

U.S.C.G. Merchant Marine Exam  
Second/Third Mate of Unlimited Tonnage  
Q114 Navigation General – Oceans  
(Sample Examination)

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

1. A green buoy has a yellow triangle on it. What type of buoy is this?
- A. This is an information or regulatory buoy that has lateral significance
  - B. It is a dual-purpose marker used where the ICW and other waterways coincide
  - C. It is a buoy that was set in error and will be replaced with a red nun buoy
  - D. This buoy that is off-station and is marked to warn mariners of its wrong position

Correct answer: B

2. Which best defines current?
- A. The horizontal movement of the water
  - B. The density changes in the water
  - C. The vertical movement of the water
  - D. None of the above

Correct answer: A

3. You are underway on course 050°T and your maximum speed is 12 knots. The eye of a hurricane bears 080°T, 100 miles from your position. The hurricane is moving towards 265°T at 22 knots. If you maneuver at 12 knots to avoid the hurricane, what could be the maximum CPA?
- A. 56 miles
  - B. 76 miles
  - C. 63 miles
  - D. 69 miles

Correct answer: C

4. Buoys which only mark the left or right side of the channel will never exhibit a light with which characteristic?
- A. Flashing
  - B. Composite group flashing
  - C. Quick flashing
  - D. Equal interval (isophase)

Correct answer: B

5. The error in a sextant altitude caused by refraction is greatest when the celestial body is in which location?
- A. High in the sky
  - B. Rising above 45° elevation
  - C. Near the horizon
  - D. At or near transit

Correct answer: C

6. The magnitude of three stars is indicated. Which star is the brightest?

- A. Canopus -0.9
- B. Vega +0.1
- C. Antares +1.2
- D. Cannot be determined; magnitude indicates size not brightness

Correct answer: A

7. In the Northern Hemisphere how do the major ocean currents tend to flow?

- A. Counterclockwise except in the Gulf Stream
- B. Clockwise around the North Atlantic and North Pacific Oceans
- C. Clockwise or counterclockwise depending on whether it is warm or cold current
- D. Counterclockwise around the North Atlantic and North Pacific Oceans

Correct answer: B

8. Your vessel is on course  $312^{\circ}\text{pgc}$  and you sight a lighthouse dead ahead at a range of 10 miles. The gyro error is  $3^{\circ}\text{E}$ . What course would you steer to leave the lighthouse 1.5 miles abeam to starboard?

- A.  $304^{\circ}\text{pgc}$
- B.  $304^{\circ}\text{T}$
- C.  $309^{\circ}\text{pgc}$
- D.  $309^{\circ}\text{T}$

Correct answer: A

9. Your vessel is on course  $270^{\circ}\text{T}$ , speed 10 knots. The apparent wind is from  $10^{\circ}$  off the port bow, speed 30 knots. From which direction is the true wind?

- A.  $345^{\circ}\text{T}$
- B.  $075^{\circ}\text{T}$
- C.  $255^{\circ}\text{T}$
- D.  $165^{\circ}\text{T}$

Correct answer: C

10. Which of the following is the most accurate method of determining gyrocompass error while underway?

- A. It cannot be determined accurately at sea due to drift of unknown currents.
- B. Comparing the gyro heading with the magnetic compass heading
- C. Comparing the gyro azimuth of a celestial body with the computed azimuth of the body
- D. Determining from the chart the course made good between celestial fixes

Correct answer: C

11. With respect to failure warnings and status indications, GPS receivers should provide, at a minimum, \_\_\_\_\_.

- A. a warning of loss of position
- B. an indication of a change in satellite configuration
- C. an alarm if engine speed is suddenly reduced
- D. a cross-track error alarm

Correct answer: A

12. On a weather map, what does a large letter "H" indicate?

- A. A high-pressure area with warm, moist air, and inclement weather
- B. A high-pressure area with cool, dry air, and fair weather
- C. Horse latitudes, with rough seas and strong winds
- D. A heavy squall line is immanent near the "H"

Correct answer: B

13. While entering a harbor on a course of 225° per gyrocompass, you take a bearing on a pair of range lights and get 220° per gyrocompass. The bearing on the chart is 217°T. The variation for the area is 6°W, and deviation is 2°W. What course would you steer per gyrocompass to make good a true course of 232°?

