

U.S.C.G. Merchant Marine Exam

DDE – 1000/4000 HP

Q633 Engineering Safety & Environmental Protection

(Sample Examination)

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

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

Correct answer: B

2. A flat block placed under the end of a shore for the purpose of distributing pressure is referred to as a _____.
- A. strongback
 - B. butt piece
 - C. shore foot
 - D. shole

Correct answer: D

3. After measuring the length to which a section of shoring should be cut, you should cut the shoring _____.
- A. approximately 1/2 inch shorter than the measured length to allow for the use of wedges
 - 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. to the same length as the measured length

Correct answer: A

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

Correct answer: C

5. Which of the devices listed would be safe to use in a compartment with insufficient oxygen?
- A. Dust or gas mask.
 - B. Self-contained breathing apparatus.
 - C. Wet handkerchief.
 - D. Canister type mask.

Correct answer: B

6. You are involved in an emergency landing of a helicopter on the water. You should inflate your life jacket _____.
- A. upon entering the helicopter
 - B. prior to reaching the water
 - C. after reaching the water, but prior to exiting the helicopter
 - D. after exiting clear of the helicopter

Correct answer: D

7. 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 should be tight fitting.
 - C. A tear in the suit will not appreciably reduce its value.
 - D. They provide sufficient flotation to do away with the necessity of wearing a life jacket.

Correct answer: D

8. When collecting condensation for drinking water, _____.
- A. a sponge used to mop up and store condensation must be kept salt free
 - B. only condensation on the bottom of the canopy should be collected
 - C. it should be strained through a finely woven cloth
 - D. chlorine tablets should be used to make it drinkable

Correct answer: A

9. 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

10. 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

11. When using foam, a "Class B" fire is extinguished by _____.
- A. smothering the fire
 - B. replacing the fuel
 - C. cooling the surface
 - D. all of the above

Correct answer: A

12. 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. Carbon dioxide should be applied slowly to a large engine room fire.
- C. Its total cooling effect is far greater than water.
- D. Its smothering effect is excellent for class "B" fires.

Correct answer: D

13. A hand portable CO₂ fire extinguisher is effective on burning oil only _____.

- A. If applied in connection with foam
- B. If applied promptly
- C. To prevent rekindling
- D. If attempts to extinguish the fire with low velocity fog have failed

Correct answer: B

14. Recharging a previously used cartridge-operated dry chemical fire extinguisher is accomplished by _____.

- A. recharging the cartridge and refilling it with powder
- B. replacing the propellant cartridge and refilling it with powder
- C. puncturing the cartridge seal after installation
- D. authorized fire equipment servicing personnel only

Correct answer: B

15. 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 keeper screw
- B. a locknut
- C. a spring-loaded catch
- D. water pressure

Correct answer: C

16. Fire hoses located at protected fire stations must always be _____.

- A. connected to the fire hydrant
- B. capped on the ends for protection
- C. supplied with a smooth bore nozzle
- D. open to the air to prevent rot

Correct answer: A

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

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

Correct answer: B

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

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

Correct answer: A

19. Which of the following statements represents the correct action to take when three crew members discover a fire?

- A. All three men fight the fire and report it immediately after it is extinguished.
- B. One man reports the fire, one man fights the fire, and one man evacuate and secure the area.
- C. One man reports the fire, and the other two men fight the fire.
- D. One man reports the fire, one man fights the fire, and one man act as a safety observer.

Correct answer: B

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

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

Correct answer: C

21. The longer an oil fire is permitted to burn, the _____.

- A. easier it is to extinguish
- B. easier it is to control
- C. harder it is to extinguish
- D. less chance there is of reignition

Correct answer: C

22. 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

23. The highest concentration of a harmful substance to which a person may be exposed without danger to health, is termed the _____.

- A. vapor pressure
- B. odor threshold
- C. threshold limit value
- D. tolerance point

Correct answer: C

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

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

Correct answer: A

25. Before entering a fuel tank that has been cleaned, it should be checked with an oxygen indicator and a/an _____.

- A. flame safety lamp
- B. Orsat apparatus
- C. halide torch
- D. combustible gas indicator

Correct answer: D

26. In accordance with 33 CFR Subchapter O (Pollution), each completed page of the Oil Record Book must be signed by the _____.

- A. Chief engineer
- B. Engineer on watch
- C. Master
- D. Chief mate

Correct answer: C

27. In accordance with 46 CFR Subchapter I (Cargo and Miscellaneous Vessels), fire main outlet valves or hydrants located on exposed decks shall be _____.

