

U.S.C.G. Merchant Marine Exam  
Master/Chief Mate of Unlimited Tonnage  
Q104 Deck Safety - Stability Problems  
(Sample Examination)

**Choose the best answer to the following Multiple Choice Questions.**

1. Use the material in Section 1, the blue pages, of the Stability Data Reference Book. If the KG is 25.2 feet, and the drafts are: FWD 27'-11", AFT 28'-09"; at what angle will the vessel lose positive stability?
- (A) 54°
  - (B) 59°
  - (C) 65°
  - (D) 71°

*If choice A is selected set score to 1.*

2. Your vessel's drafts are: FWD 14'-04", AFT 15'-02"; and the KG is 23.2 feet. Use the selected stability curves in the blue pages of the Stability Data Reference Book to determine the angle of list if the center of gravity is shifted 1.0 foot off the centerline.
- (A) 9°
  - (B) 12°
  - (C) 15°
  - (D) 17°

*If choice B is selected set score to 1.*

3. On a vessel of 9,000 tons displacement there are two slack deep tanks of palm oil (SG .86). Each tank is 40 feet long and 30 feet wide. What is the reduction in metacentric height due to free surface with the vessel in sea water (SG 1.025)?
- (A) .27 ft
  - (B) .48 ft
  - (C) .57 ft
  - (D) .74 ft

*If choice B is selected set score to 1.*

4. The SS AMERICAN MARINER will sail with the load shown in table ST-0082 below. Use the white pages of The Stability Data Reference Book to determine the drafts.

ITEM	TONS	LCG-FP
F.O. & SALT WATER	3865	280.0
FRESH WATER	140	308.0
DRY CARGO	6200	254.0
REEFER CARGO	265	351.0
DECK CARGO	151	58.4

- (A) FWD 25'-09", AFT 27'-02"
- (B) FWD 26'-02", AFT 26'-08"
- (C) FWD 24'-11", AFT 29'-11"
- (D) FWD 25'-03", AFT 28'-09"

*If choice A is selected set score to 1.*

5. Use the floodable length curve in Section 1, the blue pages, of the Stability Data Reference Book. If the curve represents 45 percent permeability, and holds 2 and 3 flood, the vessel will sink if the permeability exceeds what percent?

- (A) 37
- (B) 26
- (C) 23
- (D) 31

*If choice A is selected set score to 1.*

6. Your vessel's drafts are: FWD 18'-03", AFT 18'-09"; and the KG is 22.6 feet. Use the selected stability curves in the blue pages of the Stability Data Reference Book to determine the angle of list if the center of gravity is shifted 1.4 feet off the centerline.

- (A) 18°
- (B) 22°
- (C) 26°
- (D) 30°

*If choice B is selected set score to 1.*

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7. The SS AMERICAN MARINER has the liquid load shown in table ST-0155 below. Use the white pages of The Stability Data Reference Book to determine the LCG-FP of the liquid load.

DB 1 CL	48.2	DB 6 CL	200.0
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DT 1A CL	257.6
DB 4 P	128.1	DT 2 P	100.7
DB 4 S	128.1	DT 2 S	100.7
DB 5 CL	196.2	DT 4 P/S	110.0
DB 5 P	178.0	DT 5 P/S	108.4
DB 5 S	180.0	DIS/WATER	20.0

- (A) 229.8 ft
- (B) 236.7 ft
- (C) 244.6 ft
- (D) 251.5 ft

*If choice B is selected set score to 1.*

8. The SS AMERICAN MARINER is loaded with the cargo shown in table ST-0070 below. Use the white pages of The Stability Data Reference Book to determine the amount of liquid loading required in the double bottom tanks to meet a one compartment standard.

Deck cargo	210 Tons
Upper tween deck layer	1220 Tons
Lower tween deck layer	910 Tons
Hold layer	870 Tons

- (A) 1171.5 tons
- (B) 1311.0 tons
- (C) 1503.0 tons
- (D) 1710.5 tons

*If choice C is selected set score to 1.*

9. A tank with internal dimensions of 40 feet X 20 feet X 12 feet is pressed with fuel oil weighing 54 pounds per cubic foot. What is the weight, in short tons, of the liquid?

- (A) 11.3 short tons
- (B) 259.2 short tons
- (C) 135.0 short tons
- (D) 518.4 short tons

*If choice B is selected set score to 1.*

10. You are loading in a port subject to the tropical load line mark and bound for a port subject to the winter load line mark. You will enter the summer zone after steaming eight days, and you will enter the winter zone after a total of ten days. You will consume 31 tons of fuel, water, and stores per day. The hydrometer reading at the loading pier is 1.016, and the average TPI is 41. What is the minimum freeboard required at the start of the voyage? Reference Table BL-0015 below.

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	66 inches (T)	6 inches above (S)
Summer	72 inches (S)	*
Winter	78 inches (W)	6 inches below (S)
Fresh water allowance	6 inches	

- (A) 72 inches
- (B) 64 inches
- (C) 70 inches
- (D) 68 inches

*If choice D is selected set score to 1.*

11. The SS AMERICAN MARINER is ready to bunker with drafts of FWD 14'-04", AFT 18'-08". After all bunkers are on board, soundings indicate the tonnages shown in table ST-0173 below. Use the white pages of The Stability Data Reference Book to determine the free surface correction.

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	227.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	224.1	DT 6 S	201.2
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8
DB 5 CL	170.4		
DB 6 CL	212.0		

- (A) 1.05 feet
- (B) 1.15 feet
- (C) 1.25 feet
- (D) 1.31 feet

*If choice A is selected set score to 1.*

- 12.** You are loading in a port subject to the winter load line mark and bound for a port subject to the tropical load line mark. You will enter the summer zone after steaming four days, and you will enter the tropical zone after a total of twelve days. You will consume 39 tons of fuel, water, and stores per day. The hydrometer reading at the loading pier is 1.025, and the average TPI is 49. What is the minimum freeboard required at the start of the voyage? Reference Table BL-0010 below.

FREEBOARD FROM DECK LINE			LOAD LINE
Tropical	76 inches	(T)	7 inches above (S)
Summer	83 inches	(S)	*
Winter	90 inches	(W)	7 inches below (S)
Fresh water allowance	10 inches		

- (A) 90 inches
- (B) 87 inches
- (C) 80 inches
- (D) 77 inches

*If choice A is selected set score to 1.*

- 13.** Your drafts are: FWD 23'-03", AFT 24'-01". Use the blue pages of the Stability Data Reference Book to determine the vessels displacement if you are in fresh water.

- (A) 11,650 tons
- (B) 11,800 tons
- (C) 12,000 tons
- (D) 12,250 tons

*If choice C is selected set score to 1.*

- 14.** Your vessel's drafts are: FWD 24'-04", AFT 25'-10"; and the KG is 23.5 feet. Use the selected stability curves in the blue pages of the Stability Data Reference Book to determine the righting arm at 37° inclination.

- (A) 1.9 feet
- (B) 2.1 feet
- (C) 3.5 feet
- (D) 4.2 feet

*If choice B is selected set score to 1.*

**15.** Using the information in Section 1, the blue pages, of the Stability Data Reference Book, determine the danger angle for permanent list if the KG is 22.2 feet and the drafts are: FWD 23'-06", AFT 24'-03".

- (A) 26°
- (B) 30°
- (C) 34°
- (D) 53°

*If choice A is selected set score to 1.*