- A. 229°pgc
- B. 231°pgc
- C. 233°pgc
- D. 235°pgc

Correct answer: D

14. General information about the location, characteristics, facilities, and services for U.S. and foreign ports may be obtained from which publication?

- A. Sailing Directions
- B. Distances Between Ports
- C. Coast Pilot
- D. World Port Index

Correct answer: D

15. The scale on a chart is given as 1:5,000,000. What does this ratio indicate?

- A. 1 inch is equal to 5,000,000 inches on the Earth's surface
- B. 1 inch is equal to 5,000 inches on the Earth's surface
- C. 1 nautical mile on the chart is equal to 5,000 inches on the Earth's surface
- D. 1 nautical mile on the chart is equal to 5,000,000 inches on the Earth's surface

Correct answer: A

16. The revision date of a chart is printed on which area of the chart?

- A. Lower left corner
- B. Top center
- C. Part of the chart title
- D. Any clear area around the neat line

Correct answer: A

17. The chart indicates the variation was 3°45'W in 1988, and the annual change is decreasing 6'. If you use the chart in 1991 how much variation should you apply?

- A. 3°27'W
- B. 3°27'E
- C. 4°03'W
- D. 4°03'E

Correct answer: A

18. Which list of clouds is in sequence, from highest to lowest in the sky?

- A. Stratus, cirrostratus, altostratus
- B. Altostratus, stratus, cirrostratus
- C. Altostratus, cirrostratus, stratus
- D. Cirrostratus, altostratus, stratus

Correct answer: D

19. What describes an accurate position that is NOT based on any prior position?

- A. Running fix
- B. Fix
- C. Dead-reckoning position
- D. Estimated position

Correct answer: B

20. What is the characteristic of a quick flashing light?

- A. Shows not less than 60 flashes per minute
- B. Durations of light and darkness are equal
- C. Shows groups of 2 or more flashes at regular intervals
- D. Shows quick flashes for about 5 seconds followed by a 1 second dark period

Correct answer: A

21. Which term is used to describe a generally circular low-pressure area?

- A. A cold front
- B. A cyclone
- C. An anticyclone
- D. An occluded front

Correct answer: B

22. Yesterday your chronometer read 11h 59m 59s at the 1200 GMT time tick. Today the chronometer reads 11h 59m 57s at the 1200 time tick. What is the chronometer rate?

- A. +2s
- B. +3s
- C. -2s
- D. -3s

Correct answer: C

23. In illustration D044NG below, what type of buoy is indicated by the letter A?

- A. Spar
- B. Pillar
- C. Can
- D. Nun

Correct answer: C

24. When the time is based on the movement of the visible Sun along the ecliptic the time is known as \_\_\_\_\_.

- A. visible time
- B. apparent time
- C. real time
- D. mean time

Correct answer: B

25. You take a bearing of 043° and 169° of two objects. What bearing of a third object will give the best fix?

- A. 102°
- B. 144°
- C. 201°
- D. 356°

Correct answer: A

26. Where would you expect to find channels marked with the IALA-A Buoyage System?

- A. Japan
- B. Canada
- C. India
- D. Argentina

Correct answer: C

27. What publication contains information about the port facilities in Cadiz, Spain?

- A. Nautical Index
- B. World Port Index
- C. United States Coast Pilot
- D. Sailing Directions

Correct answer: B

28. In shallow water, waves that are too steep to be stable, causing the crests to move forward faster than the rest of the wave. This occurrence describes which term?

- A. Rollers
- B. White caps
- C. Breakers
- D. Surfers

Correct answer: C

29. Which symbol represents a 2-fathom curve?

- A. .. .. .
- B. -- -- --
- C. \_\_\_\_ . \_\_\_\_ . \_\_\_\_ .
- D. .. \_\_\_\_ .. \_\_\_\_ .. \_\_\_\_

Correct answer: A

30. Your vessel is participating in the Voluntary Observing Ship Program, you are preparing WS Form B-80 as seen in illustration D041NG below. The sky is overcast, and the anemometer indicates that the apparent wind is from  $144^{\circ}$  relative at 8 knots. You are on course  $162^{\circ}\text{T}$  at 15 knots. How should you encode group Nddff?

