

U.S.C.G. Merchant Marine Exam

Assistant Engineer – Limited

Q614 Engineering Safety & Environmental Protection

(Sample Examination)

Choose the best answer to the following Multiple-Choice Questions:

1. Wooden shoring, with a cross-sectional dimension of 4" X 4" should not be longer than _____.
- A. 8 feet
 - B. 10 feet
 - C. 16 feet
 - D. 20 feet

Correct answer: B

2. After measuring the length to which a section of shoring should be cut, you should cut the shoring _____.
- A. to the same length as the measured length
 - B. approximately 1/2 inch shorter per foot of the measured length to allow for wet expansion
 - C. approximately 1/2 inch longer than the measured length to allow for trimming
 - D. approximately 1/2 inch shorter than the measured length to allow for the use of wedges

Correct answer: D

3. The wooden plug fitted tightly in the vent of a damaged tank may prevent the tank from _____.
- A. developing free surfaces
 - B. developing free surface moments
 - C. collapsing
 - D. filling completely

Correct answer: D

4. In a compartment that has been completely flooded with water, the greatest pressure will be exerted _____.
- A. at the vertical center of the bulkhead
 - B. along the bottom of any bulkhead
 - C. at a point that is one-third from the bottom of the bulkhead
 - D. along the top of the bulkhead

Correct answer: B

5. Which type of respiratory protection is preferable for the repair/investigation personnel in a hydrogen sulfide (H₂S) environment?
- A. Emergency Escape Breathing Apparatus (EEBA)
 - B. Self-Contained Demand-Type Breathing Apparatus (SCDBA)
 - C. U.S. Navy Oxygen Breathing Apparatus (OBA)
 - D. Positive Self-Contained Breathing Apparatus (SCBA)

Correct answer: D

6. Which of the components listed are interchangeable between different backpack self-contained breathing apparatus produced by various manufacturers?
- A. The air cylinder
 - B. The facepiece
 - C. The regulator
 - D. All of the above

Correct answer: A

7. Which of the following statements is TRUE concerning life jackets?
- A. Buoyant vests may be substituted for life jackets.
 - B. Life jackets are designed to turn an unconscious person's face clear of the water.
 - C. Life jackets must always be worn with the same side facing outwards to float properly.
 - D. Lightly stained or faded life jackets will fail in the water and should not be used.

Correct answer: B

8. The external flotation bladder on an immersion suit should be inflated _____.
- A. before you enter the water
 - B. after you enter the water
 - C. after one hour in the water
 - D. after you notice that your suit is losing buoyancy

Correct answer: B

9. The hand brake of a lifeboat winch is _____.
- A. manually disengaged when hoisting a boat
 - B. applied by dropping the counterweighted lever
 - C. controlled by the centrifugal brake mechanism
 - D. automatically engaged if lowering speed is excessive

Correct answer: B

10. In heavy seas the helmsman should steer the survival craft _____.
- A. into the seas
 - B. broadside to the seas
 - C. in the same direction as the seas
 - D. in a series of figure-eights

Correct answer: A

11. To activate an air regeneration canister on a survival craft, you _____.
- A. put it into a container of water
 - B. tear off the tabs on the canister
 - C. turn it upside down
 - D. push "on" button

Correct answer: B

12. If a life raft should capsize, _____.

- A. climb onto the bottom
- B. swim away from the raft
- C. right the raft using the righting straps
- D. inflate the righting bag

Correct answer: C

13. The spreading of fire as a result of heat being carried through a vessel's ventilation system, is an example of heat transfer by _____.

