

U.S.C.G. Merchant Marine Exam

MODU – Assistant Engineer

Q716 Engineering Safety & Environmental Protection

(Sample Examination)

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

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

Correct answer: C

2. An acceptable method of temporarily sealing a crack formed in the hull of a vessel is to _____.
- A. apply a patch of sheet packing backed by a strongback or shoring
 - B. shore up the crack with welded braces
 - C. drill holes at each end
 - D. tack weld a doubler plate over the crack

Correct answer: A

3. The bypass valve on a self-contained breathing apparatus (SCBA) bypasses _____.
- A. the regenerator in an emergency
 - B. the regulator in an emergency
 - C. a breathing bag containing excessive pressure
 - D. oxygen to the atmosphere

Correct answer: B

4. A rigid lifesaving device designed for a group of survivors to hold on to while in the water is defined as a _____.
- A. Life raft
 - B. Life cushion
 - C. Life preserver
 - D. Buoyant apparatus

Correct answer: D

5. 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

6. Which of the following statements is true concerning an immersion suit and its use?
- A. Only a light layer of clothing may be worn underneath.
 - B. They provide sufficient flotation to do away with the necessity of wearing a life jacket.
 - C. They should be tight fitting.
 - D. A tear in the suit will not appreciably reduce its value.

Correct answer: B

7. 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

8. The canopy of your life raft should _____.
- A. go into place as the raft is inflated
 - B. be put up after everyone is aboard
 - C. be put up only in severe weather
 - D. be used as a sail if the wind is blowing

Correct answer: A

9. Which of the conditions listed is necessary for a substance to burn?
- A. The mixture of vapors with air must be between the LEL and the UEL
 - B. The temperature of the substance must be equal to or above its fire point
 - C. The air must contain oxygen in sufficient quantity
 - D. All of the above

Correct answer: D

10. All of the following are part of the fire triangle EXCEPT _____.
- A. fuel
 - B. oxygen
 - C. heat
 - D. electricity

Correct answer: D

11. The blocking open or absence of fire dampers can contribute to _____.
- A. the accumulation of explosive gases
 - B. faster cooling of the fire
 - C. the fire spreading by way of the ventilation system
 - D. fixed foam systems to be ineffective

Correct answer: C

12. To prevent the spread of fire by convection you should _____.
- A. close all openings to the area
 - B. cool the bulkhead around the fire
 - C. remove combustibles from direct exposure
 - D. shut off electrical power

Correct answer: A

13. A burning mattress is considered as which of the following classes of fire?

- A. Class "A"
- B. Class "B"
- C. Class "C"
- D. Class "D"

Correct answer: A

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

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

Correct answer: D

15. A simple precaution to reduce the possibility of accidental fires in the paint locker, is to _____.

- A. label the fixed firefighting system
- B. store paint cans on metal shelves only
- C. not allow oily rags to accumulate in the space
- D. place a portable fire extinguisher immediately outside the locker

Correct answer: C

16. Which of the following procedures reduces the possibility of an interior ventilation duct fire from rapidly spreading?

- A. Having a portable CO₂ ready at each duct opening
- B. Having a fire hose charged at each duct opening
- C. Keeping the duct exterior clean
- D. Keeping the duct interior clean

Correct answer: D

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

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

Correct answer: D

18. A three inch overboard discharge line, located six feet below the waterline, has ruptured and separated from the hull. What would be the minimum number of strokes per minute required from a 10" x 8" x 12" duplex double acting steam operated reciprocating bilge pump, operating at 96% efficiency, to keep the bilge water level from continuing to rise? Illustration SF-0034

- A. 45 strokes per minute
- B. 56 strokes per minute
- C. 87 strokes per minute
- D. 98 strokes per minute

Correct answer: C

19. Which of the following is required to be included in the fireman's (emergency) outfit?

- A. Chemical protection face shield
- B. Approved work vest
- C. Self-contained breathing apparatus
- D. 5 cell approved flashlight

Correct answer: C

20. The process that occurs when heat is generated by a chemical reaction within a substance and continues to a point of ignition is known as _____.

- A. chemical combustion
- B. radiation ignition
- C. chemical ignition
- D. spontaneous combustion

Correct answer: D

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

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

Correct answer: D

22. The advantage of using a dry chemical fire extinguishing agent is _____.

- A. permanent extinguishment regardless of the reignition sources
- B. its good stability and non-toxicity
- C. its excellent cooling ability
- D. all of the above

Correct answer: B

23. Which of the following statements is true concerning the Halon 1301 fire extinguishing agent?

- A. The agent is highly toxic as stored in pressurized cylinders.
- B. The agent is less effective than carbon dioxide.
- C. The agent cannot be used on electrical fires because it leaves a residue.
- D. Halon extinguishes the fire by a chain breaking reaction.