- A. 81408
- B. 91521
- C. 83322
- D. 01615

Correct answer: C

31. Which term is used to describe the wind speed and direction observed from a moving vessel?

- A. The apparent wind
- B. The coordinate wind
- C. The anemometer wind
- D. The true wind

Correct answer: A

32. Which of the symbols shown in illustration D018NG below represents a warm front?

- A. A
- B. B
- C. C
- D. D

Correct answer: C

33. You are on course  $030^{\circ}\text{T}$ . The relative bearing of a lighthouse is  $45^{\circ}$ . What is the true bearing?

- A.  $075^{\circ}$
- B.  $015^{\circ}$
- C.  $345^{\circ}$
- D.  $255^{\circ}$

Correct answer: A

34. In the North Sea area, you sight a buoy showing a quick white light with 6 flashes, followed by one long flash at 15 second intervals. Which of the four topmarks shown in illustration D030NG below would be fitted to this buoy?

- A. A
- B. B
- C. C
- D. D

Correct answer: A

35. IN REGION A of the IALA Buoyage System, when entering from seaward, how would the starboard side of a channel be marked?

- A. A red can buoy
- B. A green can buoy
- C. A green conical buoy
- D. A red conical buoy

Correct answer: C

36. What is the geographic longitude of a body whose GHA is  $215^{\circ}15'$ ?

- A.  $144^{\circ}45'E$
- B.  $144^{\circ}45'W$
- C.  $35^{\circ}15'E$
- D.  $35^{\circ}15'W$

Correct answer: A

37. Which is TRUE concerning Hot air?

- A. The moisture content of air is independent of air temperature
- B. Hot air holds more moisture than cold air
- C. Hot air retains the same amount of moisture as cold air
- D. Hot air holds less moisture than cold air

Correct answer: B

38. What happens to the intensity of a hurricane as it reaches higher latitudes and cooler waters?

- A. Decreases
- B. Remains the same
- C. Increases
- D. None of the above

Correct answer: A

39. Which navigational equipment is required to be tested and logged before a towing vessel embarks on a voyage of more than 24 hours?

- A. Radar(s) and VHF radio(s)
- B. Compass and/or swing meter
- C. GPS receiver(s)
- D. All required navigational equipment, without exception

Correct answer: D

40. You are approaching a light fitted with a RACON. How is the light identified on the radar?

- A. A dashed line originating from the center of the scope and running to the light
- B. A circle appearing on the scope surrounding the light
- C. An audible signal when the sweep crosses the light
- D. A radial line appearing on the same bearing originating at a greater range than the light

Correct answer: D



41. Which scale is used to estimate wind speed by observing sea conditions?

- A. Metric scale
- B. Coriolis scale
- C. Beaufort scale
- D. Wind scale

Correct answer: C

42. The owner or Master of a towing vessel that is operating within a Vessel Traffic Service (VTS) area must report specific information to the service. Which of the following choices is not required to be reported?

- A. Any malfunction of propulsion machinery, steering gear, radar, gyrocompass or depth-sounder, if installed
- B. A shortage of personnel, lack of charts, maps or other required publications
- C. The type of credential he/she holds and its serial number
- D. Any characteristics of the vessel that affect its maneuverability

Correct answer: C

43. You are in LONG 165°E, zone time at 0400, 1 November. What is the zone time and date in LONG 165°W?

- A. 1800, 31 October
- B. 0600, 31 October
- C. 0600, 1 November
- D. 1800, 1 November

Correct answer: B

44. In a tropical cyclone, in the Northern Hemisphere, a vessel hove to with the wind shifting counterclockwise is located in which position?

- A. Ahead of the storm center
- B. In the dangerous semicircle
- C. Directly in the approach path of the storm
- D. In the navigable semicircle

Correct answer: D

45. The southeast trade winds actually blow in which direction?

- A. Northwest
- B. South
- C. East
- D. Southeast

Correct answer: A

46. Which is the most commonly encountered fog at sea?

- A. Frontal fog
- B. Advection fog
- C. Radiation fog
- D. Conduction fog

Correct answer: B

47. The most dangerous form of icing encountered at sea is formed by which of the following?

- A. Rime
- B. Freezing rain
- C. Sea spray
- D. Hail

Correct answer: C

48. Under the IALA Buoyage Systems, which is TRUE of safe water marks?

- A. They may show a quick-flashing, Q(9)15s, white light
- B. They must show a composite group-flashing, Fl(2 + 1), green light
- C. They may show a composite group-flashing, Fl(2 + 1), red light
- D. They may show a white Morse (A) light

