



**DIRECTORATE OF MERCHANT SHIPPING  
GOVERNMENT OF SRI LANKA**

**CERTIFICATE OF COMPETENCY EXAMINATION**

GRADE : OFFICER IN CHARGE OF A NAVIGATIONAL WATCH ON SHIPS OF  
500 GT OR MORE (UNLIMITED)

SUBJECT : BRIDGE EQUIPMENT

DATE : 12.Dec.2023

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Time allowed THREE hours

Total marks : 120

Answer all SIX (6) questions

Pass marks : 50%

Formulae and all intermediate steps taken in reaching your answer should be clearly shown. You may draw sketches wherever required.

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**Instructions to candidate**

- Answer all questions
  - Time : 1300hrs to 1600hrs (03hours)
  - Total marks : 120
  - Pass Mark : 50%
  - Electronic devices capable of storing and retrieving are **not** allowed
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1. a) Explain the function of Bridge Navigation Watch Alarm system (BNWAS) Fitted on Bridge. (10 marks)
- b) With respect to a Sextant explain
  - i. What is meant by Interaction between screws?
  - ii. Why it is preferred to find the value of "Index Error" using the Sun?(05 marks each)
2. With reference to Navtex;
  - i. explain how it operates and the purpose of it. (08 marks)
  - ii. Describe how the appropriate stations are selected by the operator. (04 marks)
  - iii. list the types of messages available, highlighting the ones that cannot be blocked by the operator and giving the reasons for it. (08 marks)
3. a) Describe the following segments in the GPS system
  - (i) Space segment (ii) Control Segment (06 Marks)
- b) Explain the function of the DGPS (08 Marks)
- c) Briefly describes the Enhance Loran system (06 Marks)

4. With regard to Autopilot system;
- a) Explain the effectiveness of the following controls on the Autopilot system;
    - i. weather
    - ii. off course alarm(03 marks each)
  - b) what is meant by Non Follow Up steering mode? (05 marks)
  - c) Explain the sequins of steps to be followed when switching over from manual steering to autopilot. (09 marks)
5. a) Define the terms,
- (i) Variation (ii) Deviation (iii) Angle of Dip (06 Marks)
  - b) Discuss the advantages and disadvantages of Wet card compass (05 Marks)
  - c) Explain the following properties of free gyroscope
    - (i) Gyroscope Inertia (Rigidity in the space)
    - (ii) Precession
    - (iii) Three degree of Freedom(03Marks each)
6. With regard to the Echo Sounder used for depth measurement,
- a) Discuss the advantages and disadvantages of Single and Dual Transducers. (08 marks)
  - b) Briefly explain the followings;
    - i. The purpose of having Transmission Mark / Zero mark.
    - ii. Separation Error.
    - iii. Aeration. (04 marks each)