**DIRECTORATE OF MERCHANT SHIPPING**

**GOVERNMENT OF SRI LANKA**

**CERTIFICATE OF COMPETENCY EXAMINATION**

GRADE : CHIEF MATE ON SHIPS OF 500 GT OR MORE (UNLIMITED)

SUBJECT : Ship Construction

DATE : 27th February 2024

Time allowed **THREE** hours Total marks : 120

**ANSWER ANY SIX QUESTIONS**  Pass marks : 50%

Formulae and all intermediate steps taken in reaching your answer should be clearly shown. You may draw sketches wherever required. Electronic devices capable of storing and retrieving are **NOT** allowed.

1. Due to pitching and pounding fore end of the vessel should be extra stiffened to withstand strong impacts.
2. Sketch the fore end construction of a ship.
3. marks)
4. With the aid of sketch above (a) state how panting and pounding regions are

 strengthened.

1. marks)
2. Sketch FOUR types of rolled steel sections commonly employed to stiffen plating

(08 marks)

1. State where in ship’s structure the rolled sections in (a) would be employed

(04 marks)

1. What are the types of framing systems used in construction of vessels and discuss the

 important features related to such framing systems.

 (08 marks)

1. In relation to a ship survey, list the main survey schemes for Safety related certificates.

(05 marks)

1. What is the requirement of dry dock survey.

(05 marks)

1. Explain what EDD program is and how you plan for IWS.

(10 marks)

1. Sketch and describe a transverse midship section of a bulk carrier constructed on a combined framing system indicating it’s salient features.

(11 marks)

1. Ship designers often say that the bulk carrier is a rational structure with minimal amount of waste. Justify the above comment with reasons.

(09 marks)

1. In relation to a watertight doors below the water line;
2. Describe the methods adopted to achieve the strength at a watertight door opening.

(05marks)

1. What maintenance and inspections are carried out on above (i) doors.

(03marks)

1. Explain the following terms;
2. Sheer strake
3. Bilge strake
4. Keel
5. Bilge keel

(03 marks each)

1. Name steel materials used in strength members such as ship structure and hull plating.

(04 marks)

1. Discuss the advantages of using such material in relation to their properties of strength.

(08 marks)

1. Indicate;
2. the main attractions of Aluminum in preference to mild in ship construction.

(04 marks)

1. the disadvantages of use of Aluminum.

(04 marks)

1. Name types of rudders.

 (03 marks)

1. What is meant by the term “Balanced Rudder”

 (03 marks)

1. What is the Lifting of Rudder and how it is compensated.

(06 marks)

1. Sketch and name a rudder pintle bearing arrangement indicating important details

 (08 marks)

1. With reference to corrosion on ship’s hull;
2. Describe two ways of preventing corrosion.

(04 marks)

1. What is cathodic protection, explain with a corrosion cell.

(04 marks)

1. Sketch and describe an impressed current system employed in a commercial vessel in order to control corrosion.

(12 marks)

1. Briefly explain the purpose of following features included in a ship’s structure. You may use suitable sketches where necessary.

a) Double bottom tank

b) Duct keel

c) Longitudinal girders and shell plating

d) Solid floors and bracket floors.

e) Collision bulk head

(04 marks each)