- A. conduction
- B. convection
- C. radiation
- D. windage

Correct answer: B

14. It is necessary to cool the bulkheads and decks surrounding a compartment where there is a fire in order to _____.

- A. cool the metal below its ignition temperature
- B. form a dense coating of smothering steam
- C. prevent oxygen from reaching the flames
- D. prevent the fire from spreading by the conduction of heat

Correct answer: D

15. Hazardous conditions exist which may result in spontaneous combustion when _____.

- A. oil-soaked rags are stowed in the machine shop
- B. dry metal turnings accumulate
- C. powdered aluminum is stowed dry
- D. all of the above

Correct answer: A

16. To prevent oily rags from spontaneously igniting they should be _____.

- A. cleaned thoroughly for reuse
- B. kept in the paint locker
- C. discarded as soon as possible
- D. kept in nonmetal containers

Correct answer: C

17. A magnesium fire would be classified as a _____.

- A. class "A"
- B. class "B"
- C. class "C"
- D. class "D"

Correct answer: D

18. A class "D" fire would involve the burning of _____.

- A. diesel oil
- B. electrical insulation
- C. dunnage
- D. magnesium

Correct answer: D

19. To fight a class "C" fire, you should use carbon dioxide or _____.

- A. mechanical foam
- B. chemically treated saw dust
- C. dry chemical
- D. chemical foam

Correct answer: C

20. When required to work in an area where explosive gases may accumulate, you should use hand tools which are _____.

- A. high carbon steel
- B. approved by the Coast Guard
- C. fixed with a ferrous cover
- D. non-ferrous

Correct answer: D

21. Good housekeeping on a vessel prevents fires by _____.

- A. allowing better access in an emergency
- B. eliminating potential fuel sources
- C. eliminating trip hazards
- D. improving personnel qualifications

Correct answer: B

22. Paints and solvents used aboard a vessel should be _____.

- A. returned to the paint locker after each use
- B. drained into a common container after each use
- C. stowed safely at the work site until work is completed
- D. covered with a fine mesh screen to protect from ignition sources

Correct answer: A

23. In a typical automatic fire alarm system, all zone circuits are always connected _____.

- A. to the trouble alarm supervising resistor
- B. in series
- C. in parallel
- D. to the detecting cabinet

Correct answer: D

24. The advantage of using a dry chemical fire extinguishing agent is _____.
- A. its excellent cooling ability
 - B. permanent extinguishment regardless of the reignition sources
 - C. its good stability and non-toxicity
 - D. all of the above

Correct answer: C

25. Which of the following statements is true concerning carbon dioxide when used as a fire extinguishing agent?
- A. Carbon dioxide is corrosive when exposed to fire.
 - B. Its smothering effect is excellent for class "B" fires.
 - C. Carbon dioxide should be applied slowly to a large engine room fire.
 - D. Its total cooling effect is far greater than water.

Correct answer: B

26. Recharging a previously used cartridge-operated dry chemical fire extinguisher is accomplished by _____.
- A. authorized fire equipment servicing personnel only
 - B. recharging the cartridge and refilling it with powder
 - C. puncturing the cartridge seal after installation
 - D. replacing the propellant cartridge and refilling it with powder

Correct answer: D

27. In a cartridge-operated dry chemical type fire extinguisher, when the CO₂ cartridge is activated, the dry chemical is released from the extinguisher _____.
- A. with the squeeze-grip on/off nozzle at the end of the hose
 - B. with the squeeze-grip trigger on top of the container
 - C. by turning the activating handle on the bottom of the container
 - D. by squeezing the control valve carrying handle

Correct answer: A

28. Which fire extinguisher is most prone to freezing when stowed in low temperatures?
- A. Halon 1211
 - B. Foam
 - C. Dry chemical
 - D. Carbon dioxide

Correct answer: B

29. Which of the following statements is true concerning the fire extinguisher shown in the illustration?
Illustration SF-0006
- A. There is no danger of reflash in using the illustrated extinguisher on a class "B" fire.
 - B. The illustrated extinguisher must never be used in conjunction with water.
 - C. The agent may be applied in short bursts by squeezing and releasing the lever on the nozzle.
 - D. The initial discharge of the extinguisher should be at close range to scatter the burning material.

