Amplitude Problems

Basic Concept Problems (non-USCG exams)

AMP B1. Using the Amplitude Table in Bowditch, you have determined that the calculated amplitude of the sun is 10 degrees. It is August 15th and you are in the northern hemisphere. What is the calculated bearing of sunrise and sunset?

Answer: Sunrise – 080° T, Sunset – 280° T.

AMP B2. Using the Amplitude Table in Bowditch, you have determined that the calculated amplitude of the sun is 3 degrees. It is October 23rd and you are in the northern hemisphere. What is the calculated bearing of sunrise and sunset?

Answer: Sunrise – 093° T, Sunset 267° T.

AMP B3. Using the Amplitude Table in Bowditch, you have determined that the calculated amplitude of the sun is 20 degrees. It is August 15th and you are in the southern hemisphere. What is the calculated bearing of sunrise and sunset?

Answer: Sunrise – 070° T, Sunset – 290° T.

AMP B4. Your latitude is 10N. The declination of the sun is 12 degrees. What is the amplitude of the sun?

Answer: 12.2 degrees.

Amplitudes of the Sun (Celestial Horizon)

AMP B5. On 10 August your vessel's 0426 zone time DR position is latitude 52° 07' N, longitude 142° 16' E, when an amplitude of the Sun is observed. The Sun's lower limb is about 20 minutes of arc above the visible horizon and bears 074.5° per standard compass. Variation in the area is 12° W. The chronometer reads 07h 24m 19s and is 2m 34s fast. Which of the following is the deviation of the standard compass?

a) 0.0°
b) 1.3° W
c) 1.3° E – correct
d) 2.3° W

AMP B6. On 10 February in DR position latitude 25° 32.0' N, longitude 135° 15.0' E, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 109° psc. The chronometer reads 09h 43m 25s and is 3m 20s fast. Variation in the area is 4.5° W. What is the deviation of the standard magnetic compass?

a) 1.6° E – correct
b) 2.9° W
c) 10.5° E
d) 30.5° W

AMP B7. On 11 January, your vessel's 0655 zone time DR position is latitude 24° 30' N, longitude 122° 02' W, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 101° per standard compass. Variation in the area is 11.6° E. The chronometer reads 02h 52m 48s and is 2m 12s slow. What is the deviation of the standard compass?

a) 1.4° E – correct
b) 1.4° W
c) 4.6° E
d) 4.6° W

AMP B8. On 17 April your vessel's position is latitude 21° 00' S, longitude 78° 30' W, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 082.7° per standard magnetic compass. Variation in the area is 2.0° W. The chronometer reads 10h 59m 24s and is 01m 24s fast. What is the deviation on the compass?

a) 2.0° W- correct
b) 3.0° W
c) 2.5° E
d) 3.0° E

Amplitudes of the Sun (Visible Horizon)

AMP B9. On 10 June you vessel's 0519 zone time DR position is latitude 27° 07.0' N, longitude 92° 10.0' W, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 063.6° per standard magnetic compass. The variation in the area is 4.8° E. The chronometer reads 11h 17m 32s and is 1m 18s slow. What is the deviation of the compass?

a) 5.6° E
b) 4.8° E
c) 4.2° W
d) 4.8° W- correct

AMP B10. On 16 April in DR position latitude 28° 07.0' N, longitude 81° 47.0' W, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 073.5° psc. The chronometer reads 10h 53m 41s and is 2m 23s slow. Variation in the area is 11° E. What is the deviation of the magnetic compass?

a) 4.5° E
b) 4.9° W
c) 6.1° E
d) 6.5° W- correct

AMP B11. On 5 September in DR position latitude 23° 17.0' S, longitude 154° 35.0' E, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 275° per standard magnetic compass. The chronometer reads 7h 49m 26s and is 1m 52s fast. Variation in the area is 3° W. What is the deviation of the standard magnetic compass?

