SEAGOING DECK OFFICER CLASS 1 & CLASS 2

CERTIFICATE OF COMPETENCY

PAPER 3

SHIP TECHNOLOGY

Time Allowed: 3 hours

INSTRUCTION: -

This paper contains NINE questions where

Candidates should answer Questions 1, 2 and 3 plus any other FOUR questions from the remainder.

Questions do not carry equal marks and candidates are advised to allocate their time accordingly.

The total mark of this paper is 100 and the passing mark is 50 (50%).

CANDIDATES ARE NOT ALLOWED TO WRITE ON OR DEFACE THIS PAPER

This paper consists of this page and THREE other printed pages.

Notes to Candidates:-

i) Write down your name in the top right-hand corner on the first page of the answer sheets.

ii) Write down the question number in the top left-hand corner on each page.

iii) Answer each question on a new page.

iv) No need to copy the questions' details onto the answer sheets.

v) Switch off all your mobile phones and communication devices when in the examination room.

vi) Return all the question paper(s), the used and unused answer sheets before leaving the examination room.

vii) Do not disturb other candidate(s) in the examination room.

viii) Do not attempt to take any photos or recordings of any question papers and/or answer sheets.

ix) The progress of the examination is being recorded by close-circuit television (CCTV) and voice recorders in the examination room.

If the above rules from item v) to viii) are infringed, candidates will be regarded as having failed the examination as a whole and will not be accepted for re-examination for such period as may be decided by the Director.

考生注意事項：-

i) 在答題紙首頁右上角寫上姓名。

ii) 在每頁答題紙的左上角標明回答的問題題號。

iii) 每一條問題另開新頁作答。

iv) 不需要抄寫問題到答題紙上。

v) 進入試場後，把手機及所有通信設備關閉。

vi) 離開試場前，交回所有試卷、所有用過和未用過的答題紙及草稿紙。

vii) 試場內不可干擾其他考生。

viii) 切勿嘗試拍攝或錄取任何試卷或答案。

ix) 考試期間試場內會有閉路電視(CCTV)和錄音系統進行記錄。

如果違反上述 v) 至 viii) 規則，即當作所有考試不及格，以及在處長決定的期間內不得重考。

Candidates should answer questions 1, 2 & 3 and any other FOUR from the remainder.

1. (a) List the main factors which would affect the fuel consumption of a sea passage and what factors can be considered for fuel saving for the voyage from Yokohama to Seattle USA .

   (b) With respect to a full form bulk carrier, outline the elements of construction and design which are commonly seen and which contribute to good fuel economy.

   (c) A 35,000 tonnes displacement vessel consuming fuel by 50 tonnes/day at 18 knots, estimate her fuel consumption for a 4,500 nautical miles voyage when her displacement is 28,000 tonnes and intended speed at 14 knots.

(20 marks)

2. In seagoing ship building field, there are two basic expectations. One is the designed vessel has sufficient strength to endure the weight of cargo and external forces caused by weathers on sea, it means the steel structures of ship was designed sophistically with sufficient strength. Another is to control ship weight to minimum for loading more cargo with better economy revenue.

   (a) What are the requirements of ship building steel?

   (b) How to trade off the stronger ship structures and lighter ship weight?

(20 marks)

3. Hydraulics is used in every engineering field. On modern seagoing vessels, the hydraulic system was designed and running popularly on board of vessels,

   (a) Please illustrate the hydraulic machines/systems on board a modern seagoing vessel

   (b) What are the advantages and disadvantages of hydraulics?

(20 marks)

Candidates should answer any FOUR questions from the following.

4. (a) With the aid of diagram(s), describe the operation of controllable pitch propeller. Outline basic design requirements of controllable pitch propeller?

   (b) With comparing to fixed pitch propeller, what are the advantages and disadvantages of controllable pitch propeller?

(10 marks)

5. (a) Illustrate three different method of anti-corrosion for protecting different ship structures.

   (b) What are the advantages and disadvantages of them?

(10 marks)

6. (a) Describe the requirements of the Ship Security Plan on board a passenger ship.

   (b) List four other available operational plans and describe the functional use of each on board a passenger ship.

(10 marks)

7. (a) Which document on board contains the information of different fire class division? Why different class division was designed for different part structures on board?

   (b) What is the difference between A and B class division

(10 marks)

8. (a) Discuss the principle design of hatch cover and watertight door for the function of watertight?

   (b) How to conduct the periodic and daily inspection and maintenance for maintaining proper watertight.

(10 marks)

9. A container ship at present time 0830 hours on 15th of the month, departing a port "A" (Time Zone = UTC+3) will be RFA (Running Full Away) to the next port of call "B" (Time Zone = UTC+7) for a distance of 4,550 nautical miles by ETA 0830 20th.

   If the fixed pitch of the propeller is 8.593 metres and the apparent slip ratio is 12.50%, calculate the RPM setting on the main engine to make the ETA.

(10 marks)

- END -