Correct answer: C

30. When the cotton cover of a fire hose becomes oily or greasy, it should be washed with a solution of mild soapy fresh water and _____.
- A. cornstarch
 - B. a soft-bristled brush
 - C. paint thinner
 - D. a wire brush

Correct answer: B

31. A low velocity fog applicator is retained in an all-purpose nozzle by a bayonet joint. The applicator is prevented from rotating in the joint by _____.
- A. a locknut
 - B. water pressure
 - C. a keeper screw
 - D. a spring-loaded catch

Correct answer: D

32. The source of power for the CO2 discharge alarm siren is obtained from _____.
- A. The general alarm 24-volt DC bus
 - B. The flow of CO2 under pressure
 - C. The emergency power and lighting bus
 - D. All of the above

Correct answer: B

33. When fighting a shipboard fire, crew members securing doorways, hatches, and applying cooling water to adjacent decks and bulkheads, while monitoring the spread of heat and smoke, are setting a _____.
- A. buffer zone
 - B. fire boundary
 - C. safety perimeter
 - D. cooling zone

Correct answer: B

34. During cargo operations, a deck fire has occurred due to a leaking cargo line. You should FIRST _____.
- A. prevent the spread of fire with a foam dam
 - B. apply CO2 on the burning fuel at its source
 - C. blanket the cargo spill with foam
 - D. stop the transfer of cargo

Correct answer: D

35. The most effective method of extinguishing a class "A" fire is by _____.
- A. using a sodium based dry chemical
 - B. blanketing and smothering
 - C. quenching and cooling
 - D. using non-conducting extinguishers

Correct answer: C

36. When approaching a fire from windward, you should shield firefighters from the fire by using an applicator and _____.

- A. a straight stream of water
- B. high-velocity fog
- C. foam spray
- D. low-velocity fog

Correct answer: D

37. The most important characteristic of a fire extinguishing agent to be used on electrical fires is for the agent to be _____.

- A. wet
- B. non-conducting
- C. flame resistant
- D. easily removable

Correct answer: B

38. If a fire ignites in the engine room as a result of a high-pressure fuel oil leak, you should FIRST _____.

- A. find a soda acid extinguisher
- B. secure the ventilation
- C. shut off the fuel oil supply
- D. secure the generator

Correct answer: C

39. The airborne concentrations of substances (such as hydrogen sulfide) under which nearly all workers may be repeatedly exposed without adverse effects are called _____.

- A. exposure limits
- B. concentration limits
- C. threshold limit values
- D. substance limit values

Correct answer: C

40. The reading of a combustible gas indicator indicates the percentage of the _____.

- A. Concentration of flammable gas in a compartment
- B. Lower explosive limit of a flammable gas concentration
- C. Concentration by weight of nonflammable gas in a compartment
- D. Upper explosive limit of a flammable gas concentration

Correct answer: B

41. If you see an individual fall overboard, what is the FIRST thing you should do?

- A. pass the word to the bridge
- B. throw a life ring overboard
- C. hail "Man Overboard"
- D. sound three prolonged blasts

Correct answer: B

42. Before entering a fuel tank that has been cleaned, it should be checked with an oxygen indicator and a/an _____.
- A. Orsat apparatus
 - B. halide torch
 - C. flame safety lamp
 - D. combustible gas indicator

Correct answer: D

43. Before entering any space that has been sealed, its oxygen level should be tested. What level of oxygen in the space is equal to fresh air?
- A. 10.0%
 - B. 15.8%
 - C. 20.8%
 - D. 25.8%

Correct answer: C

44. The worst atmospheric condition for dispersion of hydrogen sulfide is _____.
- A. nearly calm, clear nights or early morning
 - B. full sun with high winds
 - C. heavy rain
 - D. gusty winds with rain