- A. Behind glass or a suitably marked enclosure
- B. Opened up and internally examined at each Coast Guard biannual inspection for certification
- C. Protected against freezing or be fitted with cutout valves and drain valves
- D. All of the above

Correct answer: C

28. Which of the precautions listed should be observed when taking on diesel fuel?

- A. Provide a portable fan to blow away fumes.
- B. Prohibit smoking in the area.
- C. Display a black triangle during daylight hours.
- D. Secure all lighting to the main deck.

Correct answer: B

29. As its temperature rises, the volume of fuel oil stored in a tank will _____.

- A. decrease
- B. remain the same
- C. increase
- D. none of the above

Correct answer: C

- 30.** 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

- 31.** A fire involving trash and paper waste would be classified as a _____.
- A. class "A"
 - B. class "B"
 - C. class "C"
 - D. class "D"

Correct answer: A

- 32.** A class "B" fire develops on the weather deck amidships of a moored tank vessel. The fire party should man the _____.
- A. windward monitor and direct the foam onto a vertical surface while standing by with a charged hose to protect the monitor operator with water fog if needed
 - B. leeward monitor and direct the foam onto a vertical surface while applying water fog to protect the monitor operator
 - C. windward monitor and direct the foam onto a vertical surface while applying water fog to the fire
 - D. leeward monitor and direct the foam onto a vertical surface while applying a solid stream of water to wash residual fuel over the side away from the pier

Correct answer: A

- 33.** Radiation can cause a fire to spread by _____.
- A. transmitting the heat of a fire through the ship's metal
 - B. burning liquids flowing into another space
 - C. heated gases flowing through ventilation systems
 - D. the transfer of heat across an unobstructed space

Correct answer: D

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

Correct answer: D

35. To prevent the spread of fire by convection you should _____.

- A. cool the bulkhead around the fire
- B. remove combustibles from direct exposure
- C. close all openings to the area
- D. shut off electrical power

Correct answer: C

36. The most likely location for a liquid cargo fire to occur on a tanker would be _____.

- A. In the amidships house
- B. At the main deck manifold
- C. At the vent header
- D. In the pumproom

Correct answer: D

37. 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

38. On a cargo ship equipped with a combination fire detection/carbon dioxide extinguishing system, the presence of fire is indicated at the cabinet simultaneously in two spaces: No.3 hold upper between decks, containing bagged coffee beans; and No.4 lower hold containing fertilizer. To combat these fires, you should _____.

- A. open the applicable three-way valve for No.4 hold. After discharge, secure the valve; then open the applicable valve for No.3 hold
- B. open the applicable three-way valve for No.3 hold and fight the fire in No.4 hold with water
- C. open the three-way valves to each space simultaneously
- D. activate the pilot CO2 cylinders, directing the discharge to No.3 hold, then to No.4 hold through the three-way valve

Correct answer: A

39. Fire detecting systems on merchant vessels may be arranged to sense _____.

- A. rate of temperature rise
- B. ionized particles
- C. smoke
- D. all of the above

Correct answer: D

40. If the cause of severe list or trim of a vessel is due to off-center ballast, counter-flooding into empty tanks will _____.

- A. increase list or trim
- B. decrease list or trim
- C. increase the righting arm
- D. increase the righting moment

Correct answer: B

41. If additional weight is placed on the main deck of the vessel shown in the illustration _____. Illustration SF-0023

- A. K will rise
- B. GM will increase
- C. KB will go down
- D. G will rise

Correct answer: D

42. The weight of the liquid displaced by a vessel floating in sea water is equal to the _____.

- A. weight required to sink the vessel
- B. total weight of the vessel
- C. displaced submerged volume
- D. reserve buoyancy

Correct answer: B

43. In the absence of external forces, adding weight to one side of a floating vessel, will cause the vessel to _____.

- A. decrease draft at the center of flotation
- B. list until the center of buoyancy is aligned vertically with the center of gravity
- C. trim to the side opposite TCG until all moments are equal
- D. heel until the angle of loll is reached

Correct answer: B

44. The important stability parameter "KG" is defined as the _____.

- A. Metacentric height
- B. Height of the metacenter above the keel
- C. Height of the center of buoyancy above the keel
- D. Height of the center of gravity above the keel

Correct answer: D

45. The vapors given off by heated fuel oil are flammable, explosive, and _____.

- A. heavier than air
- B. lighter than air
- C. non-toxic
- D. odorless

Correct answer: A

46. When pumping sour crude, which gas should be tested for prior to entering the cargo pumphoom to repair a leaking pump?