Correct answer: D

49. In illustration D045NG below, what two shapes shown are used to indicate a preferred channel?

- A. B and C
- B. C and D
- C. A and D
- D. A and B

Correct answer: C

50. Radar makes the most accurate determination of the \_\_\_\_\_.

- A. distance to a target
- B. shape of a target
- C. size of a target
- D. direction of a target

Correct answer: A

51. Which correction(s) must be applied to an aneroid barometer?

- A. Instrument error and latitude correction
- B. Instrument error only
- C. Height error only
- D. Instrument error and height error

Correct answer: D

52. In the IALA Buoyage System, what do buoys with alternating red and green horizontal bands indicate?

- A. Fishing areas
- B. The preferred channel
- C. An isolated danger
- D. Spoil grounds

Correct answer: B

53. At which interval should a traditional spring driven marine chronometer be rewound?

- A. Every 12 hours
- B. Once a day
- C. Once every 3 days
- D. Once a week

Correct answer: B

54. Which term is given to the mechanical lifting of air by the upslope slant of the terrain?

- A. Advective lifting
- B. Vertical lifting
- C. Topographic lifting
- D. Convective lifting

Correct answer: C

55. What do red sectors of navigation lights warn mariners of?

- A. Floating debris
- B. Shoals or nearby land
- C. Recently sunken vessels
- D. Heavily trafficked areas

Correct answer: B

56. The survey information upon which a chart is based is found at which location?

- A. At the top center of the next line
- B. Near the chart title
- C. At the lower left corner
- D. At any convenient location

Correct answer: B

57. You are approaching Chatham Strait from the south in foggy weather. You have Coronation Island and Hazy Islands on the radar. Suddenly the radar malfunctions. You then resort to using whistle echoes to determine your distance off Coronation Island. Your stopwatch reads 16.3 seconds for the echo to be heard. How far are you off Coronation Island?

- A. 1.0 mile
- B. 1.5 miles
- C. 2.0 miles
- D. 2.5 miles

Correct answer: B

58. To find a magnetic compass course from a true course what must you apply?

- A. Deviation and variation
- B. Magnetic anomalies (local disturbances)
- C. Deviation
- D. Variation

Correct answer: A

59. Which is TRUE as the temperature of an air mass decreases?

- A. The absolute humidity decreases
- B. The specific humidity decreases
- C. The dew point rises
- D. The relative humidity increases

Correct answer: D

60. The needle of an aneroid barometer points to 30.05 on the dial. What does this indicate?

- A. 30.05 millibars
- B. The barometric pressure is falling
- C. 30.05 millimeters of mercury
- D. 30.05 inches of mercury

Correct answer: D

61. To find the specific phase characteristic of a lighthouse on a sound of the United States you would use which reference?

- A. American Practical Navigator
- B. U.S. Coast Pilot
- C. Nautical Chart Catalog
- D. Light List

Correct answer: D

62. What should you apply to a fathometer reading to determine the depth of water?

- A. Subtract the sea water correction.
- B. Subtract the draft of the vessel.
- C. Add the sea water correction.
- D. Add the draft of the vessel.

Correct answer: D

63. Which term is given to a light that has a light period shorter than its dark period?

- A. Alternating
- B. Occulting
- C. Pulsating
- D. Flashing

Correct answer: D

64. What is a characteristic of cardinal marks?

- A. Number-letter combinations for identification
- B. Light rhythms indicating directional orientation
- C. Square or triangular topmarks
- D. Vertical stripes

Correct answer: B

65. The spin axis of a gyroscope tends to remain fixed in space in the direction in which it is started. How does this gyroscope become north seeking so that it can be used as a compass?
- A. By mechanically or electrically applying forces to precess the gyroscope
  - B. By starting the compass with the spin axis in a north/south position
  - C. The rotation of the Earth (Earth rate) automatically aligns the gyroscope with north, except for speed errors
  - D. By taking advantage of the property of gyroscopic inertia

Correct answer: A

66. In the horizon system of coordinates what is equivalent to the poles on the Earth?
- A. Celestial poles
  - B. Zenith, nadir
  - C. Ecliptic poles
  - D. Nodes

Correct answer: B

67. Which condition exists at the summer solstice in the Northern Hemisphere?
- A. The Southern Hemisphere is having winter.
  - B. The Sun shines equally on both hemispheres.
  - C. The north polar regions are in continual darkness.
  - D. The Northern Hemisphere is having short days and long nights.

