



SEAGOING DECK OFFICER CLASS 3

CERTIFICATE OF COMPETENCY

PART A

PAPER 2

OFFSHORE NAVIGATION

Time Allowed : 2 hours

INSTRUCTION : -

This paper contains FOUR questions where

Candidates should answer all questions.

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

The full marks for this paper is 100 and the pass mark for this examination is 70%.

Materials to be supplied:

1. Nautical Almanac 2007
2. Nautical Tables
3. Graph paper

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 all questions.

1. While in DR (Dead Reckoning) position $12^{\circ} 41' N$ $142^{\circ} 02' E$ on 5th December 2007 you make the following observation of the planet VENUS.

Time at ship	1345 hours
Sextant Altitude	$11^{\circ} 29.0'$
Index Error	1.9' off the arc
Height of Eye	7.1 metres
Chronometer	4 h. 31 m. 29 s.
Chronometer Error	3 m. 34 s. slow of UTC (Coordinated Universal Time)

Find the direction of the position line and a position through which it passes.

(30 marks)

2. While in DR position $50^{\circ} 43' N$ $154^{\circ} 05' E$ on 1st May 2007 you make the following observation of POLARIS during morning twilight.

Time at ship	0248 hours
Sextant altitude	$50^{\circ} 42.5'$
Index error	3.0' off the arc
Height of eye	15.0 metres.
Chronometer	17 h. 32 m. 38 s.
Chronometer error	3 m. 48 s. fast of UTC
Standard compass bearing	358°
Variation	$7^{\circ} E$

Find

- (a) the latitude of the observer.
(b) the deviation of the standard compass for the direction of the ships head.

(25 marks)

3. By Great Circle Sailing (GCS) between initial position (1) $35^{\circ} 00' N$ $141^{\circ} 00' E$ and final position (2) $22^{\circ} 00' N$ $119^{\circ} 00' W$, the GCS route is divided by each 20 equal-distant waypoints.

- (a) To determine the initial course and GCS distance between initial position and final position.
(b) In practical transit-ocean navigation, how to implement the GCS navigation?

- (c) Comparing the methods of GCS and Mercator's Sailing, if number of waypoints on GCS route is more than 20, will the difference between these two methods increase or decrease and why?

(25 marks)

4. At 1030 on 17 February 2007, while in DR position $22^{\circ} 30' N$ $032^{\circ} 30' W$, an azimuth of the sun is taken.

Chronometer time	12 h. 30 m. 15 s.
Chronometer error	4 m. 40 s. slow
Compass bearing (sun)	145°
Variation	$4^{\circ} W$

Find the deviation.

(20 marks)

- END -