

HONG KONG POLYTECHNIC  
DEPARTMENT OF NAUTICAL STUDIES

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COURSE : Certificate of Proficiency in Ship Command  
CLASS : Part B  
SESSION : 1990/91  
SUBJECT : Shipboard Operations  
DATE : 11 June 1991  
TIME ALLOWED : 3 hours

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

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

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1. Your vessel is preparing to load a cargo of grain with a stowage factor of  $1.24\text{m}^3/\text{tonne}$ . The proposed loading plan will result in a loaded displacement of 20,000 tonnes and a Total Volumetric Heeling Moment due to grain shift of  $4960\text{m}^4$ . The values of GZ for the vessel from her stability data are:

Heel (degrees)	10	20	30	40	50	60
GZ (metres)	0.197	0.337	0.405	0.440	0.450	0.385

- (a) Calculate the angle of list that would result from a shift of grain.
- (b) Assess whether or not the vessel loaded as planned would comply with the criteria of the IMO grain rules. (Assume  $\Theta_F > 40^\circ$ ).

( 20 marks )

2. A vessel of 280m length and 91,400 tonnes displacement is to drydock with draughts 8.6m F and 12.6m A.  $KG=9.6\text{m}$ . The following particulars may be assumed constant during drydocking:

KM : 13.0m                      LCF : 143.0m forward of the AP  
TPC : 98.5 tonnes              MCTC : 2430 tonnes metre

Calculate:

- (i) her mean draught and virtual GM at the instant when she takes the blocks fore and aft,
- (ii) her mean draught when she becomes unstable and outline the dangers if this occurs too early in the drydocking process.

( 20 marks )

3. The Code of Safe Practice for Solid Bulk Cargoes contains important information such as

- (i) IMO class  
(ii) MFAG table number  
(iii) EmS number  
(iv) angle of repose

- (a) Write notes on how the above information would assist in the safe operation of a ship.
- (b) Select any one cargo from the above publication and state its particular requirements with respect to its properties, segregation and stowage, and special requirements.

( 20 marks )

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4. Your vessel has arrived at an outer anchorage of a river port with draughts of 5.20 forward and 5.56m aft. It is intended to discharge the minimum necessary amount of cargo from number 2 hold and number 5 hold into lighters so that your maximum draught will be 5.30m for proceeding up river. No.2 hold is 52m forward of amidships and No.5 hold is 34m abaft amidships. LCF is amidships; TPC=23 and MCTC=172.

Calculate the minimum amount of cargo to discharge from each hold to reach the required draught and state what the draughts forward and aft will then be.

( 10 marks )

5. (a) List the factors used in the calculation of assigned freeboard.  
(b) Discuss briefly the items to be considered by the authorities in order to satisfy conditions of assignment of freeboard.

( 10 marks )

6. Your ship is a medium size geared bulk carrier and you have been ordered to load on deck a cylindrical pressure vessel, 30 metres long, 8 metres diameter and 80 tonnes weight, using shore cranes. Describe the preparations you would make before arrival at the loading port and the precautions to be observed during the loading process.

( 10 marks )

7. You are on board a general cargo ship equipped with derricks. Describe how you would ensure that the derricks are safe to use for cargo operations.

( 10 marks )

8. Identify the particular safety problems which may be associated with loading cargo on a chemical carrier. Outline the special precautions which should be taken.

( 10 marks )

9. Discuss the types of cargo damage which can occur during an ocean passage on a fully containerised vessel.

( 10 marks )