a) 2.1° E
b) 2.4° W
c) 5.1° E- correct
d) 5.4° W

AMP B12. On 20 June your vessel's 1955 ZT DR position is latitude 52° 38.9' N, longitude 3° 42.7' E, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 311° per gyrocompass. Variation in the area is 6° W. At the time of the observation, the helmsman noted that she was heading 352° per gyrocompass and 358° per steering compass. What is the gyro error and deviation for that heading?

a) 1.3° W gyro error, 1.3°E deviation
b) 0.0° gyro error, 0.0° deviation
c) 1.3° W gyro error, 1.3° W deviation
d) 1.3° E gyro error, 1.3° E deviation – correct

Amplitudes of the Moon

AMP B13. At 1502 ZT on 4 August, in DR position latitude 11° 21.6 S, longitude 088° 14.3' E, you observe an amplitude of the Moon. The upper limb of the Moon is on the visible horizon and bears 289° psc. The variation is 15° W. What is the deviation?

a) 1.1° E
b) 1.1° W – correct
c) 1.9° E
d) 1.9° W

AMP B14. At 1318 ZT on 10 September, in DR position latitude 24° 05.8' N, longitude 058° 08.3' E, you observe an amplitude of the Moon. The upper limb of the Moon is on the visible horizon and bears 254° psc. Variation is 2° W. What is the deviation?

a) 8.0° W
b) 8.0° E
c) 4.0° W – correct
d) 4.0° E

AMP B15. At 1337 ZT on July 17, in DR position latitude 30° 56.8' S, longitude 039° 36.5' W, you observe an amplitude of the Moon. The upper limb of the Moon is on the visible horizon bearing 263° psc. The variation is 20° W. What is the deviation?

a) 2.6° E
b) 2.6° W
c) 3.6° E – correct
d) 3.6° W

AMP B16. At 1542 ZT on 23 October, in DR position latitude 37° 28.5' N, longitude 156° 17.3' E, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 282.5° psc. The variation is 0.0°. What is the deviation?

a) 2.2° E – correct
b) 2.2° W
c) 1.2° E
d) 1.2° W

AMP B17. At 1523 ZT on 14 June, in DR position latitude 31° 58' S, longitude 48° 42' W, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 118° psc. The variation is 10° W. What is the deviation?

a) 2.5° W
b) 2.1° W – correct
c) 1.7° W
d) 1.7° E

Amplitudes of Planets

AMP B18. At 2048 ZT on 13 October, you are in DR position latitude 44° 02.8' S, longitude 146° 58.3' E when you observe an amplitude of Venus. The planet is about one Sun's diameter above the visible horizon and bears 222.2° psc. The variation is 15° E. What is the deviation?

a) 0.0°
b) 1.1° E
c) 1.0° W – correct
d) 1.5° W

AMP B19. At 2232 ZT on 14 July you are in DR position latitude 33° 52 S, longitude 150° 03' W when you observe an amplitude of Jupiter. The planet is about one Sun's diameter above the visible horizon and bears 268.5° pgc. The variation is 15° E. What is the gyro error?

a) 1.0° E - correct
b) 0.5° E
c) 0.0°
d) 0.5° W

AMP B20. At 2234 ZT on 14 July you are in DR position latitude 34° 03' N, longitude 150° 16' W, when you observe an amplitude of Saturn. The planet is about one Sun's diameter above the visible horizon and bears 272.1° pgc. The variation is 14° E. What is the gyro error?

a) 0.5° W
b) 0.5° E
c) 1.5° W - correct
d) 2.5° E

AMP B21. At 2237 ZT on 14 July, you are in DR position latitude 33° 57' N, longitude 150° 32' W when you observe an amplitude of Saturn. The planet is about one Sun's diameter above the visible horizon and bears 258.6° psc. The variation is 14° E. What is the deviation?

a) 2.0° W – correct
b) 1.0° W
c) 0.0°
d) 1.0° E