

**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 : 04th July 2017

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)

- a) Sketch FOUR types of rolled steel sections commonly employed to stiffen plating
(04 marks)
- b) State where in ship's structure the rolled sections in (a) would be employed
(04 marks)
- c) A Frame is a stiffener member attached to the inside of the hull of the ship. Explain the service rendered by it.
(04 marks)
- d) What are the types of framing systems used in construction of vessels and discuss the important features related to such framing systems.
(08 marks)

2)

- a) In relation to a ship survey, what is meant by the term "suspect areas of a vessel"
(05 marks)
- b) List the suspect areas that a surveyor may find on a deck of a vessel during his inspection.
(05 marks)
- c) What is substantial corrosion?
(05 marks)
- d) Explain subsequent to a survey how to deal with the areas identified as substantial corrosion.
(05 marks)

3)

- a) Sketch and describe a transverse midship section of a bulk carrier constructed on a combined framing system indicating its salient features.
(12 marks)

- b) Ship designers often say that the bulk carrier is a rational structure with minimal amount of waste. Justify the above comment with reasons. (08 marks)
- 4) With reference to dry docking of a vessel;
- a) How the vessel is planned and prepared for dry docking? (06 marks)
- b) State the pre docking information and drawings given to dry dock authority. (04 marks)
- c) Describe the Extent of survey/items to be examined and repairs carried out in dry dock taking the advantage of dry dock occupation. (10 marks)
- 5)
- a) In relation to a water tight doors below the water line;
- i. Describe the methods adopted to achieve the strength at a watertight door opening. (05marks)
- ii. What maintenance and inspections are carried out on above (i) doors. (03marks)
- b) Explain the following terms;
- i. Sheer strake
- ii. Bilge strake
- iii. Keel
- iv. Bilge keel (03 marks each)
- 6)
- a) Name steel materials used in strength members such as ship structure and hull plating. (04 marks)
- b) Discuss the advantages of using such material in relation to their properties of strength. (08 marks)
- c) Indicate;
- i. the main attractions of Aluminium in preference to mild in ship construction. (04 marks)
- ii. the disadvantages of use of Aluminium. (04 marks)

7)

- a) Explain the purpose of the transverse water tight bulkheads. (04 marks)
- b) Describe using a sketch as necessary, how a pipe line is passed through a bulk head. (04 marks)
- c) Show on a sketch, the common welding faults. (04 marks)
- d) Explain the four reasons for above (c) faults. (02 marks each)

8)

- a) Name types of rudders. (03 marks)
- b) What is meant by the term “Balanced Rudder”? (04 marks)
- c) Sketch and name a rudder pintle bearing arrangement indicating important details. (10 marks)
- d) What are the materials used in above pintle bearing arrangement? (03marks)

9)

- a) Sketch the fore end construction of a ship. (10 marks)
- b) With the aid of sketch above (a) state how panting and pounding regions are strengthened. (10 marks)