Correct answer: D

24. Annual servicing of a hand portable CO₂ fire extinguisher includes _____.

- A. Weighing the cylinder and recharging if weight loss exceeds 10% of the weight of the charge
- B. Inspecting the pressure gauge to ensure the needle is within operating range
- C. Hydrostatic testing of the cylinder
- D. Discharging, cleaning inside, and recharging

Correct answer: A

25. Which of the following statements is true concerning Halon 1301 fire extinguishing equipment?

- A. The agent cannot be used on electrical fires because it leaves a residue.
- B. The agent is highly toxic at normal room temperature.
- C. For portable extinguishers, the agent is only available in a 2-pound unit.
- D. Halon extinguishes the fire by smothering action.

Correct answer: C

26. Which of the listed characteristics applies to a semi-portable CO₂ system?

- A. The cylinders are mounted horizontally.
- B. It has a portable hose and nozzle.
- C. Each cylinder must weigh less than 50 pounds.
- D. It has distribution piping installed permanently.

Correct answer: B

27. 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

28. A ship's low-pressure CO₂ fixed fire extinguishing system is normally designed for a storage tank pressure and temperature of approximately _____.

- A. 14.7 psia and 0 degrees Fahrenheit
- B. 150 psig and 72 degrees Fahrenheit
- C. 300 psig and 0 degrees Fahrenheit
- D. 1500 psig and 72 degrees Fahrenheit

Correct answer: C

29. What is the purpose of opening the doors and portholes in figure 2 of the illustration? Illustration SF-0013

- A. To provide air flow around the compartment in order to contain the fire
- B. To keep the hose teams cool
- C. To allow water used to fight the fire to flow out of the superstructure
- D. To allow venting of combustion products from the fire to the atmosphere

Correct answer: D

30. During cargo operations, a deck fire has occurred due to a leaking cargo line. You should FIRST _____.

- A. stop the transfer of cargo
- B. blanket the cargo spill with foam
- C. apply CO₂ on the burning fuel at its source
- D. prevent the spread of fire with a foam dam

Correct answer: A

31. If deck cargo is carried, it should be stowed so that it _____.

- A. is not higher than 12 inches above the deck
- B. will cover less than 25 percent of deck space
- C. does not block access to the fire station hydrant
- D. will be easily visible from the bridge

Correct answer: C

32. Which extinguishing agent is the best for use on electrical fires?

- A. Water fog
- B. CO₂
- C. Dry chemical
- D. Foam

Correct answer: B

33. A large fire has developed in the HFO centrifuge room accessed by door "E". To combat the fire, you should _____. Illustration SF-0013

- A. Only need to set up a hose team to cool the door, then open the door and extinguish the fire using a type B-II extinguisher
- B. Advance the hose team into the room without any additional preparatory action
- C. Keep the door tightly closed until all the oil has been consumed by the fire
- D. Cool adjoining horizontal and vertical surfaces before opening the door to extinguish the fire

Correct answer: D

34. When fighting a liquefied natural gas fire, you should _____.

- A. secure the source of gas, then extinguish the fire
- B. extinguish the fire, then secure the source of gas
- C. use only carbon dioxide
- D. use only dry chemical

Correct answer: A

35. If flammable vapors have penetrated a gas free space, which of the following actions would be the most hazardous to perform?

- A. Opening switches in the space to de-energize circuits
- B. Closing switches adjacent to the space to operate vent fans
- C. Leaving electrical circuits energized in the space
- D. Securing all power to the space from a remote location

Correct answer: A

36. 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

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

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

Correct answer: A

38. An oxygen indicator will detect _____.

- A. the presence of harmful amounts of carbon monoxide
- B. concentrations of explosive gas
- C. an oxygen deficiency in a space
- D. all of the above

Correct answer: C

39. In accordance with 33 CFR Subchapter O (Pollution), which of the following is a mandatory section of the shipboard oil pollution emergency plan?