Correct answer: A

45. The explosive range of methane is 5% to 15% by volume in air. This means a vapor/air mixture of _____.
- A. 3 percent methane by volume is too rich to burn
 - B. 5 percent methane by volume will give a reading of 100 percent LEL on a combustible gas indicator
 - C. 10 percent methane by volume is too rich to burn
 - D. 20 percent methane by volume is too lean to burn

Correct answer: B

46. Which of the petroleum products listed has a flash point below 150°F?
- A. Asphalt
 - B. Light fuel oils
 - C. Road oils
 - D. Lubricating oils

Correct answer: B

47. Which of the following hazards is associated with the handling of petroleum products?
- A. Fire
 - B. Asphyxiation
 - C. Explosion
 - D. All of the above

Correct answer: D

48. An LNG carrier has an approved type of gas detecting system to detect methane leaks in the _____.

- A. cargo handling rooms
- B. boiler burner supply piping
- C. barrier spaces
- D. all of the above

Correct answer: D

49. If, in a compartment or space, the gas or oxygen content is not within permissible concentration, and dangerous gases are either present, or may be produced by residues, what would be the safety designation listed on a marine chemist's certificate?

- A. Safe for Men - Not Safe for Fire
- B. Safe for Men - Safe for Fire
- C. Not Safe for Men - Not Safe for Fire
- D. Not Safe for Men - Safe for Fire

Correct answer: C

50. A health hazard term listed on a Safety Data Sheet (SDS) that indicates allergic-like reaction in some people after repeated exposure is _____.

- A. skin contact hazard
- B. pyrophoric hazard
- C. sensitizer
- D. oxidizer

Correct answer: C

51. A specific document which identifies a chemical, and lists its physical properties, health hazards, required controls, firefighting procedures, cleanup methods, waste disposal, and the safe handling and storage requirements, is commonly called a _____.

- A. Safety Data Sheet
- B. Hazardous Chemical Information Sheet
- C. Physical/Chemical Characteristics Document
- D. Hazardous Chemical Loading Document

Correct answer: A

52. According to 33 CFR Subchapter O (Pollution), an oceangoing ship of over 400 gross tons must be fitted with a standard discharge shore connection. What size bolt circle diameter is required for this shore connection to transfer oily ballast to a shoreside reception facility?

- A. 125 mm
- B. 183 mm
- C. 215 mm
- D. 250 mm

Correct answer: B

53. In accordance with 33 CFR Subchapter O (Pollution), a shipboard oil pollution emergency plan is required to be reviewed _____.
- A. Annually only
 - B. Biennially only
 - C. Quad-annually only
 - D. Only once every five years

Correct answer: A

54. In accordance with 33 CFR Subchapter O (Pollution), where will you find the procedures for the reporting of oil discharge into the water?
- A. The vessel's Oil Record Book
 - B. The vessel's Oil Transfer Procedures
 - C. The vessel's Certificate of Inspection
 - D. The vessel's International Oil Pollution Prevention Certificate

Correct answer: B

55. When the scuppers are plugged and an oil spill occurs on deck, you should _____.
- A. remove plugs from scuppers to allow the spill to run overboard and wipe the area dry with rags
 - B. use absorbent material, such as sawdust, to clean up the spill
 - C. remove plugs from scuppers and wash fuel overboard with water
 - D. remove plugs from scuppers and wash the fuel overboard with a solvent

Correct answer: B

56. One consideration for determining the safest maximum rate at which bunker fuel may be received is by the _____.
- A. number of tanks to be filled
 - B. size of the fuel storage tanks ashore
 - C. type of fuel transfer pump
 - D. distance to the fuel storage tanks ashore

Correct answer: A

57. In accordance with 33 CFR Subchapter O (Pollution), the Oil Record Book for all U.S. ships _____.
- A. Is the property of the U.S. government
 - B. Is required to have entries recorded within 48 hours of completion of the particular operation
 - C. Should not be used to record the accidental discharge of oil or oily mixtures
 - D. Is to be kept in the personal possession of the master

