

U.S.C.G. Merchant Marine Exam
Second/Third Mate of Unlimited Tonnage
Q117 Navigation Problems – Oceans
(Sample Examination)

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

1. On 5 May your 1800 ZT DR position is LAT $26^{\circ}11.5'N$, LONG $65^{\circ}35.0'W$. You are on course $270^{\circ}T$ at a speed of 12 knots. What will be the ZT of sunset at your vessel?
- A. 1825
 - B. 1840
 - C. 1857
 - D. 1901

Correct answer: C

2. On 20 September your 0730 zone time position was LAT $28^{\circ}58.0'N$, LONG $152^{\circ}26.0'W$. Your vessel was steaming on course $225^{\circ}T$ at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0931 ZT. The chronometer read 07h 29m 20s and was slow 02m 22s. The observed altitude (Ho) was $44^{\circ}14.4'$. LAN occurred at 1206 zone time. The observed altitude (Ho) was $62^{\circ}49.5'$. What was the longitude of your 1200 zone time running fix?
- A. LONG $153^{\circ}32.5'W$
 - B. LONG $153^{\circ}27.2'W$
 - C. LONG $153^{\circ}23.5'W$
 - D. LONG $153^{\circ}20.0'W$

Correct answer: C

3. On 26 September your 0830 zone time DR position is LAT $26^{\circ}04.0'N$, LONG $129^{\circ}16.0'W$. Your vessel is on course $119^{\circ}T$ at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?
- A. 1124
 - B. 1127
 - C. 1130
 - D. 1133

Correct answer: A

4. On 12 September your 0600 zone time (ZT) fix gives you a position of LAT $22^{\circ}51.9'N$, LONG $133^{\circ}40.1'W$. Your vessel is on course $062^{\circ}T$, and your speed is 12.3 knots. Local apparent noon (LAN) occurs at 1142 ZT, at which time a meridian altitude of the Sun's upper limb is observed. The observed altitude (Ho) for this sight is $70^{\circ}33.2'$. What is the calculated latitude at LAN?
- A. $23^{\circ}23.0'N$
 - B. $23^{\circ}24.8'N$
 - C. $23^{\circ}26.5'N$
 - D. $23^{\circ}27.9'N$

Correct answer: B

Q117-Navigation Problems-Oceans
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Illustrations: 0

5. While on a course of 349°T , a light bears 13° on your starboard bow at a distance of 10.8 miles. What course should you steer to pass 2.5 miles abeam of the light, leaving it to starboard?
- A. 349°
 - B. 336°
 - C. 002°
 - D. 323°

Correct answer: A

6. On 3 December evening twilight for your vessel will occur at 1901 zone time. Your vessel's DR position will be LAT $24^{\circ}18.5' \text{ S}$, LONG $110^{\circ}30.6' \text{ W}$. 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. Alpheratz, Achernar, Nunki
 - D. Rigel, Canopus, Regulus

Correct answer: C

7. On 18 August at 0600 ZT, morning stars were observed, and the vessel's position was determined to be LAT $19^{\circ}48' \text{ N}$, LONG $108^{\circ}34' \text{ W}$. Your vessel is steaming on course 166°T at a speed of 16 knots. An observation of the Sun's lower limb is made at 1036 ZT. The chronometer reads 05h 34m 48s and is slow 01m 24s. What is the computed altitude (Hc) and azimuth (Zn) for this 1036 ZT observation using the assumed position method?
- A. Hc $65^{\circ}18.5'$, Zn 102.1°
 - B. Hc $65^{\circ}14.8'$, Zn 100.4°
 - C. Hc $65^{\circ}11.3'$, Zn 099.4°
 - D. Hc $65^{\circ}07.2'$, Zn 101.2°

Correct answer: B

8. On 13 October at 1847 ZT, your vessel's DR position is LAT $42^{\circ}17.4' \text{ N}$, LONG $138^{\circ}46.2' \text{ W}$. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading $42^{\circ}16.8'$, with an index error of $3.2'$ on the arc. Your chronometer reads 03h 45m 20s and is 1m 32s slow. What is your latitude by Polaris, given a height of eye of 44 feet?
- A. $42^{\circ}09.1' \text{ N}$
 - B. $42^{\circ}12.5' \text{ N}$
 - C. $42^{\circ}16.0' \text{ N}$
 - D. $42^{\circ}19.5' \text{ N}$

Correct answer: A

9. You depart LAT 38°14'N, LONG 12°42'W, for LAT 38°14'N, LONG 46°09'W. What are the course and distance by parallel sailing?
- A. 090°T, 1576.5 miles
 - B. 090°T, 2879.0 miles
 - C. 270°T, 1576.5 miles
 - D. 270°T, 2868.5 miles

Correct answer: C

10. You desire to make good 152°T. The magnetic compass deviation is 4°E, the variation is 5°E, and the gyro error is 3°E. A southwesterly wind produces a 4° leeway. Which course would you steer per standard compass to make good the true course?
- A. 143°psc
 - B. 147°psc
 - C. 137°psc
 - D. 141°psc

Correct answer: B

11. On 22 February your 2045 ZT position is LAT 33°19'N, LONG 52°06'W. You observe Polaris bearing 358.1°pgc. At the time of the observation the helmsman noted that he was heading 048°pgc and 065°psc. The variation is 19°W. What is the deviation for that heading?
- A. 1°E
 - B. 3°E
 - C. 1°W
 - D. 3°W

Correct answer: B

12. On 22 July your 0442 DR position is LAT 26°35.6'N, LONG 22°16.7'W. You observe an unidentified star bearing 104°T at an observed altitude (Ho) of 9°55.7'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?
- A. Menkar
 - B. Acamar
 - C. Hamal
 - D. Rigel

Correct answer: D

13. On 19 November your 0200 zone time DR position is LAT 18°41'N, LONG 150°37'E. You are on course 014°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.

NP-0031				
BODY	ZONE TIME	GHA	OBSERVED ALTITUDE (Ho)	DECLINATION
Arcturus	0532	137°03.2'	22°34.9'	N 19°16.7'
Suhail	0537	215°10.4'	26°45.6'	S 43°21.2'
Capella	0538	273°25.1'	31°43.5'	N 45°58.7'

- A. LAT 19°45.4'N, LONG 150°52.6'E
- B. LAT 19°42.8'N, LONG 150°56.9'E
- C. LAT 19°41.2'N, LONG 150°46.3'E
- D. LAT 19°39.3'N, LONG 150°51.8'E

Correct answer: A

14. The great circle distance from LAT 24°25.3'N, LONG 83°02.6'W to LAT 35°57.2'N, LONG 5°45.7'W is 3966.5 miles. Determine the latitude of the vertex.

- A. 38°46.2'N
- B. 38°16.4'N
- C. 38°09.4'N
- D. 37°57.3'N

Correct answer: C

15. A vessel at LAT 20°00'N, LONG 107°30'W is to proceed to LAT 24°40'N, LONG 112°30'W. What is the course and distance by mid-latitude sailing?

- A. 314.0°T, 389.0 miles
- B. 318.3°T, 399.0 miles
- C. 317.2°T, 397.0 miles
- D. 315.3°T, 394.0 miles

Correct answer: D