

## 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) collapsing
  - (C) developing free surfaces
  - (D) filling completely

*If choice D is selected set score to 1.*

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

*If choice D is selected set score to 1.*

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

*If choice B is selected set score to 1.*

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

*If choice A is selected set score to 1.*

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

*If choice B is selected set score to 1.*

6. 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.

*If choice B is selected set score to 1.*

7. An immersion suit should be equipped with a/an \_\_\_\_\_.

- (A) air bottle for breathing
- (B) whistle and hand-held flare
- (C) whistle, strobe light, and reflective tape
- (D) whistle, hand-held flare, and sea dye marker

*If choice C is selected set score to 1.*

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

*If choice A is selected set score to 1.*

9. The most important reason for taking anti-seasickness pills as soon as possible after entering a life raft is to \_\_\_\_\_.

- (A) assist in sleeping
- (B) reduce appetite by decreasing nausea
- (C) prevent loss of body moisture by vomiting
- (D) prevent impaired judgment due to motion-induced deliriousness

*If choice C is selected set score to 1.*

10. The purpose of the wire stretched between the lifeboat davit heads is to \_\_\_\_\_.

- (A) keep the movement of the davits at the same speed
- (B) keep the davits from slipping when they are in the stowed position
- (C) prevent vibration during lowering of the boat
- (D) support the manropes

*If choice D is selected set score to 1.*

**11.** The advantage of using a dry chemical fire extinguishing agent is \_\_\_\_\_.

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

*If choice B is selected set score to 1.*

**12.** Which of the following statements is true concerning carbon dioxide when used as a fire extinguishing agent?

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

*If choice D is selected set score to 1.*

**13.** 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) replacing the propellant cartridge and refilling it with powder
- (D) puncturing the cartridge seal after installation

*If choice C is selected set score to 1.*

**14.** In a cartridge-operated dry chemical type fire extinguisher, when the CO<sub>2</sub> cartridge is activated, the dry chemical is released from the extinguisher \_\_\_\_\_.

- (A) by turning the activating handle on the bottom of the container
- (B) with the squeeze-grip on/off nozzle at the end of the hose
- (C) by squeezing the control valve carrying handle
- (D) with the squeeze-grip trigger on top of the container

*If choice B is selected set score to 1.*

**15.** 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) paint thinner
- (B) a wire brush
- (C) cornstarch
- (D) a soft-bristled brush

*If choice D is selected set score to 1.*

**16.** Fire hoses located at protected fire stations must always be \_\_\_\_\_.

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

*If choice C is selected set score to 1.*

**17.** If deck cargo is carried, it should be stowed so that it \_\_\_\_\_.

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

*If choice C is selected set score to 1.*

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

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

*If choice D is selected set score to 1.*

**19.** During cargo operations, a deck fire has occurred due to a leaking cargo line. You should FIRST \_\_\_\_\_.

- (A) stop the transfer of cargo
- (B) prevent the spread of fire with a foam dam
- (C) blanket the cargo spill with foam
- (D) apply CO<sub>2</sub> on the burning fuel at its source

*If choice A is selected set score to 1.*

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

- (A) Dry chemical
- (B) Water fog
- (C) Foam
- (D) CO<sub>2</sub>

*If choice D is selected set score to 1.*

**21.** The longer an oil fire is permitted to burn, the \_\_\_\_\_.

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

*If choice B is selected set score to 1.*

**22.** Which of the following conditions is true concerning flammable liquid vapors with a concentration above the upper explosive limit?

- (A) The mixture is too rich to burn.
- (B) The mixture is too lean to burn.
- (C) The vapor is about to explode.
- (D) Conditions are perfect for combustion.

*If choice A is selected set score to 1.*

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

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

*If choice A is selected set score to 1.*

**24.** 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

*If choice D is selected set score to 1.*

**25.** 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

*If choice A is selected set score to 1.*

**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) Master
- (C) Engineer on watch
- (D) Chief mate

*If choice B is selected set score to 1.*

**27.** In accordance with 46 CFR Subchapter H (Passenger Vessels), which of the following statements is true regarding sprinkler heads which are normally activated by the melting of a fusible link?

- (A) Sprinkler heads installed in the living spaces would have a higher melting point fusible link than those installed in the galley.
- (B) Sprinkler heads installed in the galley and living spaces would have the same fusible link melting point.
- (C) Sprinkler heads installed in the galley would have a higher melting point fusible link than those installed in the living spaces.
- (D) None of the above; sprinkler heads with fusible links are prohibited aboard U.S. flag vessels.

*If choice C is selected set score to 1.*

**28.** Your vessel is taking on bunkers from a shoreside facility. If oil begins flowing from one tank vent, which of the following actions should be taken FIRST?

- (A) Close the valve on the tank vent line.
- (B) Set out drip pans and sawdust and begin to mop up the spill.
- (C) Open the intake valve to an adjacent tank.
- (D) Signal the shore control point to shut down.

*If choice D is selected set score to 1.*

**29.** When should you expect to find an insulating flange in a fueling hose?

- (A) When static electricity is not expected to be a problem.
- (B) When a bonding cable is employed.
- (C) When transferring LNG.
- (D) When the terminal is equipped with a cathodic protection system.

*If choice D is selected set score to 1.*

**30.** In accordance with 33 CFR Subchapter O (Pollution), which of the following is NOT required to be provided as part of the appendixes of the Shipboard Oil Pollution Emergency Plan?