Correct answer: A

68. According to Buys Ballot's Law, when an observer in the Southern Hemisphere experiences a northwest wind, where is the center of the low pressure located?
- A. East-Northeast
  - B. West-Southwest
  - C. South-Southwest
  - D. East-Southeast

Correct answer: C

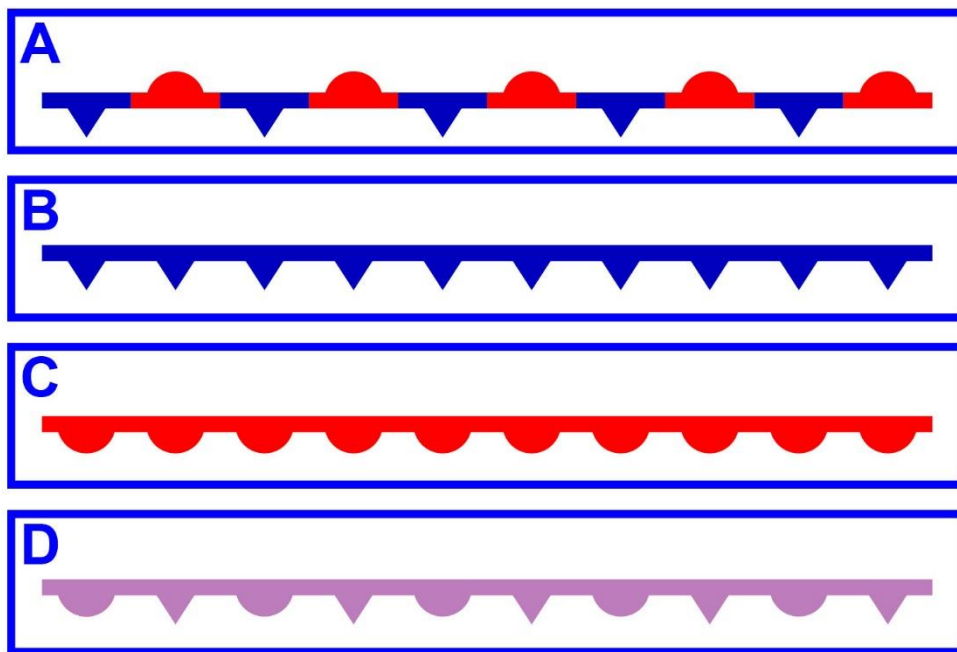
69. Your vessel is on course  $150^{\circ}\text{T}$ , speed 17 knots. The apparent wind is from  $40^{\circ}$  off the starboard bow, speed 15 knots. What is the speed of the true wind?
- A. 9.0 knots
  - B. 10.2 knots
  - C. 11.0 knots
  - D. 12.0 knots

Correct answer: C

70. Swell is the rise and fall of the ocean's surface due to \_\_\_\_\_.
- A. the pull of the moon
  - B. fetch
  - C. distant winds
  - D. local storms

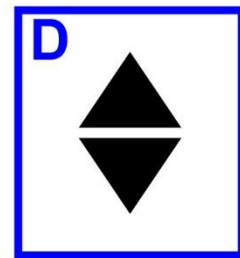
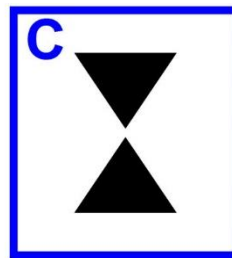
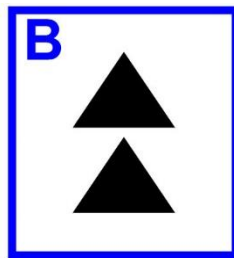
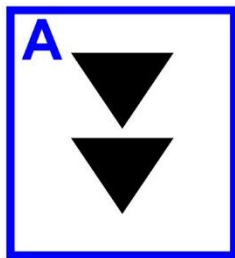
Correct answer: C

