is that a lunar eclipse may not take place on every full moon day?

3. What are circumpolar bodies? What are the conditions necessary for a body to be circumpolar?

4. With the help of a diagram describe the various phases of the Moon.

Part –B **Marks: 45**

PRACTICAL NAVIGATION

· Attempt **FIVE** questions from this Section.
· All Questions carry equal Marks.

5. Find the distance along a great circle, the initial course and the final course from 32°12'N 018°15'E to 05°40'N 034°20'W.

6. On 12th Sept 1992, DR 43°05'S 072°29'E, the sextant meridian altitude of the star ADEBARAN was 30°40.2', If IE was nil and HE was 18m, find the latitude and PL.

7. On 23rd Sept 1992, a ship in Dr long 160°12'W, found the sextant altitude of Polaris to be 36°18.6'at GMT 23d 05h 21m 08s. If TE was 2.8' ON the arc and HE was 10m, Find the direction of the PL and the latitude where it cuts the DR longitude.

8. On 30th April 1992, 0900 hrs Ship's time, in DR position Lat 00°20'N 060°12'W and observed longitude 060°14'W with PL running 159°(T) - 339°(T), the vessel sailed on a course of 020°(T) at a speed of 15 knots till noon, when the sextant meridian altitude of the Sun's UL was obtained as 76°18.6'. If IE was 3.1' off the arc and HE was 20 m, find the noon position of the ship by plotting.

9. On 30th April 1992, in DR 00°20'N 060°12'W, the sextant altitude of the Sun's UL East of the meridian was 44°13.4' when GPS gave GMT as 30d 13h 00m 52s. If IE was 3.1' OFF the arc and HE was 20m, find the intercept and the direction of the PL.

10. On 25th Feb 1992, a ship in DR 20°04'S 090°04'W, the sextant altitude of the Moon's UL was 52°26.8' at GMT 25d 14h 52m 16s`. If HE was 19m and IE was 0.6'OFF the arc, calculate the direction of the PL and a position through which it passes.

11. On 16th Jan 1992, a ship in DR 31°41'N 100°10'E, the sextant altitude of VENUS was 19°48.6'when GMT was 16d 23h 39m 38s. If IE was 2.1' ON the arc and HE was 12m, Find the direction of the PL and a position through which to draw it using long by chronometer method.

12. On 23rd Sept 1992, in EP 48°20'S 158°46'E, the sextant altitude of the Sun's LL near the meridian was 41°36.7'at GMT 23d 01h 00m 12s. If IE aws 3.4' ON the arc and HE was 17m, find the direction of the PL and the latitude where it cuts the DR longitude.

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