

U.S.C.G. Merchant Marine Exam  
Mate Offshore Supply Vessels  
Q215 Navigation Problems - Oceans  
(Sample Examination)

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

1. On 8 April your evening DR position is LAT  $22^{\circ}16.0' N$ , LONG  $157^{\circ}58.3' W$ . You observe an unidentified star bearing  $238^{\circ}T$  at an observed altitude ( $H_o$ ) of  $50^{\circ}02.7'$ . The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?
- (A) Alnilam
  - (B) Betelgeuse
  - (C) Bellatrix
  - (D) Aldebaran

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

2. On 18 November your 1750 zone time DR position is LONG  $110^{\circ}16.0' W$ . At that time you observe Polaris with a sextant altitude ( $h_s$ ) of  $21^{\circ}29.8'$ . The chronometer time of the sight is 00h 52m 43s, and the chronometer error is 02m 18s fast. The index error is 3.2' on the arc, and the height of eye is 49.5 feet. What is your latitude by Polaris?
- (A)  $21^{\circ}28.1'N$
  - (B)  $21^{\circ}03.4'N$
  - (C)  $21^{\circ}35.1'N$
  - (D)  $21^{\circ}13.4'N$

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

3. Your vessel departs Seattle at 1010 zone time, (ZD +8), on 28 May bound for Apra, Guam, (ZD -10). The distance by great circle is 4,948 miles, and you estimate that you will average 18.5 knots. What is your estimated zone time of arrival?
- (A) 1737, 9 June
  - (B) 0737, 9 June
  - (C) 0737, 10 June
  - (D) 1937, 9 June

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

4. On 1 November your 1600 zone time DR position is LAT  $27^{\circ}48'S$ , LONG  $91^{\circ}26'E$ . Your vessel is on a course of  $327^{\circ} T$  at a speed of 16 knots. What will be the zone time of sunset at your vessel?
- (A) 1829
  - (B) 1813
  - (C) 1821
  - (D) 1836

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

5. Determine the great circle distance and initial course from LAT  $34^{\circ}51.0'N$ , LONG  $115^{\circ}01.2'E$  to LAT  $10^{\circ}16.0'S$ , LONG  $51^{\circ}42.6'E$ .
- (A) 4582 miles,  $245.6^{\circ}T$
  - (B) 4436 miles,  $245.3^{\circ}T$
  - (C) 4598 miles,  $245.6^{\circ}T$
  - (D) 4493 miles,  $245.6^{\circ}T$

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

6. On 7 November your 0830 zone time position was LAT  $27^{\circ}36.0'N$ , LONG  $162^{\circ}19.0'W$ . Your vessel was steaming on course  $289^{\circ}T$  at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0945 ZT. The chronometer read 08h 43m 11s and was slow 01m 51s. The observed altitude ( $H_o$ ) was  $38^{\circ}21.1'$ . Local Apparent Noon (LAN) occurred at 1138 zone time. The observed altitude ( $H_o$ ) was  $45^{\circ}35.0'$ . What was the longitude of your 1200 zone time running fix?
- (A)  $163^{\circ}34.0'W$
  - (B)  $163^{\circ}26.0'W$
  - (C)  $163^{\circ}30.2'W$
  - (D)  $163^{\circ}38.8'W$

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

7. On 3 December evening twilight for your vessel will occur at 1901 zone time. Your vessel's DR position will be LAT  $24^{\circ}18.5' S$ , LONG  $110^{\circ}30.6' W$ . Considering their magnitude and location, what are the three stars best suited to observe for a fix at star time?
- (A) Rigel, Canopus, Regulus
  - (B) Antares, Fomalhaut, Mirfak
  - (C) Alpheratz, Achernar, Nunki
  - (D) Canopus, Hamal, Deneb

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

8. Your vessel receives a distress call from a vessel reporting her position as LAT  $35^{\circ}01.0'S$ , LONG  $18^{\circ}51.0'W$ . Your position is LAT  $35^{\circ}01.0'S$ , LONG  $21^{\circ}42.0'W$ . Determine the true course and distance from your vessel to the vessel in distress by parallel sailing.
- (A)  $090^{\circ}T$ , 140.0 miles
  - (B)  $270^{\circ}T$ , 140.0 miles
  - (C)  $090^{\circ}T$ , 189.2 miles
  - (D)  $270^{\circ}T$ , 189.2 miles

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

9. A vessel steams 580 miles on course 083°T from LAT 13°12'N, LONG 71°12'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?

- (A) LAT 14°20'N, LONG 61°21'W
- (B) LAT 14°23'N, LONG 61°19'W
- (C) LAT 14°25'N, LONG 61°17'W
- (D) LAT 14°17'N, LONG 61°23'W

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

10. On 1 July your 0515 zone time fix gives you a position of LAT 23°24.0'S, LONG 151°42.0'W. Your vessel is on course 240°T, and your speed is 10.0 knots. Local apparent noon (LAN) occurs at 1215 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 42°55.0'. What is the latitude at 1200 ZT?

- (A) 24°02.5'S
- (B) 24°01.0'S
- (C) 23°59.7'S
- (D) 23°58.6'S

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

11. On 25 March your 0500 ZT DR position is LAT 28°14.0' S, LONG 93°17.0' E. You are on course 291°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0550 running fix.

Body	Zone Time	GHA	Observed Altitude	Declination
Peacock	0520	226°18.5'	49°42.9'	S 56°47.6'
Altair	0535	238°38.2'	43°53.1'	N 8°48.9'
Spica	0550	338°48.5'	21°11.7'	S 11°03.8'

- (A) LAT 28°06.4'S, LONG 93°02.5'E
- (B) LAT 28°15.9'S, LONG 92°56.9'E
- (C) LAT 27°53.2'S, LONG 93°17.6'E
- (D) LAT 28°19.3'S, LONG 92°59.0'E

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

**12.** On 24 January your 0700 zone time DR position is LAT 22°25.0'N, LONG 46°10.0'W. Your vessel is on course 110°T at a speed of 12.0 knots. What is the zone time of local apparent noon (LAN)?

- (A) 1212
- (B) 1215
- (C) 1203
- (D) 1208

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

**13.** You observe the lower limb of the Sun at a sextant altitude (hs) of 45°49.7' on 13 November . The index error is 1.0' on the arc. The height of eye is 61 feet (18.6 meters). What is the observed altitude (Ho)?

- (A) 45°49.8'
- (B) 45°52.9'
- (C) 45°56.4'
- (D) 45°59.3'

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

**14.** You desire to make good a true course of 174°. The variation is 17°W, magnetic compass deviation is 4°W, and gyrocompass error is 4°E. A west-southwest wind produces a 4° leeway. What is the course to steer per standard magnetic compass to make the true course good?

- (A) 197°psc
- (B) 195°psc
- (C) 203°psc
- (D) 199°psc

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

**15.** 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°W
- (B) 3°E
- (C) 3°W
- (D) 1°E

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