## D018NG



Adapted for testing purposes only from BOWDITCH, The American Practical Navigator,  
An Epitome of Navigation, 2002 Bicentennial Edition  
Copyright © 2002 by The National Imagery and Mapping Agency, U. S. Government  
Further reproduction prohibited without permission

## D030NG



# National Maritime Center

Keep 'em Safe, Keep 'em Sailing



National  
Maritime  
Center

## D041NG

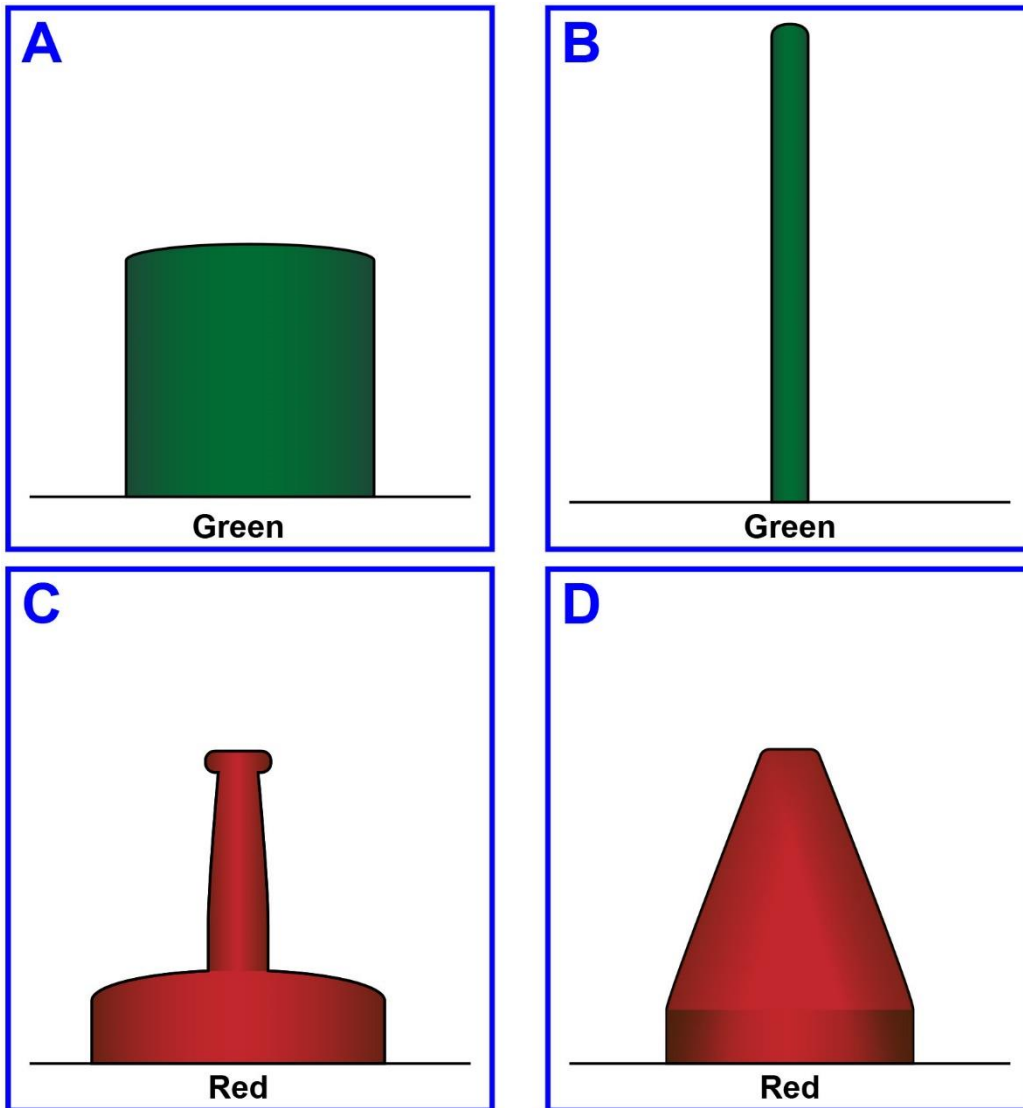
WS FORM B-80 (5-94) PRES. BY WMO DIRECTIVES				<b>U.S. DEPARTMENT OF COMMERCE</b> NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE		
<b>WEATHER REPORT FOR IMMEDIATE TRANSMISSION</b>						
NO.	SHIP NAME	DATE SENT (UTC)	TIME SENT (UTC)	STA. CALLED	FREQUENCY	
<b>ADDRESSES</b>						
U.S. Coast Guard: No address needed, start with BBXX indicator and ship's call sign.						
<b>INMARSAT</b> Standard A: Select—Coast Earth Station (CES), routine priority, duplex telex channel, and initiate call. When GA + is received, select 41 +. Upon receipt of answerback, NWS OBS MHTS, send the weather report starting with the BBXX indicator and ship's call sign. End the report with 5 periods. Try to limit INMARSAT call time to 30 seconds. Standard C: To establish special access code 41, see manufacturers recommended instructions for set-up, or the Mariners Weather Log Summer, 1994, or later editions.						
U.S. commercial and foreign radio stations: To: OBS METEO _____ (get address from "Radio Stations Accepting. . ."). Start with BBXX indicator and ship's call sign and combine the remaining numbers into 10-character groups.						
INDICATOR	CALL SIGN	YYGGi <sub>w</sub>	99L <sub>a</sub> L <sub>a</sub> L <sub>a</sub>	Q <sub>c</sub> L <sub>o</sub> L <sub>o</sub> L <sub>o</sub> L <sub>o</sub>	i <sub>R</sub> i <sub>x</sub> hVV	Nddff
BBXX			99		4	
00fff	1s <sub>n</sub> TTT	2s <sub>n</sub> T <sub>d</sub> T <sub>d</sub> T <sub>d</sub>	4PPPP	5appp	7wwW <sub>1</sub> W <sub>2</sub>	8N <sub>h</sub> C <sub>L</sub> C <sub>M</sub> C <sub>H</sub>
222D <sub>s</sub> V <sub>s</sub>	0s <sub>s</sub> T <sub>w</sub> T <sub>w</sub> T <sub>w</sub>	2P <sub>w</sub> P <sub>w</sub> H <sub>w</sub> H <sub>w</sub>	3d <sub>w1</sub> d <sub>w1</sub> d <sub>w2</sub> d <sub>w2</sub>	4P <sub>w1</sub> P <sub>w1</sub> H <sub>w1</sub> H <sub>w1</sub>	5P <sub>w2</sub> P <sub>w2</sub> H <sub>w2</sub> H <sub>w2</sub>	6I <sub>s</sub> E <sub>s</sub> E <sub>s</sub> R <sub>s</sub>
8S <sub>w</sub> T <sub>b</sub> T <sub>b</sub> T <sub>b</sub>	ICE	c <sub>i</sub> S <sub>i</sub> b <sub>i</sub> D <sub>i</sub> z <sub>i</sub>	PLAIN LANGUAGE			TRANSMITTED BY
No Government Administration, or Company or person employed in the forwarding and delivery of this message shall be liable for any loss or damage arising from failure to transmit or to deliver the said message or from any neglect, delay, error or omission in the transmission thereof.						

