



**SEAGOING DECK OFFICER CLASS 1 & CLASS 2**  
**CERTIFICATE OF COMPETENCY**

**PAPER 1**

**NAVIGATION**

Time Allowed: 3 hours

***INSTRUCTION : -***

This paper contains NINE questions where

SECTION A: TWO questions.

SECTION B: THREE questions.

SECTION C: FOUR questions.

Candidates should answer all questions from SECTION A, any TWO questions from SECTION B and any THREE questions from SECTION C.

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

The full mark for this paper is 100 and the passing mark is 60 (60%).

***CANDIDATES ARE NOT ALLOWED TO WRITE ON OR DEFACE THIS PAPER***

***This paper consists of this page and FOUR 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。

**SECTION A**

***Candidates should answer all questions in this section.***

1. During the course of a swing, compass bearing of the sun were observed and the true bearings calculated and shown in the following table:

Suppose that the variation is equal to 5°E at the location of the magnetic compass.

Compass course	000°	045°	090°	135°	180°	225°	270°	315°
Compass bearing	072°	070.5°	064°	060°	062.5°	069.5°	071°	070°
True bearing	070°	071.5°	072°	073°	073.5°	074.5°	075°	076°

- (a) Find the values of coefficients A to E and then use these results to compute the deviation on a compass heading of 305° (C). Illustrate with diagrams the “sign” of the deviation due to each coefficient on any required heading.

Assume **zero angle of heel** while conducting the swing and taking the bearings.

- (b) Explain, with the aid of appropriate sketches, the typical causes of coefficients B, C and D of a magnetic compass.
- (c) Referring to the causes that you explained in (b), briefly describe the appropriate methods that can correct the coefficients of magnetic compass.
- (d) What precautions need to be considered during routine maintenance and inspection?

**(25 marks)**

2. (a) When vessel is sailing in confined waters with high traffic density and dense fog, how to employ the navigational equipment onboard for a safe navigation?
- (b) What are the limitations of radar?
- (c) Name the types of target recommended for a graphical display in AIS (Automatic Identification System).
- (d) Can the information obtained from AIS be 100% correct? What the limitations?

**(25 marks)**

**SECTION B**

*Answer any TWO questions from this section.*

3. (a) With the aid of a simple sketch of the tropical storm in north hemisphere, describe how the storms move and develop from summer to autumn season .
- (b) Explain, with the aid of a simple sketch, how to ascertain own vessel position located in dangerous quadrant of the storm and how to exit the dangers by proper actions.

**(10 marks)**

4. (a) With the aid of a simple sketch of the primary ocean currents, describe how currents are flowing in different earth oceans and how can we take advantages of the ocean current for trans-ocean navigation?.
- (b) Explain the main factors of giving rising to the ocean currents.

**(10 marks)**

5. Explain how monsoon is developed. What precautions should be considered when ship sails in the areas affected by monsoon?

**(10 marks)**

**SECTION C**

**Answer any THREE questions from this section.**

6. Comparing similar length of a VLCC (Very Large Crude Carrier) and a container vessel, explain the meanings and differences of the manoeuvring characteristics factor as below:-

- (a) advance;
- (b) transfer;
- (c) tactical diameter;
- (d) drift angle; and
- (e) crash stop distance.

**(10 marks)**

7. What are the precautions in manoeuvring to launch or recover rescue boats or survival craft in heavy weathers?

**(10 marks)**

8. Particulars of your vessel are as follows:

60,000 tonnes deadweight tanker, with all statutory navigational aids, auto-pilot, bridge control, unmanned machinery space, with manning available including a master, 3 deck officers, 5 engineer officers and 8 deck ratings.

Enumerate the points you would consider in deciding the composition of watches and state the appropriate watch arrangement when:

- (a) at ocean going under normal conditions from sunset to sunrise; and
- (b) river sailing in heavy rains.

**(10 marks)**

9. Your vessel, which has a doctor on board, intends to rendezvous with another vessel which requires medical assistance. From the following information, calculate the course to steer and the earliest possible rendezvous time.

Own vessel in position      30°45.0'N      065°22.0'W      speed 12 knots.

Other vessel in position      32°55.0'N      067°30.0'W      slow steaming on a  
course of 070° true  
at a speed of 2  
knots.

**(10 marks)**

**- END -**