

# **Indian Maritime University**

(A Central University, Govt of India)

May-June 2018 End Semester Examinations

**B Sc (Nautical Science) – Third Year**

**(AY 2009 to 2012-13 batches only)**

**Navigation – III (UG21T1301)**

---

Date: 30.06.2018

Time: 3 Hrs

Max. Marks : 75

Pass Marks : 38

---

**Note: Use of Non -Programmable Scientific Calculator is permitted.  
Use 1992 Almanac only.**

---

## **SECTION - 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) :- (2X5=10)
  - (i) Greenwich Hour Angle
  - (ii) Circumpolar Body
  - (iii) Elongation
  - (iv) Civil Twilight
  - (v) Superior Conjunction
2. (a) List down necessary conditions for solar Eclipse to occur. Explain why it does not occur every month. (5)  
(b) Explain Bode's Law with respect to the distances of planets from the sun. (5)
3. Explain the Phenomenon of Tides. How are they caused? Write down differences between Spring and Neap Tides. (10)
4. What is the process "Precession of the equinoxes" and explain its effects? (10)

**SECTION - B****PRACTICAL NAVIGATION****(Marks 45)**

- **Attempt any FIVE questions from this section.**
- **All questions carry equal marks.**

5. On 19th Jan 1992 PM at ship in DR position  $40^{\circ}20'S$ ,  $175^{\circ}40'E$ , the sextant altitude of the Sun's LL was  $43^{\circ}10.2'$  at 03h 49m 10s chronometer time (error 01m 10s fast). If I.E. was 1.8' OFF the arc and H.E. was 15m, find the direction of the PL and the longitude, where it cuts DR Latitude. (9)
6. Find the distance along a great circle and the initial course from latitude  $32^{\circ}12'N$ , longitude  $018^{\circ}15'E$  to latitude  $05^{\circ}40'N$ , longitude  $34^{\circ}20'W$ . (9)
7. On 30th April 1992, in DR  $22^{\circ}38'N$   $076^{\circ}42'E$ , compute the sextant meridian altitude of the Sun's LL, if I.E. was 1.6' ON the arc and H.E. was 22m. (9)
8. On 14th Sept 1992, in DR longitude  $116^{\circ}27'W$ , the sextant meridian altitude of the Sun's UL North of the observer was  $70^{\circ}29.8'$ . If IE as 3.2' OFF the arc and HE was 12m, find the latitude and state the direction of the PL. (9)
9. An observer in the northern Hemisphere observes the true altitude of a celestial body to be  $20^{\circ}$ , when it was on the observer's prime vertical. If the amplitude of the body is  $36^{\circ}19.6'$ , find the Latitude of the observer and declination of the body. (9)
10. On 19th Jan 1992, at GMT 07h 33m 44s, at Ship in DR  $00^{\circ}02'N$   $170^{\circ}50'E$ , the sextant altitude of the star BETELGEUSE was  $43^{\circ}11.1'$ . If HE was 18m and HE was 18m and IE was 1.3' off the arc, find the direction of the PL and a position through which it passes. (9)
11. On 29th Nov 1992 in DR  $26^{\circ}27'N$   $130^{\circ}27'W$  at GMT 17h 47m 49s, the sextant altitude of the SUN's UL, East of the meridian was  $28^{\circ}11.0'$ . If HE was 10m and IE was 2.3' off the arc, Calculate the PL and a position through which it passes. Use Long by chronometer method. (9)
12. If a vessel in DR  $22^{\circ}16'N$   $36^{\circ}24'E$  obtained the observations of three stars A, B, and C as follows, find its position: (9)

Star	Azimuth	Intercept
A	$334^{\circ}(T)$	3.2 M Towards
B	$032^{\circ}(T)$	5.6 M Towards
C	$102^{\circ}(T)$	8.9 M Towards

-----