

Indian Maritime University
(A Central University, Govt. of India)
End Semester Examinations – June 2023
Programme Name: B Tech (NAOE)
Semester: VI
Subject Code: UG12T2603
Subject Name: Ship Design

Date: 06.06.2023	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.

Section A

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

1. Compound amount factor is always
 - a. >1
 - b. <1
 - c. $=1$
 - d. None of the above
2. Depreciation allowances is a
 - a. Book Value
 - b. Profit
 - c. Money available for investment
 - d. None of the above
3. Increasing midship area coefficient value while keeping constant block coefficient will have _____ of the following effect
 - a. Decreased separation resistance
 - b. Decreased wave resistance
 - c. Both A & B
 - d. None of the above
4. Regulation 12 A gives the guidelines for allocation of _____ tanks
 - a. Fuel oil Tank
 - b. Ballast Tank
 - c. Foam Tank
 - d. Fresh Water Tank

5. The weight of liquids in pipes of the ship will be considered as
 - a. A part of light ship weight
 - b. A part of deadweight
 - c. It can be considered in light ship weight or deadweight
 - d. None of the above

6. The trim value allow when calculating segregated ballast tank capacity.
 - a. Trim by stern less than 0.015L
 - b. Trim by ford less than 0.015L
 - c. Trim by stern less than 0.02L
 - d. Trim by Ford less than 0.02L

7. Which one of the following is not a basic principles of IMO goal-based standards/regulations:
 - a. Broad, over-arching safety, environmental and/or security standards that ships are required to meet during their lifecycle.
 - b. The required level to be achieved by the requirements applied by class societies and other recognized organizations, Administrations and IMO.
 - c. Clear, demonstrable, verifiable, long standing, implementable and achievable, irrespective of ship design and technology.
 - d. Specific enough in order lead to a one correct interpretations.

8. While determining the engine room height, which of the following considerations to be taken.
 - a. Distance between centerline of crankshaft and crane hook
 - b. Space for arranging pipes and pumps
 - c. Length of the main engine
 - d. Distance for installing diesel generator

9. What are general values of double bottom height and wing tank with of a suezmax tanker
 - a. 2.46 m , 2.46 m
 - b. 2.46 m , 2.55 m
 - c. 2.80 m , 2.55 m
 - d. 2.80 m , 2.46 m

10. Required EEDI means:
 - a. The actual EEDI of a ship as calculated according to IMO Guidelines.
 - b. The reference EEDI value for a specific ship.
 - c. The regulatory limit for EEDI of a vessel as calculated from the Reference Line and Reduction Factor
 - d. None of the above

Section B

Five Questions of 02 Marks each

11. Explain different terms in the class notation GL 100 A5

12. Indicate some of the ship performance characteristics and their dependence on ship parameters?
13. What are the different methods of estimating the light ship weight of the vessel?
14. Explain cargo handling capacity and hold capacity.
15. List any eight IMO conventions.

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16.
 - a. Explain the shipbuilding marketing concept using a flow chart? (Consider the following aspects Identify customer needs, Product development)
(5 marks)
 - b. Discuss about optimal ship size for a given speed and indicate some Major factors which will effect on ship size?
(5 marks)
17. A standard design of RO-RO vessel is offered with an option of a slewing stern ramp or a straight axial ramp. When slewed over the quarter, the slewing stern ramp allows a normal alongside berth to be used for RO-RO operation. The slewing ramp costs US \$ 200,000 more and is estimated to cost US \$ 2000 extra per year in maintenance and repair costs. The cargo capacity remains the same in both the cases.
 - a. If the daily time charter hire is US \$ 7000 per day over 350 days a year on hire, what increase in daily hire is needed to justify the slewing ramp, assuming a required rate of return of 15% over 20 years?
(4 marks)
 - b. Analysis of the operation of a sister vessel with an axial ramp shows that over a typical year, 110 ports calls are made. On 75 of these, the ship has been berthed without delay, but on 35, the ship has been delayed on average 6 hours waiting for suitable berth. On such occasions a slewing ramp would have permitted the use of a vacant alongside berth for RO-RO operation. In such a case would the RO-RO vessel with a slewing stern ramp be profitable? What is the minimum number of times such a berth needs to be used to justify the slewing ramp?
(6 marks)
18. List of the four main ship categories that may be characterized by common design procedures. Explain in detail.

- 19.
- a. Explain the design considerations for forward section shape below water line and forward section flare above water?
(7 marks)
 - b. How is the forward collision bulkhead fixed on a vessel?
(3 marks)
- 20.
- a. List out all Liquid Non-Cargo Spaces on a vessel?
(3 marks)
 - b. Explain the process of development of lines plan of an ocean going general cargo ship using BSRA method. List and explain the major alterations on the BSRA hull form that you would suggest before finalizing the hull form of the vessel.
(7 marks)
21. Draw the typical general arrangement plan on a geared bulk carrier. Label and list out all the different spaces to be allocated on the vessel in a GA.
- 22.
- a. What are the different stages of Building Cost Estimation.
(5 marks)
 - b. Explain Energy Efficiency Design Index? Give the detail formula for EEDI?
(5 marks)