HONG KONG POLYTECHNIC

CENTRE FOR MARITIME STUDIES

COURSE	:	Post Experience Diploma in Ship Command
CLASS	:	Part B
SESSION	:	1991/92
SUBJECT	:	Shipboard Operations
DATE	:	Tuesday, 9th June 1992
TIME ALLOWED	:	3 hours

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

AVAILABLE FROM INVIGILATOR	:	(1) Stability data for M.V. Examiner I. (2) BSMA 48

1. M.V. Examiner I is floating at drafts : Forward 4.63m., Aft 5.17m. KG 4.83M. She now discharges and loads containers as follows :-

Discharged :

1st tier of containers	FR. 42-52	2 x 20'	]
	FR. 73-81	2 x 20'	] Empties
	FR. 98-106	2 x 20'	]

No. 1 Hold 2 x 20'

Loaded :

No. 1 Hold	2 x 20'		]
No. 3 Hold	2 x 20'		]
1st tier of containers	FR. 42-52	2 x 20'	] Loaded
	FR. 52-62	2 x 20'	]
	FR. 98-106	2 x 20'	]

Calculate her final GM and drafts forward and Aft. (20 marks)

2. (a) Define 'Transportable moisture limit' as applied to some heavy bulk cargoes.

(b) Describe fully the problems associated with the loading and carriage of a cargo of ore concentrate and describe how you could minimise them.

(20 marks)

3. (a) State the difference between 'proof load' and 'safe working load' as applied to lifting appliances.

(b) Discuss the importance in using lifting appliances within the limits of their safe working load.

(c) A derrick is rigged in the following manner:

Cargo runner	: single wire
Topping lift	: gun tackle rove to disadvantage
All blocks	: bush bearings
length of derrick	: 10.0m
length of topping lift	: 8.0m
topping lift attached to mast	: 10.0m above the deck
heel of derrick	: 2.0m above the deck

Find the following when lifting a load of 3 tonnes: (use BSMA 48)

(i) stress on the derrick head block

(ii) thrust on the derrick

(iii) tension in the topping lift

(iv) stress on masthead block

(20 marks)

4. A box shaped vessel 61.0m long, 9.15m beam and 6.3m deep is floating in sea water with an even keel draught of 3.8m. An empty fore end compartment of length 6.1m is bilged. If MCTC is 20 tonnes metre, calculate the new draughts.

(10 marks)

5. A lash vessel of 28000 tonnes displacement, KG 12.2m, KM 13.35m is floating in dock water of relative density 1.009. She then part fills her port deep tank with 1000 tonnes of palm oil, RD 0.89, Kg 8.2m and cg 7.0m from the centreline. If the free surface moment of the deep tank is 10,000 tonnes metres, calculate her resulting list.

(10 marks)

6. M.V. Examiner I, in dock water of RD 1.01 has present draughts as follows:

Forward	:	5.5m aft 5.7m
Port	:	lower edge of winter loadline mark 453 mm above water
Starboard	:	lower edge of winter loadline mark 524 mm above water

Calculate the maximum cargo she can load in order to reach her summer load displacement.

(10 marks)

7. M.V. Examiner I is floating at drafts : For'd 4.27m. Aft. 4.16m. Port. 4.23m. Stbd 4.28m. In dock water R.D. 1.0165. Fuel oil 346.1t, Fresh Water 84.7t, Diesel Oil 36.8t, Ballast 94.3t. How much cargo can she load to be at her Winter Marks in seawater?

(Note : Maximum cargo to be loaded.)

(10 marks)

8. You are on a tanker which is equipped with an inert gas system and crude oil washing. Describe fully how you would use these systems when discharging a cargo of crude oil.

(10 marks)

9. Your ship is assigned timber load lines. Describe how you would load and stow a timber deck cargo to comply with the statutory requirements.

(10 marks)

- END -

Table 1. Rope tensions in terms of P

Applicable to blocks having sheaves with bushed plain bearings
(An allowance of 6% per sheave, accumulative, is made for frictional resistance in the blocks)