Correct answer: A

58. In accordance with 33 CFR Subchapter O (Pollution), each operation involving the transfer of oil or oily mixture that requires an entry in the Oil Record Book shall be fully recorded _____.
- A. Within 24 hours of completion of the project
 - B. Within 48 hours of completion of the operation
 - C. Without delay
 - D. Within 12 hours of completion of the operation

Correct answer: C

59. In accordance with 33 CFR Subchapter O (Pollution), which of the following operations aboard a tanker must be recorded in the Oil Record Book on a tank-to-tank basis according to Coast Guard Regulations?
- A. The discharge overboard in port or at sea of any bilge water accumulated in machinery spaces
 - B. The loading or unloading of any or all oil cargo
 - C. Any internal transfer of oil cargo during a voyage
 - D. All of the above

Correct answer: D

60. Stability is determined principally by the relationship of the center of gravity and the _____.
- A. center of buoyancy
 - B. aft perpendicular
 - C. center of flotation
 - D. keel

Correct answer: A

61. If additional weight is placed on the main deck of the vessel shown in the illustration _____.
Illustration SF-0023
- A. K will rise
 - B. G will rise
 - C. KB will go down
 - D. GM will increase

Correct answer: B

62. The symbol shown in the illustration, which is used as the reference from which transverse measurements are made, is _____. Illustration SF-0022
- A. 5
 - B. 4
 - C. 3
 - D. 1

Correct answer: A

63. The distance between the bottom of the hull and the waterline is called _____.
- A. reserve buoyancy
 - B. draft
 - C. freeboard
 - D. tonnage

Correct answer: B

64. The symbol shown in the illustration and used as a reference from which the height of the center of gravity is measured, is item number _____. Illustration SF-0022
- A. 5
 - B. 4
 - C. 3
 - D. 2

Correct answer: D

65. A vessel trimmed down by the bow has _____.

- A. a greater draft aft than forward
- B. zero trim
- C. a low mean draft
- D. a greater draft forward than aft

Correct answer: D

66. Which of the following describes a vessel which is subjected to "hogging"?

- A. It has its main deck plating under tensile stress.
- B. It has its bottom plating under ductile stress.
- C. It has its bottom plating under shearing stress.
- D. It has its main deck plating under compressive stress.

Correct answer: A

67. The angular movement of a vessel about a horizontal line drawn from its bow to its stern is _____.

- A. swaying
- B. pitching
- C. heaving
- D. rolling

Correct answer: D

68. In accordance with 46 CFR Subchapter W, the fuel tanks of motor-propelled lifeboats shall be _____.

- A. Emptied and the fuel changed at least once each year
- B. Constructed so as to be completely spill proof
- C. Hydrostatically tested at each inspection for certification
- D. Emptied and gas freed when the ship is dry-docked

Correct answer: A

69. In accordance with 33 CFR Subchapter O (Pollution), a vessel operating upon the Great Lakes shall _____.

- A. Have its forwardmost frame members sufficiently stiffened to prevent ice damage
- B. Not discharge any garbage into these waters
- C. Be certified for inland use only
- D. Be required to re-distill all water used for cooling or condensate systems

