



**MERCHANT SHIPPING SECRETARIAT
GOVERNMENT OF SRI LANKA
CERTIFICATE OF COMPETENCY EXAMINATION**

GRADE : OFFICER IN CHARGE OF A NAVIGATIONAL WATCH ON SHIPS OF 500
GT OR MORE (UNLIMITED)

SUBJECT : ENGINEERING KNOWLEDGE

DATE : 25TH APR 2024

Time : 1300 HRS

Time allowed **THREE hours**

Total marks : 96

ANSWER ANY SIX QUESTIONS

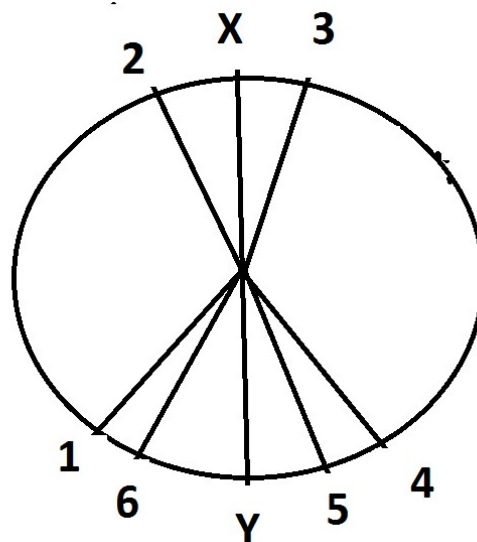
Pass marks : 50%

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) Name 6 main point of valve timing diagram of a two- stroke diesel engine as per diagram shown below

(06 marks)



- b) What is the 'OVERLAP" period of the diagram

(02 marks)

- c) Name four strokes of a diesel engine.

(08 marks)

2)

- a) Make a detailed sketch of a basic refrigeration cycle. (08 marks)
- b) Name the safety features attached to above system (08 marks)

3)

- a) Explain the meaning of A.C.(alternative current) power supply. (06 marks)
- b) What is meant by DC (direct current) power supply? (04 marks)
- c) What precautions should be taken before starting a repair work in an electric circuit? (6 marks)

4)

- a) What type of pump is commonly used for ballast operation onboard and explain the reason for using particular type. (06 marks)
- b) Explain the difference between a positive displacement pump and centrifugal pump (04 marks)
- c) Sketch and explain the priming device of a centrifugal pump? (06 marks)

5)

- a) Name 3 equipment which can be run by steam. (6 marks)
- b) Sketch a smoke tube boiler and label all the mountings. (8 marks)
- c) What is the best source of boiler feed water and why it is so important? (2 marks)

6) Make short notes on the following equipment.

- a) Emergency steering (06 marks)
- b) Emergency fire pump (06 marks)
- c) Emergency air compressor (04 marks)

7)

a) Why electricity can be dangerous?

(06 marks)

b) What precautions should be taken before starting a repair work in an electric circuit?

(10 marks)

8)

What are the main causes for the following problems in a main engine?

a) Scavenge fire

b) Uptake fire

c) Starting airline explosion

d) Crank case explosion.

(04 marks each)

9)

a) List the three-equipment available on board in order to meet the "MARPOL" requirements.

(06 marks)

b) Sketch and explain the Oily Water Separator onboard.

(10 marks)