Number of parts of rope holding the load	Rope tension at specified position (see key diagram, figure 8)									
	P_0		P_1		P_2		P_3		P_4	
	Hoisting	Lowering	Hoisting	Lowering	Hoisting	Lowering	Hoisting	Lowering	Hoisting	Lowering
1	–	–	–	–	1.060 P	0.943 P	1.124 P	0.890 P	1.191 P	0.840 P
2	0.485 P	0.515 P	0.515 P	0.485 P	0.545 P	0.458 P	0.578 P	0.432 P	0.613 P	0.408 P
3	0.314 P	0.353 P	0.353 P	0.314 P	0.374 P	0.296 P	0.396 P	0.280 P	0.420 P	0.264 P
4	0.229 P	0.272 P	0.272 P	0.229 P	0.289 P	0.216 P	0.306 P	0.204 P	0.324 P	0.192 P
5	0.177 P	0.224 P	0.224 P	0.177 P	0.237 P	0.167 P	0.252 P	0.158 P	0.267 P	0.149 P
6	0.143 P	0.192 P	0.192 P	0.143 P	0.203 P	0.135 P	0.216 P	0.128 P	0.228 P	0.120 P
7	0.119 P	0.169 P	0.169 P	0.119 P	0.179 P	0.112 P	0.190 P	0.106 P	0.201 P	0.100 P
8	0.101 P	0.152 P	0.152 P	0.101 P	0.161 P	0.095 P	0.171 P	0.090 P	0.181 P	0.085 P
9	0.087 P	0.139 P	0.139 P	0.087 P	0.147 P	0.082 P	0.156 P	0.077 P	0.165 P	0.073 P
10	0.076 P	0.128 P	0.128 P	0.076 P	0.136 P	0.072 P	0.144 P	0.068 P	0.153 P	0.064 P
11	0.067 P	0.120 P	0.120 P	0.067 P	0.127 P	0.063 P	0.134 P	0.059 P	0.142 P	0.056 P
12	0.059 P	0.112 P	0.112 P	0.059 P	0.119 P	0.056 P	0.126 P	0.053 P	0.134 P	0.050 P
13	0.053 P	0.107 P	0.107 P	0.053 P	0.113 P	0.050 P	0.120 P	0.047 P	0.127 P	0.044 P
14	0.048 P	0.102 P	0.102 P	0.048 P	0.108 P	0.045 P	0.114 P	0.042 P	0.121 P	0.040 P
15	0.043 P	0.097 P	0.097 P	0.043 P	0.103 P	0.040 P	0.109 P	0.038 P	0.116 P	0.036 P
16	0.039 P	0.093 P	0.093 P	0.039 P	0.099 P	0.037 P	0.105 P	0.035 P	0.111 P	0.033 P
17	0.035 P	0.090 P	0.090 P	0.035 P	0.095 P	0.033 P	0.101 P	0.032 P	0.107 P	0.030 P
18	0.032 P	0.087 P	0.087 P	0.032 P	0.092 P	0.030 P	0.098 P	0.029 P	0.104 P	0.027 P

NOTE. No reduction in frictional resistance is made for the angle of lead of the rope to the pulley.

Table 2. Rope tensions in terms of P

Applicable to blocks having sheaves with ball or roller bearings
(An allowance of 2% per sheave, accumulative, is made for frictional resistance in the blocks)

Number of parts of rope holding the load	Rope tension at specified positions (see key diagram, figure 8)									
	P_0		P_1		P_2		P_3		P_4	
	Hoisting	Lowering	Hoisting	Lowering	Hoisting	Lowering	Hoisting	Lowering	Hoisting	Lowering
1	–	–	–	–	1.020 P	0.980 P	1.040 P	0.961 P	1.061 P	0.942 P
2	0.495 P	0.505 P	0.505 P	0.495 P	0.515 P	0.485 P	0.525 P	0.476 P	0.536 P	0.466 P
3	0.327 P	0.340 P	0.340 P	0.327 P	0.347 P	0.320 P	0.354 P	0.314 P	0.361 P	0.308 P
4	0.243 P	0.257 P	0.257 P	0.243 P	0.263 P	0.238 P	0.268 P	0.233 P	0.273 P	0.228 P
5	0.192 P	0.208 P	0.208 P	0.192 P	0.212 P	0.188 P	0.216 P	0.185 P	0.221 P	0.181 P
6	0.158 P	0.175 P	0.175 P	0.158 P	0.178 P	0.155 P	0.182 P	0.152 P	0.186 P	0.149 P
7	0.134 P	0.152 P	0.152 P	0.134 P	0.154 P	0.132 P	0.158 P	0.129 P	0.161 P	0.127 P
8	0.116 P	0.134 P	0.134 P	0.116 P	0.136 P	0.114 P	0.139 P	0.112 P	0.142 P	0.110 P
9	0.102 P	0.120 P	0.120 P	0.102 P	0.122 P	0.100 P	0.125 P	0.098 P	0.127 P	0.097 P
10	0.091 P	0.109 P	0.109 P	0.091 P	0.111 P	0.090 P	0.114 P	0.088 P	0.116 P	0.086 P
11	0.082 P	0.100 P	0.100 P	0.082 P	0.102 P	0.081 P	0.104 P	0.079 P	0.106 P	0.078 P
12	0.075 P	0.093 P	0.093 P	0.075 P	0.095 P	0.073 P	0.096 P	0.072 P	0.098 P	0.070 P
13	0.068 P	0.086 P	0.086 P	0.068 P	0.088 P	0.067 P	0.090 P	0.066 P	0.092 P	0.064 P
14	0.063 P	0.081 P	0.081 P	0.063 P	0.083 P	0.061 P	0.084 P	0.060 P	0.086 P	0.059 P
15	0.058 P	0.076 P	0.076 P	0.058 P	0.078 P	0.057 P	0.079 P	0.056 P	0.081 P	0.054 P
16	0.054 P	0.072 P	0.072 P	0.054 P	0.074 P	0.053 P	0.075 P	0.052 P	0.077 P	0.051 P
17	0.050 P	0.069 P	0.069 P	0.050 P	0.070 P	0.049 P	0.071 P	0.048 P	0.073 P	0.047 P
18	0.047 P	0.065 P	0.065 P	0.047 P	0.067 P	0.046 P	0.068 P	0.045 P	0.069 P	0.044 P

NOTE. No reduction in frictional resistance is made for the angle of lead of the rope to the pulley.