Supersedes NOAA Form 72-4A (1-82) which should be destroyed.

Adapted for testing purposes only from U.S. Department of Commerce  
 National Oceanic and Atmospheric Administration  
 National Weather Service  
 Further reproduction prohibited without permission



## D044NG



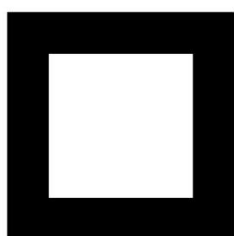
Adapted for testing purposes only from CUTLER, Dutton's Nautical Navigation, 15<sup>th</sup> edition

Copyright © 2004 by the U.S. Naval Institute

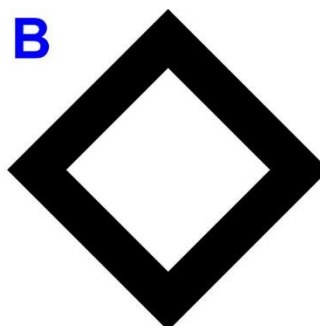
Further reproduction prohibited without permission

**D045NG**

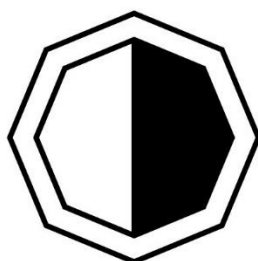
**A**



**B**



**C**



**D**

