



**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 : 3rd April 2018

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) Describe EACH of the following, stating what component parts of the ships structure help to resist the effect.
 - a) Racking
 - b) Water pressure effect
 - c) Panting
 - d) Pounding
 - e) Dry docking stresses

(04 marks each)

- 2)
 - 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)

- 3) Answer the following questions with regards to container ships and their stresses:
 - a) Sketch and describe mid ship section of a container vessel.

(10 marks)
 - b) How to achieve the torsional strength of a Container carrier with large opening on deck?

(03 marks)
 - c) What are the types of stresses that are taken into account in a vessel?

(07 marks)

- 4)
- a) Name types of rudders used. (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)
- 5) With reference to large container carriers;
- a) sketch a transverse section of a modern container carrier. (14 marks)
 - b) explain how the stresses raised due to large hatch openings are compensated. (06 marks)
- 6)
- 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)
- 7)
- a) Explain the two types of stern constructions. (06 marks)
 - b) Sketch stern construction arrangement of a ship and describe. (14 marks)
- 8)
- a) In relation to 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)