- A. Removal equipment list
- B. Reporting requirements
- C. Plan exercises
- D. List of individuals required to respond

Correct answer: B

40. 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

41. Which of the petroleum products listed has a flash point below 150°F?

- A. Asphalt
- B. Lubricating oils
- C. Light fuel oils
- D. Road oils

Correct answer: C

42. Bunker "C" is classified as a grade _____.

- A. "A" liquid
- B. "B" liquid
- C. "E" liquid
- D. "D" liquid

Correct answer: C

43. When checking the level of a volatile liquid in a tank on the weather deck of a tank vessel, you should position yourself _____.
- A. at a right angle to the wind direction
 - B. on the windward side of the opening
 - C. on the leeward side of the opening
 - D. so that the obstruction of your body will protect you from the fumes

Correct answer: A

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

Correct answer: C

45. 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

46. Small oil spills on deck can be prevented from contaminating any waters by _____.
- A. placing floating booms around the ship
 - B. plugging all scuppers and drains
 - C. regularly emptying all drip pans
 - D. thoroughly draining all bunkering hoses

Correct answer: B

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

Correct answer: D

48. If the cause of severe list or trim of a vessel is due to off-center ballast, counter-flooding into empty tanks will _____.
- A. decrease list or trim
 - B. increase list or trim
 - C. increase the righting moment
 - D. increase the righting arm

Correct answer: A

49. In the absence of external forces, the center of gravity of a floating vessel is located directly above the _____.
- A. metacenter
 - B. center of flotation
 - C. geometric center of the displaced volume
 - D. amidships

