

U.S.C.G. Merchant Marine Exam  
Master/Chief Mate of Unlimited Tonnage  
Q109 Navigation Problems – Oceans  
(Sample Examination)

Choose the best answer to the following Multiple-Choice questions.

1. On 26 July your 1030 ZT DR position is LAT 18°25'N, LONG 51°15'W. You are on course 231°T, speed 15 knots. Determine your 1200 position using the following observations of the Sun.

NP-0100

Zone Time	GHA	Declination	Ho
1228	50°23.5'	N 19°21.9'	88°14.3'
1236	52°23.5'	N 19°21.8'	88°29.0'

- A. LAT 18°00.9'N, LONG 51°31.9'W  
 B. LAT 18°03.5'N, LONG 51°36.2'W  
 C. LAT 18°07.2'N, LONG 51°30.4'W  
 D. LAT 18°10.6'N, LONG 51°25.1'W

Correct answer: C

2. On 3 December evening twilight for your vessel will occur at 1901 zone time. Your vessel's DR position will be LAT 24°18.5' S, LONG 110°30.6' W. Considering their magnitude and location, what are the three stars best suited to observe for a fix at star time?

- A. Antares, Fomalhaut, Mirfak  
 B. Canopus, Hamal, Deneb  
 C. Rigel, Canopus, Regulus  
 D. Alpheratz, Achernar, Nunki

Correct answer: D

3. On 28 July your 0800 zone time (ZT) fix gives you a position of LAT 25°16.0'N, LONG 71°19.0'W. Your vessel is on course 026°T, and your speed is 17.5 knots. Local apparent noon (LAN) occurs at 1150 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 82°28.7'. What is the latitude at 1200 ZT?

- A. 26°25.0'N  
 B. 26°27.6'N  
 C. 26°29.8'N  
 D. 26°32.0'N

Correct answer: B

4. Determine the great circle distance and initial course from LAT 08°36.0'N, LONG 126°17.0'E to LAT 02°12.0'S, LONG 81°53.0'W.

- A. 9015 miles, 067°T  
 B. 9076 miles, 079°T  
 C. 9105 miles, 079°T  
 D. 9076 miles, 067°T

Correct answer: B

5. On 5 June your 0420 zone time DR position is LAT  $26^{\circ}47.0'$  N, LONG  $133^{\circ}19.5'$  W. At that time, you observe Vega bearing  $298.1^{\circ}$ psc. The chronometer reads 01h 21m 17s, and the chronometer error is 02m 25s fast. The variation is  $3.5^{\circ}$ E. What is the deviation of the standard compass?
- A.  $1.8^{\circ}$ E
  - B.  $5.2^{\circ}$ E
  - C.  $1.8^{\circ}$ W
  - D.  $5.2^{\circ}$ W

Correct answer: C

6. On 10 July your 0930 zone time DR position is LAT  $26^{\circ}31.0'$ S, LONG  $4^{\circ}41.0'$ E. Your vessel is on course  $308^{\circ}$ T at a speed of 22.0 knots. What is the zone time of local apparent noon (LAN)?
- A. 1144
  - B. 1149
  - C. 1153
  - D. 1159

Correct answer: B

7. You desire to make good a true course of  $129^{\circ}$ . The variation is  $7^{\circ}$ E, magnetic compass deviation is  $4^{\circ}$ E, and gyrocompass error is  $2^{\circ}$ W. An easterly wind produces a  $4^{\circ}$  leeway. What is the course to steer per standard magnetic compass to make the true course good?
- A.  $126^{\circ}$ psc
  - B.  $114^{\circ}$ psc
  - C.  $116^{\circ}$ psc
  - D.  $122^{\circ}$ psc

Correct answer: B

8. Using gnomonic tracking chart WOXZC 5270, determine which of the following statements about a voyage from San Francisco to San Bernardino Strait (LAT  $13^{\circ}00'$ N, LONG  $125^{\circ}30'$ E) is TRUE.
- A. Distance is measured using the length of a degree of longitude at the point of tangency.
  - B. The entire track line is west of the Northern Hemisphere vertex.
  - C. You will cross the Northern Hemisphere vertex at the approximate longitude of  $159^{\circ}$ W.
  - D. A composite sailing should be used to avoid the Bonin Islands.

Correct answer: C

9. A great circle crosses the equator at  $17^{\circ}$ W. It will also cross the equator at what other longitude?
- A.  $173^{\circ}$ W
  - B.  $17^{\circ}$ E
  - C.  $117^{\circ}$ W
  - D.  $163^{\circ}$ E

Correct answer: D

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10. On 18 October your 1330 ZT DR position is LAT 27°32.0'N, LONG 154°47.0'W. You are on course 115°T at a speed of 20 knots. What will be the zone time of sunset at your vessel?
- A. 1715
  - B. 1729
  - C. 1742
  - D. 1751

Correct answer: C

11. On 4 December your 1500 ZT DR position is LAT 18°06.0'N, LONG 75°42.0'W. You are on course 020°T at a speed of 15.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1548 running fix.

NP-0014

BODY	ZONE TIME	GHA	OBSERVED ALTITUDE (Ho)	DECLINATION
Venus	1500	73°51.1'	48°29.5'	S 23°22.1'
Sun L/L	1524	128°25.7'	24°24.9'	S 22°18.6'
Moon L/L	1548	37°54.1'	43°24.8'	S 9°43.0'

- A. LAT 18°10.3'N, LONG 75°34.5'W
- B. LAT 18°12.6'N, LONG 75°42.0'W
- C. LAT 18°14.0'N, LONG 75°40.0'W
- D. LAT 18°17.3'N, LONG 75°37.7'W

Correct answer: D

12. On 16 February your 1845 ZT DR position is LAT 25°50.5'N, LONG 46°24.0'W. At that time you observe Polaris with a sextant altitude (hs) of 26°25.5'. The chronometer time of the sight is 09h 47m 30s and the chronometer error is 02m 16s fast. The index error is 2.5' off the arc, and the height of eye is 55.0 feet. What is your latitude by Polaris?
- A. 25°38.0'N
  - B. 25°44.2'N
  - C. 26°00.1'N
  - D. 26°37.5'N

Correct answer: A

13. You observe the lower limb of the Sun at a sextant altitude (hs) of 28°24.7' on 17 May. The index error is 1.5' off the arc. The height of eye is 86 feet (26 meters). What is the observed altitude (Ho)?
- A. 28°29.7'
  - B. 28°30.6'
  - C. 28°31.5'
  - D. 28°32.9'

Correct answer: C

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14. Determine the distance from LAT 59°12'N, LONG 14°00'W to LAT 59°12'N, LONG 03°20'W, by parallel sailing.
- A. 324.2 miles
  - B. 325.4 miles
  - C. 327.7 miles
  - D. 328.9 miles

Correct answer: C

15. On 2 October your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 11°37.6' bearing 066°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?
- A. Caph
  - B. Ruckbah
  - C. Scheat
  - D. Algenib

Correct answer: D