HONG KONG POLYTECHNIC

DEPARTMENT OF NAUTICAL STUDIES

COURSE : Certificate of Proficiency in Ship Command

CLASS : Part B

SESSION : 1990-91

SUBJECT : Shipboard Operations

DATE : 24 JUNE 1991 (Re-exam)

TIME ALLOWED : 3 hours

INSTRUCTIONS TO CANDIDATES : Attempt questions 1, 2 and 3 and any FOUR of the remainder

---

AVAILABLE FROM INVIGILATOR : Stability data for M.V. EXAMINER I.

---

1. (a) State the reasons why a ship, on completion of loading and prior to departure, should not have an excessive trim.

(b) M.V. Examiner I has a displacement of 6900 tonnes and is trimmed 0.9m by the stern. She is to sail up river where the relative density of the water is 1.01 and the maximum allowable draught is 5.4m.

Cargo may be discharged from cargo holds No. 1A (LCG 33m forward of AP) and No. 3A (LCG 78m forward of AP). Determine the minimum amount of cargo to be discharged from each hold.

(20 marks)

2. (a) With the aid of a sketch list the minimum stability criteria for a ship at the assigned freeboard as stipulated by IMO.

(b) M.V. Examiner I sails with an even keel draught of 5.6m and a KG of 5.2m. By the time she arrives at her next port, the following changes have taken place:

(i) DB No. 1 FWD P & S are empty (originally 98% full)

(ii) DB No. 3 C only contains 45m³ of FO (originally 98% full)

(iii) DB No. 2 inner S (breadth 4m) is empty (originally full)

(iv) FW tanks P & S are now each half full (Kg of consumed water 9.28m) (originally full).

For this arrival condition,

(i) find the draughts fore and aft

(ii) plot the curve of statical stability

(iii) find the virtual GM

(iv) calculate the list.

(20 marks)

3. You are on board a very old tanker which is not equipped with either an Inert Gas System or a Crude Oil Washing System. Explain fully the dangers that exist during discharge of your cargo of crude oil and state the precautions you would take to minimise them.

(20 marks)

4. M.V. Examiner I has a full load of containers on deck and has draught 5.4m, KG 5.34m. The lateral windage area for this condition is 1060m² with the centroid 11.5m above the keel. If the ship is subjected to a steady strong beam wind causing a pressure of 0.16 tonne/m² find the angle of heel using the given righting-levers' curve.

(10 marks)

5. A vessel of 8000 tonnes displacement has KM 4.6m, KG 4.55m, KB 3.4m and is upright. An item of cargo weighing 40 tonnes is moved 10m upwards and through a horizontal distance of 6m from port to starboard. Calculate the angle of list using the wall-sided formula.

(10 marks)

6. Your ship is about to load a cargo of dangerous goods. State the precautions you would take,

(i) when planning the stowage of the cargo

(ii) when receiving and loading the cargo

(iii) during the voyage

(10 marks)

7. (a) Define "Angle of Repose" as applied to a bulk cargo and state the usefulness of knowing such an angle.

(b) Bulk grain cargo is considered to be liable to shift.

(i) Explain how you would determine if a free grain surface requires to be secured or not.

(ii) Describe briefly one method you would adopt to secure a free grain surface in a partially filled hold.

(10 marks)

8. Discuss the problems associated with the carriage of loaded containers on a general cargo ship.

(10 marks)

9. From the following data find the tank ullage at the discharging port:

Tank dimensions	: 30m x 10m x 12m (LxBxD)
Weight of cargo loaded	: 3300 tonnes
Relative density of cargo	: 0.930 at 32°C
Correction factor for R.D.	: 0.007 per degree C
Cargo temperature at discharge port	: 25°C

(10 marks)

- END -