

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. Determine the great circle distance and initial course from LAT 35°08.0'S, LONG 19°26.0'E to LAT 33°16.0'S, LONG 115°36.0'E.
- A. 4559 miles, 121°T
 - B. 4682 miles, 059°T
 - C. 4457 miles, 126°T
 - D. 4688 miles, 126°T

Correct answer: A

2. On 5 May at 1953 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 29°30.0'N, LONG 66°25.7'W, and your sextant reads 29°07.2'. Your chronometer reads 11h 51m 45s, and your chronometer error is 01m 36s slow. Your height of eye is 56 feet, and the index error for your sextant is 1.5' on the arc. What is the latitude of your vessel from your observation of Polaris?
- A. 29°14.3'N
 - B. 29°23.6'N
 - C. 29°32.3'N
 - D. 29°38.8'N

Correct answer: B

3. On 13 September your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observed a faint unidentifiable star through a hole in the clouds. The star bore 351.5°T at a sextant altitude (hs) of 62°05.6'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?
- A. Alpha Herculis
 - B. Alpha Arae
 - C. Kappa Scorpii
 - D. Beta Ophiuchi

Correct answer: D

4. On 25 December your 0330 ZT DR position is LAT 25°15.0'N, LONG 32°16.0'W. You are on course 145°T at a speed of 20 knots. What will be the zone time of sunrise at your vessel?
- A. 0623
 - B. 0635
 - C. 0641
 - D. 0647

Correct answer: D

5. On 15 November your 1030 ZT DR position is LAT 19°41'S, LONG 41°37'W. You are on course 239°T, speed 22 knots. Determine your 1200 position using the following observations of the Sun.

NP-0104

Zone Time	GHA	Declination	Ho
1128	40°50.4'	S 18°33.6'	88°18.4'
1133	42°05.4'	S 18°33.6'	88°37.7'

- A. LAT 20°01.0'S, LONG 42°05.9'W
- B. LAT 20°04.3'S, LONG 42°09.8'W
- C. LAT 20°06.7'S, LONG 42°06.1'W
- D. LAT 20°08.1'S, LONG 42°00.7'W

Correct answer: A

6. On 9 September your 2043 ZT position is LAT 24°18'N, LONG 66°46'W. You observe Polaris bearing 001°pgc. At the time of the observation the helmsman noted that he was heading 031°pgc and 040°psc. The variation is 11°W. What is the deviation for that heading?

- A. 0°
- B. 1°W
- C. 3°W
- D. 2°E

Correct answer: D

7. Determine the distance from LAT 19°54.0'N, LONG 166°36.0'E to LAT 19°54.0'N, LONG 157°54.0'W, by parallel sailing.

- A. 2204.6 miles
- B. 2006.9 miles
- C. 2002.8 miles
- D. 1990.6 miles

Correct answer: C

8. A great circle crosses the equator at 141°E. It will also cross the equator at what other longitude?

- A. 141°W
- B. 180°E
- C. 39°W
- D. 41°E

Correct answer: C

9. On 3 February your 0547 zone time DR position is LAT 24°18.5'N, LONG 167°25.0'E. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?
- A. Altair, Saturn, Regulus
 - B. Jupiter, Denebola, Regulus
 - C. Arcturus, Kochab, Venus
 - D. Regulus, Deneb, Antares

Correct answer: D

10. You are planning a voyage from LAT 48°30'N, LONG 125°00'W to Korea via LAT 48°30'N, LONG 153°00'E. Which of the following track lines would you select for the safest and most direct route? (Use gnomonic tracking chart WOXZC 5270)
- A. Great circle track line between the two points
 - B. Great circle to LAT 51°00'N, LONG 178°00'W, parallel sailing for 80 miles, then great circle to the via point
 - C. Parallel sailing along 48°30'N
 - D. Rhumb line track between the two points

Correct answer: B

11. You desire to make good a true course of 157°. The variation is 15°E, magnetic compass deviation is 9°W, and gyrocompass error is 3°E. A southwesterly wind produces a 2° leeway. What is the course to steer per standard magnetic compass to make the true course good?
- A. 145°psc
 - B. 147°psc
 - C. 150°psc
 - D. 153°psc

Correct answer: D

12. On 22 November your vessel is enroute from Accra, Ghana to Montevideo, Uruguay. You are on course 240°T and making a speed of 15.0 knots. Your 1129 DR position is LAT 28°25.0'S, LONG 42°40.0'W. You observed 3 celestial bodies. Determine the latitude and longitude of your 1137 running fix.

NP-0023				
BODY	ZONE TIME	GHA	OBSERVED ALTITUDE (Ho)	DECLINATION
Venus	1129	350°00.1'	43°26.8'	S 25°41.8'
Moon	1134	082°54.7'	43°15.0'	S 01°46.5'
Sun	1137	042°38.0'	81°44.7'	S 20°11.7'

- A. LAT 28°27.0'S, LONG 42°38.0'W
- B. LAT 28°25.2'S, LONG 42°40.0'W
- C. LAT 28°25.0'S, LONG 42°36.0'W
- D. LAT 28°23.4'S, LONG 42°42.0'W

Correct answer: A

- 13.** On 28 July your 0800 zone time (ZT) fix gives you a position of LAT $25^{\circ}16.0'N$, LONG $71^{\circ}19.0'W$. Your vessel is on course $026^{\circ}T$, 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 (H_o) for this sight is $82^{\circ}28.7'$. What is the latitude at 1200 ZT?
- A. $26^{\circ}25.0'N$
 - B. $26^{\circ}27.6'N$
 - C. $26^{\circ}29.8'N$
 - D. $26^{\circ}32.0'N$

Correct answer: B

- 14.** You observe the lower limb of the Sun at a sextant altitude (hs) of $38^{\circ}07.5'$ on 8 August. The index error is $5.2'$ off the arc. The height of eye is 72 feet (22 meters). What is the observed altitude (H_o)?
- A. $38^{\circ}08.4'$
 - B. $38^{\circ}13.3'$
 - C. $38^{\circ}19.2'$
 - D. $38^{\circ}23.4'$

Correct answer: C

- 15.** On 14 October your 0800 zone time (ZT) dead reckoning position is LAT $28^{\circ}22.0'N$, LONG $161^{\circ}17.0'E$. Your vessel is on course $116^{\circ}T$ at a speed of 17.5 knots. What is the ZT of local apparent noon (LAN)?
- A. 1148
 - B. 1151
 - C. 1156
 - D. 1202

Correct answer: C