



**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 : 20th February 2019

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) What are the stresses that are subjected in longitudinal direction of a vessel?
(07 marks)
- b) List the structural members of a ship which are designed to resist the main longitudinal stresses on a ship's hull.
(06 marks)
- c) State briefly how structural continuity is maintained in these members to enable them to perform their designed function.
(07 marks)
- 2) a) Sketch and describe a transverse midship cross section of a bulk carrier constructed on a combined framing system indicating its salient features.
(12 marks)
- b) Ship designers often say that a Bulk carrier is a rational structure with minimal amount of waste. Justify the above comment with reasons.
(08 marks)
- 3) With reference to dry docking of a vessel;
 - a) How the vessel is planned and prepared for dry docking;
(05 marks)
 - b) List the drawings forwarded to the dry dock authority for preparation of the dock bed and state the useful information available in above drawings to the dock master;
(05 marks)
 - c) Describe the Extent of survey/items to be examined and repairs carried out in dry dock.
(10 marks)
- 4) a) Name 05 methods used in improving the propeller efficiency of a ship.
(05 marks)

b) Describe 03 of the improvements given in (a) above.

(05 marks each)

5) a) Differentiate between water tightness and weather tightness.

(06 marks)

b) Sketch and describe the method of achieving water tightness of a hatch cover at;

- i. periphery (outer edges) and
- ii. at the cross joint.

(07 marks each)

Your answer should indicate the method of achieving correct packing compression

6) a) Sketch the forward construction of a ship.

(08 marks)

b) In relation to the collision bulkhead comment on the following;

- i. position of the collision bulkhead relative to the length of the ship;
- ii. extent of the collision bulk head;
- iii. openings through the collision bulkhead and
- iv. compartments that are forward of the collision bulkhead that may get filled in the event of a damage.

(03 marks each)

7) With respect to types of welds briefly describe the following;

a) show on a sketch the common welding faults;

(05 marks)

b) explain the reasons for above (a) faults;

(05 marks)

c) how to carry out a dye penetrant test to check the quality of a welding joint;

(05 marks)

d) what are the defects that can be identified through a dye penetrant test?

(05 marks)

8) a) Name types of rudders.

(03 marks)

b) What is meant by the term “Balanced Rudder”?

(04 marks)

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

(10 marks)

d) What are the materials used in above pintle bearing arrangement?

(03 marks)

9) a) State the purpose of fitting double bottom in ships.

(06 marks)

b) Describe with the aid of sketches, the types of floors used in construction of double bottom.

(14 marks)