- A. Benzene
- B. Carbon monoxide
- C. Hydrogen sulfide
- D. Tetraethyl lead

Correct answer: C

47. A tank or compartment is "gas free" when there is an absence of dangerous concentrations of _____.

- A. any combustible liquid
- B. flammable or toxic gases
- C. all flammable liquids
- D. residues from cargo oil

Correct answer: B

48. If the chemical material is a mixture, what must the Safety Data Sheet (SDS) identify?

- A. The name of each hazardous ingredient.
- B. Paints or coatings that are safe to use with it.
- C. Other similar mixtures of liquids, solids or gases.
- D. None of the above.

Correct answer: A

49. Victual waste is _____.

- A. The final waste product of a manufacturing process
- B. The final discharge of sewage treatment plants
- C. The resultant sludge that is collected after water washing a boiler
- D. Any garbage that comes from food or food provisions

Correct answer: D

50. If an incorrect entry were made in the Oil Record Book, you should _____.

- A. erase the entry and rewrite it
- B. draw a single line through the wrong entry and initial it
- C. notify the ship's officer in charge
- D. completely black it out and make the correct entry alongside

Correct answer: B



SF-0013

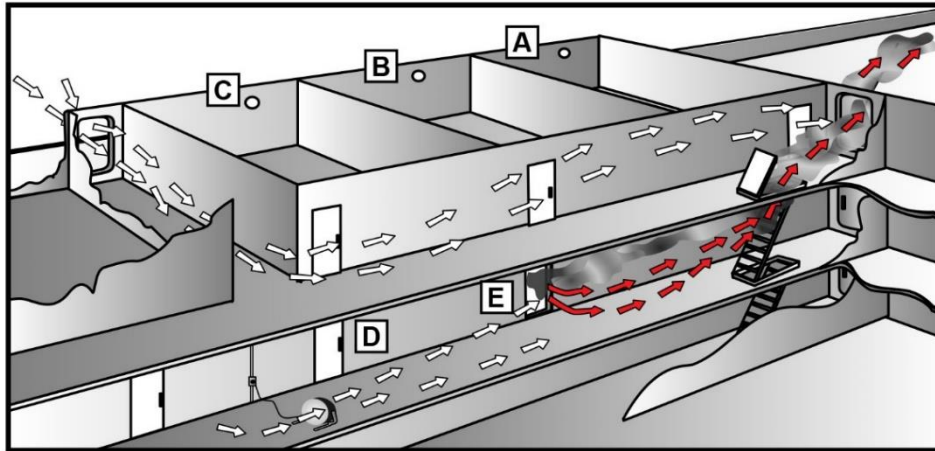


Figure 1

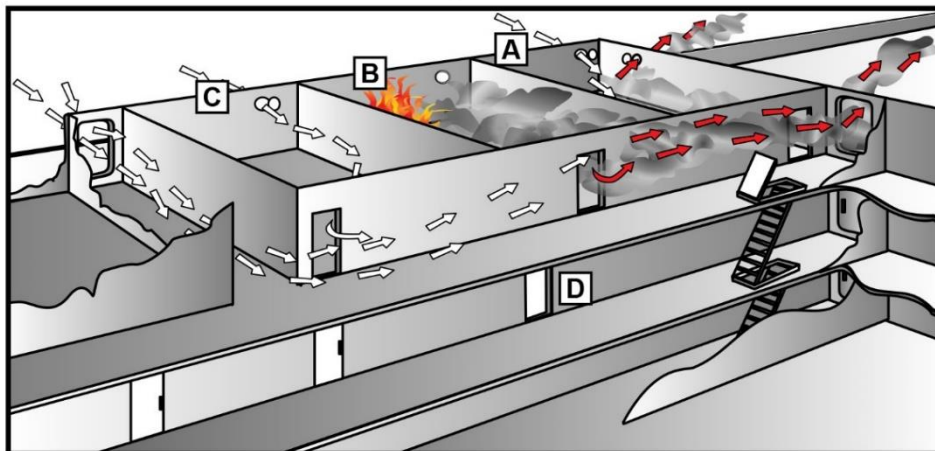


Figure 2

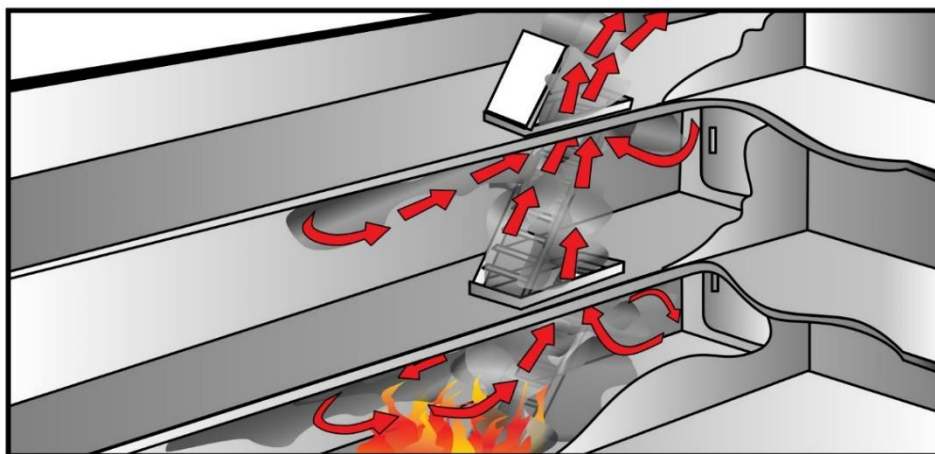


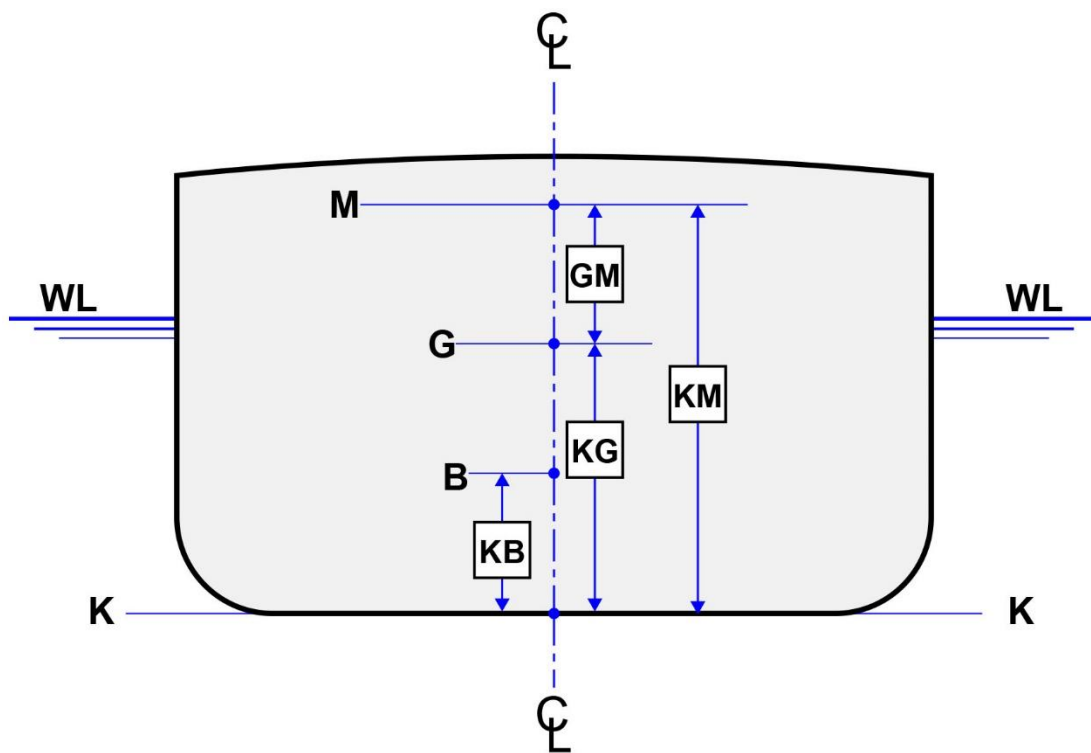
Figure 3

Adapted for testing purposes only from Marine Fire Prevention, Firefighting and Fire Safety
U.S. Department of Transportation Maritime Administration
Further reproduction prohibited without permission



SF-0023

Stability Calculations



Adapted for testing purposes only from LA DAGE, Stability and Trim
for the Ship's Officer, Third Edition
Copyright © 1983 by Cornell Maritime Press, Inc.
Further reproduction prohibited without permission