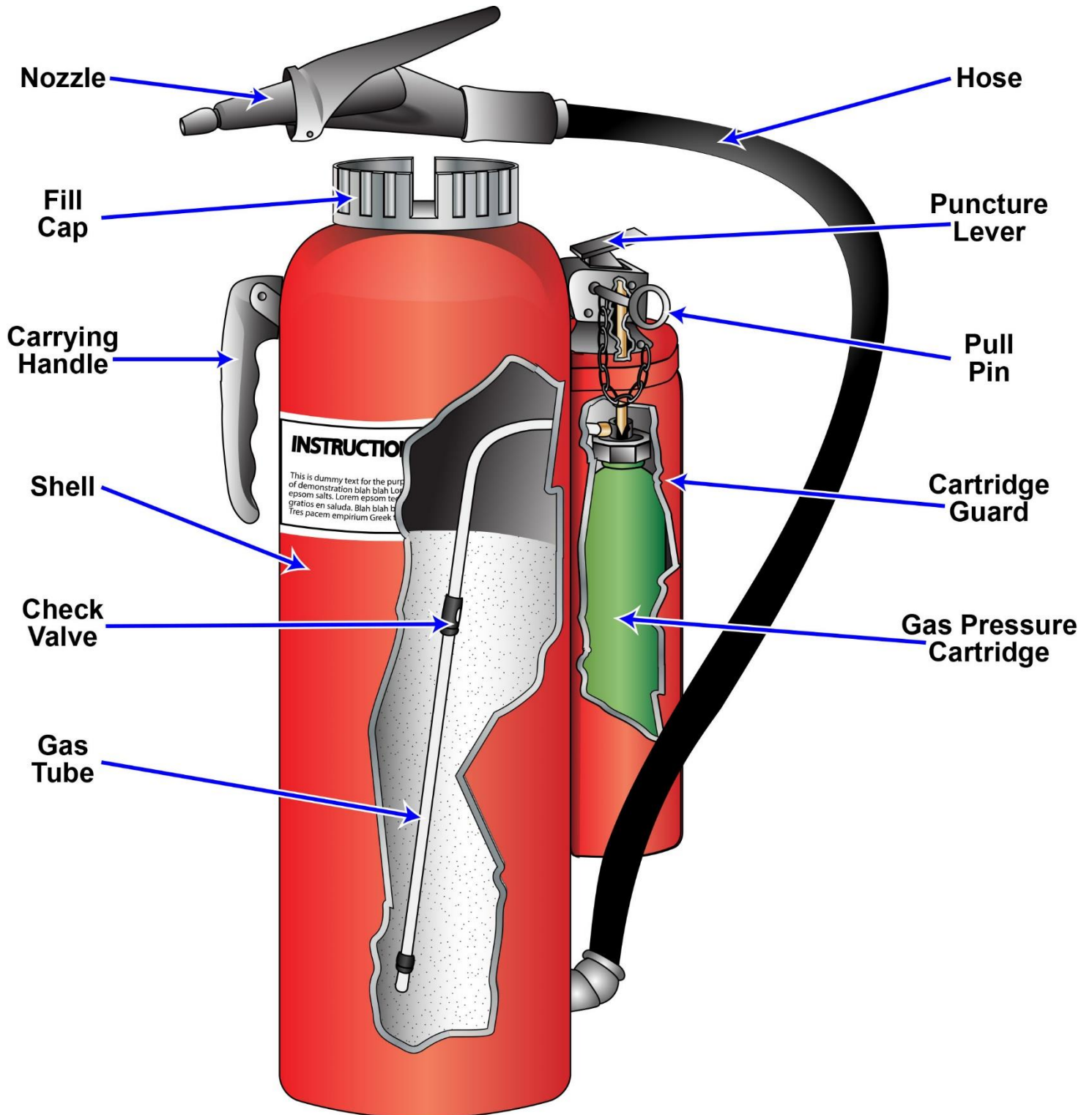
Correct answer: B

70. In accordance with 33 CFR Subchapter O, which of the following is NOT a MARPOL, Annex V, special area?

- A. Great Lakes
- B. Red Sea
- C. Black Sea
- D. Mediterranean Sea

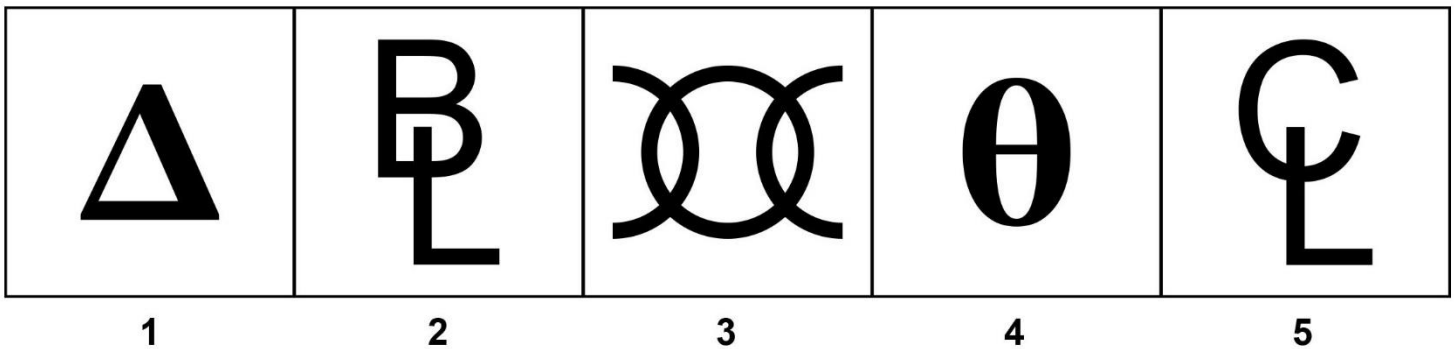