Correct answer: C

50. 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

SF-0013

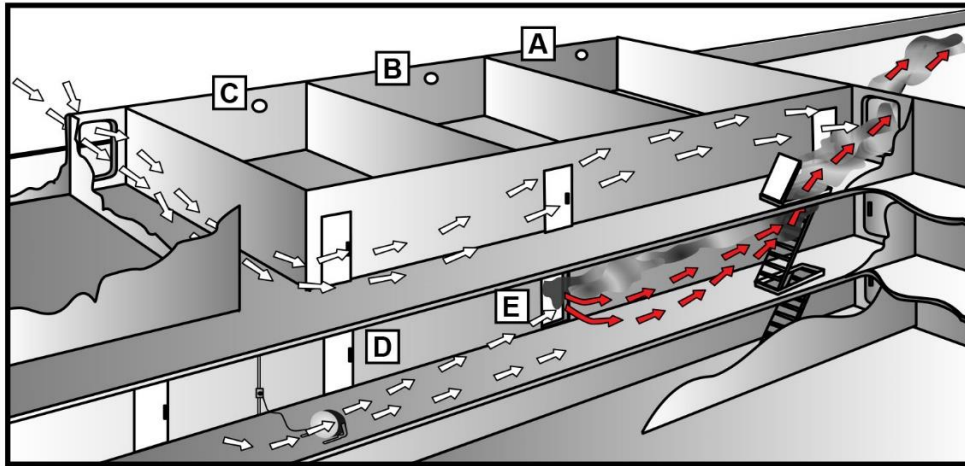


Figure 1

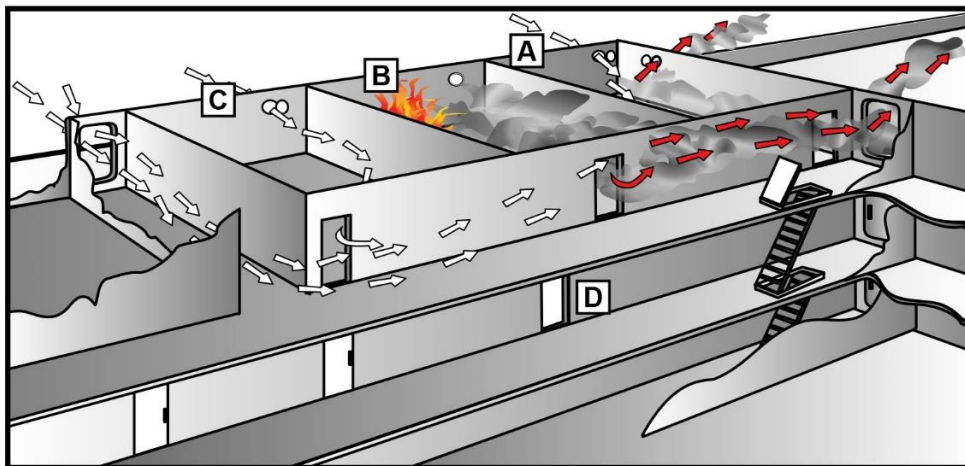


Figure 2

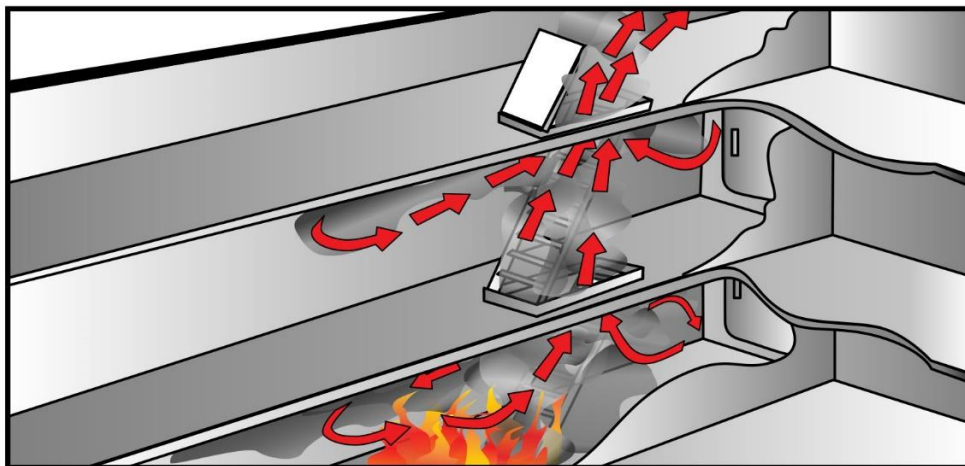
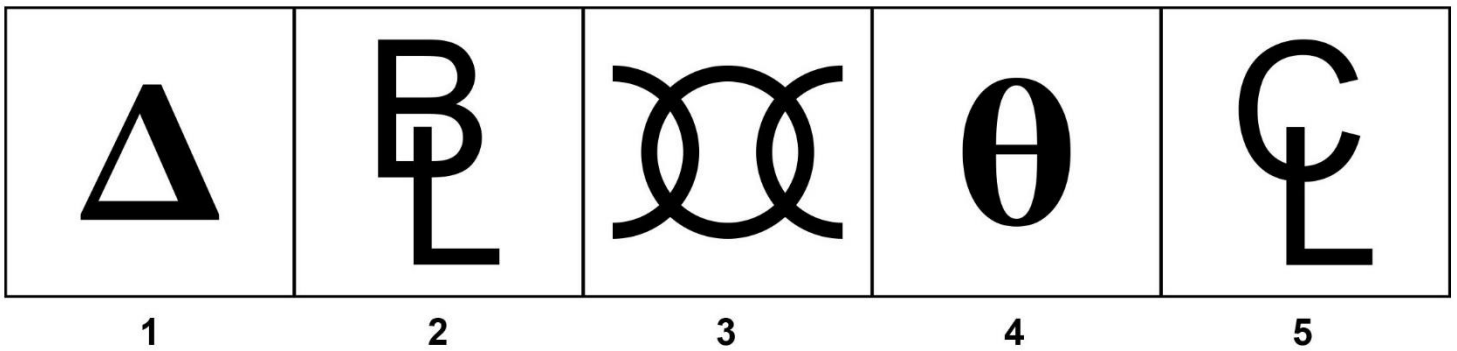


Figure 3

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SF-0022

**Vessel Dimensional
Data Symbols**



SF-0034

Flow of Gallons of Water Per Minute (gpm) Through Various Hole Diameters (in) at Various Heads (ft) of Water

	2 ft	4 ft	6 ft	8 ft	10 ft	12 ft	14 ft	16 ft
1 in	28 gpm	40 gpm	49 gpm	56 gpm	63 gpm	69 gpm	74 gpm	79 gpm
2 in	111 gpm	157 gpm	192 gpm	222 gpm	248 gpm	272 gpm	294 gpm	314 gpm
3 in	250 gpm	354 gpm	433 gpm	500 gpm	559 gpm	612 gpm	661 gpm	707 gpm
4 in	445 gpm	629 gpm	770 gpm	889 gpm	994 gpm	1089 gpm	1176 gpm	1257 gpm
5 in	695 gpm	982 gpm	1203 gpm	1389 gpm	1553 gpm	1701 gpm	1837 gpm	1964 gpm
6 in	1000 gpm	1414 gpm	1732 gpm	2000 gpm	2236 gpm	2449 gpm	2646 gpm	2828 gpm
7 in	1361 gpm	1925 gpm	2357 gpm	2722 gpm	3043 gpm	3333 gpm	3601 gpm	3849 gpm
8 in	1777 gpm	2514 gpm	3078 gpm	3555 gpm	3974 gpm	4354 gpm	4702 gpm	5027 gpm
9 in	2249 gpm	3181 gpm	3896 gpm	4499 gpm	5030 gpm	5510 gpm	5951 gpm	6362 gpm
10 in	2777 gpm	3927 gpm	4809 gpm	5553 gpm	6209 gpm	6802 gpm	7347 gpm	7854 gpm

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