Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2025
Programme Name: B Sc Nautical Science
Semester: III
Subject Code: UG21T6302
Subject Name: Bridge Electronic Equipment and Watch Keeping

Date: 08.12.2025 Max Marks: 70

Duration: 03 Hrs Pass Marks: 35

General Instructions

(i) All Sections (A, B & C) are to be attempted
(ii) Options, if any, are specified in respective section
(iii) Radar Plotting sheets to be provided and used
(iv) Non programmable scientific calculator permitted.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. What is the primary purpose of a Bridge Navigational Watch & Alarm System (BNWAS)?
   a. To record voyage data like a "black box".
   b. To automatically track and monitor vessel movements.
   c. To notify other officers if the Officer on Watch (OOW) is unresponsive.
   d. To provide long-range identification and tracking of ships.

2. According to the sources, what is the minimum voice recording period for a Voyage Data Recorder (VDR) that was installed after July 2014?
   a. 12 hours.
   b. 24 hours.
   c. 48 hours.
   d. 72 hours.

3. Which component in a marine radar system is responsible for generating the short, powerful pulses of radio waves?
   a. Magnetron.
   b. Modulator.
   c. Video Amplifier.
   d. Mixer.

4. The Global Positioning System (GPS) comprises three main segments. Which of the following is NOT one of those segments?

a. The space segment.
b. The atmospheric segment.
c. The control segment.
d. The user segment.

5. As per the principles of keeping a Navigational watch, how often should the automatic pilot be tested manually?
   a. Once per day.
   b. Within 12 hours before departure.
   c. Before entering hazardous conditions.
   d. At least once a watch.

6. A free gyroscope has two fundamental properties. What are they?
   a. Drift and Tilt.
   b. Gyroscopic Inertia and Gyroscopic Precession.
   c. Latitude Error and Rolling Error.
   d. Top Heavy and Bottom Heavy Control.

7. Which radar control adjusts the amplification of the incoming signal in the receiver to make weak echoes stronger?
   a. Brilliance.
   b. Gain.
   c. Tuning.
   d. Sea Clutter Control.

8. When using an ARPA display, which type of vector allows users to quickly determine the aspect of a target and provides better situational awareness of the overall traffic situation?
   a. Relative vector.
   b. Dynamic vector.
   c. Time vector.
   d. True vector.

9. What is the term for the angle between your vessel and a target vessel, which helps determine which of its sidelights you can see?
   a. Bearing.
   b. Aspect.
   c. Relative Course.
   d. Closest Point of Approach (CPA).

10. How often does the Automatic Identification System (AIS) typically transmit a vessel's Static Information?
    a. Every 6 minutes and on request.
    b. It depends on the vessel's speed and course alteration.
    c. At least four times a day.
    d. Every 30 seconds.

Section B

Answer all Five Questions (5 x 2marks = 10 marks)

11. Define range and bearing discrimination of a Radar.

12. What is drift and tilt of the gyroscope?

13. Define DOP and its types.

14. What are at least two limitations of the AIS?

15. Mention the major actions that need to be undertaken by OOW in case of Restricted visibility?

Section C

Answer all five Questions (5 x 10 marks = 50 marks)

16. Own ship is a small coaster of small draft on a course of 217^0(T) at a speed of 12 knots. (10)

Target Data

Time	Bearing	Range
0020	170^0T	12.0NM
0032	170^0T	9.4NM

Report the target to the OOW with - CPA, TCPA, Course and speed of the target and aspect at 0032 Hrs. (10)

17. a) Explain briefly a free gyroscope? Discuss the properties of a gyroscope? (5)

b) Discuss the Alarms relating to ECDIS. (5)

18 Describe the working of GPS receiver with its block diagram. Discuss about the frequency bands and codes of GPS. Discuss the various errors associated with GPS. (10)

19 a) Differentiate AIS and LRIT. (5)

b) Describe the working of BNWAS and the sequence of alarms in the BNWAS. (5)

20. a) What are the circumstances when the Officer of a navigational watch will call the Master to the bridge? (5)

b) Discuss the points to be checked by OOW while handing over and taking over a navigational watch. (5)

****