Correct answer: A

SF-0006

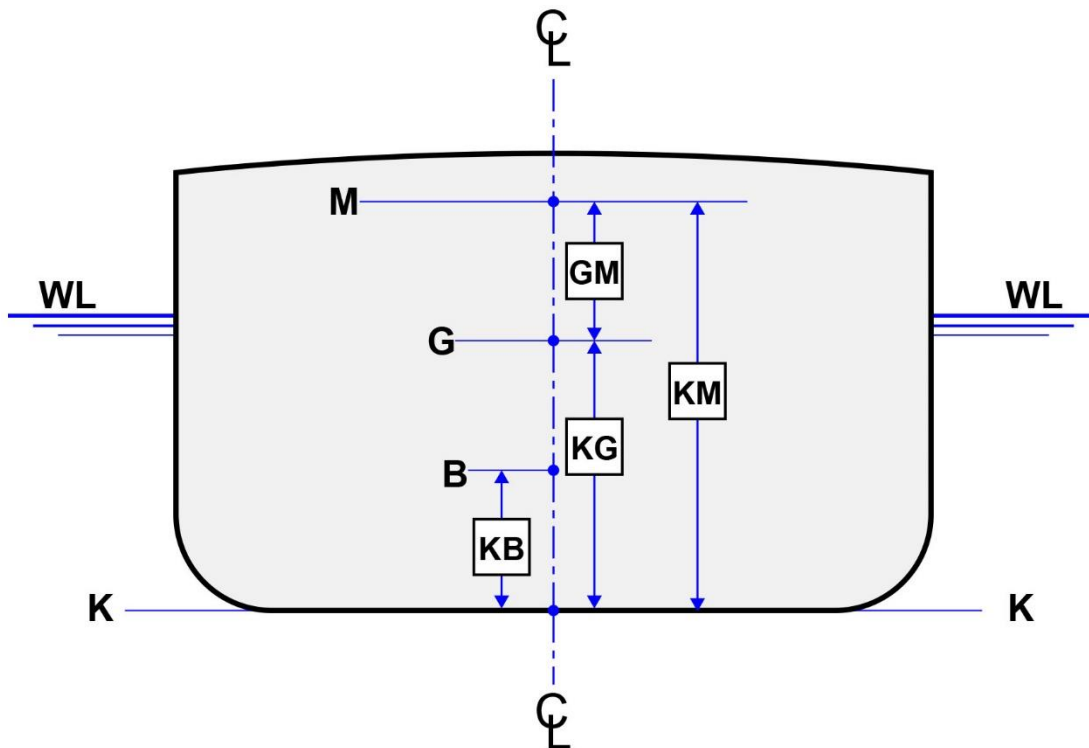


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SF-0022 Vessel Dimensional Data Symbols



SF-0023 Stability Calculations



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