

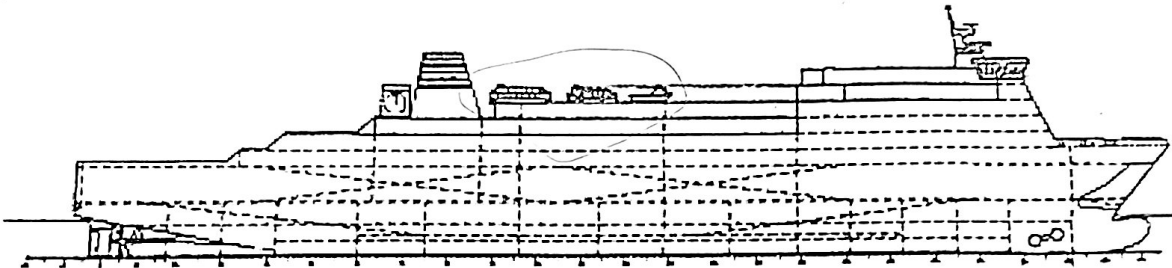
Answers in English. Remember the correct terminology, clear hand-writing and short answers.

1. Ship Categorization Principles, Main Dimensions and Definitions

- ✓ A. Sketch and explain the ships linear main dimensions? 2p
- B. What does it mean when ship is designed for unlimited operational area in terms of ship technology – give a holistic view? 2p
- C. Describe the factors associated with the use of statistics in the definition of ship main dimensions? 2p

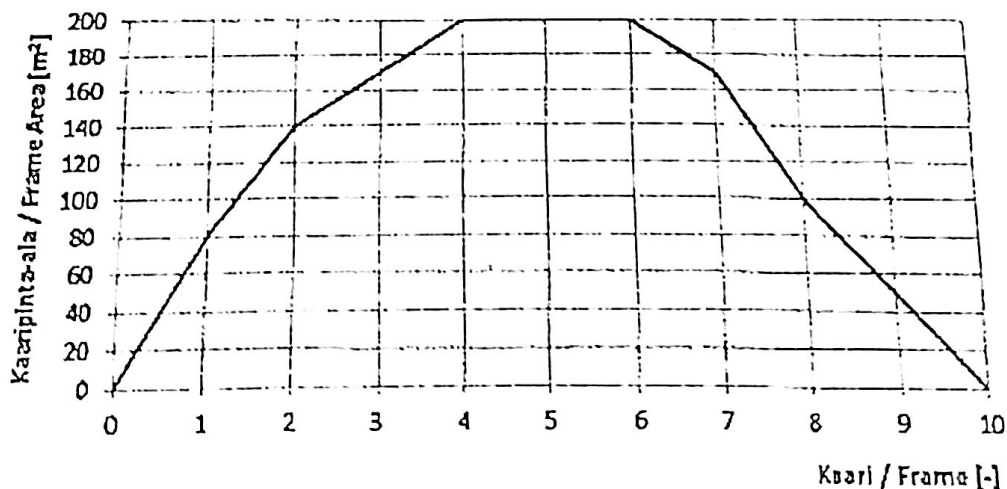
2. Ship Performance, Lines Drawing and General Arrangement

- A. What are the different scale effects that are present in ship design and where do they originate from? 2p
- B. The hull shape is traditionally described with a lines drawing. List and sketch the various items in a lines drawing and explain, what is the influence of the hydrodynamic factors on the optimal volume distribution of the hull. 2p
- ? C. Identify and justify 3 strengths and 3 weaknesses in the general arrangement of the ship below. 2p



3. Numerical Integration in Ship Design

- A. Calculate the displacement from the area curve given below using Simpson I rule. $L=150\text{m}$. 2p
- ? B. Calculate the longitudinal centre of buoyancy. 2p
- ? C. Derive Simpson I-rule for case where we have also intermediate frames at bow and aft 0.5, 1.5, 8.5 and 9.5. 2p

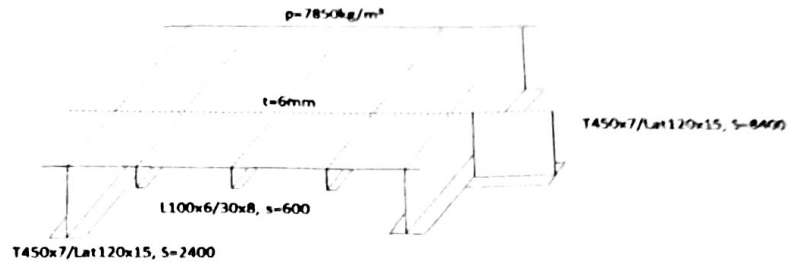


4. Hull Structure and Weight Calculations

A. Describe the load carrying mechanism of a ship. 2p

B. Describe different phases of weight calculations, the aim of these, the accuracy and amount of work. 2p

C. Calculate the weight of aluminum deck with area 10000m² manufactured from panel presented below. 2p



5. Ship Machinery and Equipment

A. List 3 of the most potential energy sources for your ship. Discuss them from viewpoint of SWOT-analysis (strength, weakness, opportunity and threat). 2p

B. Explain the difference between water and weather tight doors. 2p

C. Describe the influence of the ship type and operational area and route on the ship machinery selection. 2p

Equations:

$$N = \frac{d\Delta}{dW} = \frac{\Delta}{\Delta - W_{H+O} - \frac{2}{3}(W_M + W_F)}$$

$$\Delta = \rho g \lambda \nabla = \rho g \lambda C_B L B T$$

$$\Delta = W_{LS} + W_{DW}$$

$$A = A_1 + A_2 = \int_0^{2s} y dx = \frac{s}{3} (y_0 + 4y_1 + y_2)$$

$$A = \frac{s}{3} (y_0 + 4y_1 + 2y_2 + 4y_3 + 2y_4 + \dots + 2y_{n-2} + 4y_{n-1} + y_n)$$