- (A) A list of agencies or officials of Coastal State administrations responsible for receiving and processing incident reports.
- (B) A list which specifies who will be responsible for informing the parties listed and the priority in which they must be notified.
- (C) A list of agencies or officials in regularly visited ports.
- (D) A list of personnel duty assignments.

*If choice D is selected set score to 1.*

**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"

*If choice A is selected set score to 1.*

**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 applying water fog to the fire
- (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 standing by with a charged hose to protect the monitor operator with water fog if needed
- (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

*If choice C is selected set score to 1.*

**33.** In figure 1 of the illustration, fire would spread to compartment "B" by \_\_\_\_\_. Illustration SF-0013

- (A) Impingement
- (B) Radiation
- (C) Conduction
- (D) Convection

*If choice C is selected set score to 1.*



**34.** 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) spontaneous combustion
- (D) chemical ignition

*If choice C is selected set score to 1.*

**35.** All of the following are part of the fire triangle EXCEPT \_\_\_\_\_.

- (A) fuel
- (B) oxygen
- (C) heat
- (D) electricity

*If choice D is selected set score to 1.*

**36.** When required to work in an area where explosive gases may accumulate, you should use hand tools which are \_\_\_\_\_.

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

*If choice D is selected set score to 1.*

**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

*If choice C is selected set score to 1.*

**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.3 hold and fight the fire in No.4 hold with water
- (B) open the applicable three-way valve for No.4 hold. After discharge, secure the valve; then open the applicable valve for No.3 hold
- (C) open the three-way valves to each space simultaneously
- (D) activate the pilot CO<sub>2</sub> cylinders, directing the discharge to No.3 hold, then to No.4 hold through the three-way valve

*If choice B is selected set score to 1.*

**39.** In a typical automatic fire alarm system, all zone circuits are always connected \_\_\_\_\_.

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

*If choice A is selected set score to 1.*

**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) increase the righting arm
- (C) increase the righting moment
- (D) decrease list or trim

*If choice D is selected set score to 1.*

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

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

*If choice C is selected set score to 1.*

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

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

*If choice A is selected set score to 1.*

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

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

*If choice B is selected set score to 1.*

**44.** With no environmental forces acting on the vessel, the center of gravity of an inclined vessel is vertically aligned with the \_\_\_\_\_.

- (A) Original vertical centerline
- (B) Center of buoyancy
- (C) Center of flotation
- (D) Longitudinal centerline

*If choice B is selected set score to 1.*

**45.** The vapors given off by heated fuel oil are flammable, explosive, and \_\_\_\_\_.

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

*If choice C is selected set score to 1.*

**46.** Individuals who have consumed alcohol within 24 hours of exposure to H<sub>2</sub>S can tolerate \_\_\_\_\_.

- (A) unusually large concentrations of H<sub>2</sub>S
- (B) smaller than normal concentrations of H<sub>2</sub>S
- (C) moderate concentrations of H<sub>2</sub>S without the usual reactions
- (D) longer exposure to H<sub>2</sub>S concentrations

*If choice B is selected set score to 1.*

**47.** If emergency welding repairs must be made to the upper area of a fuel tank, the tank and/or adjacent compartments may need to be \_\_\_\_\_.

- (A) inerted
- (B) gas freed
- (C) filled with water
- (D) all of the above as necessary

*If choice D is selected set score to 1.*

**48.** 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) Material Safety Data Sheet
- (B) Hazardous Chemical Loading Document
- (C) Physical/Chemical Characteristics Document
- (D) Hazardous Chemical Information Sheet

*If choice A is selected set score to 1.*

**49.** 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

*If choice B is selected set score to 1.*

**50.** 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

*If choice C is selected set score to 1.*

## SF-0013

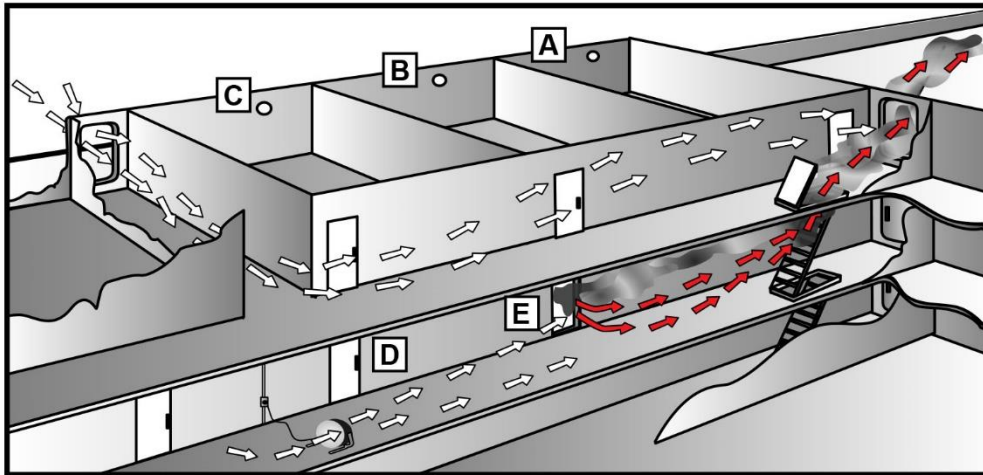


Figure 1

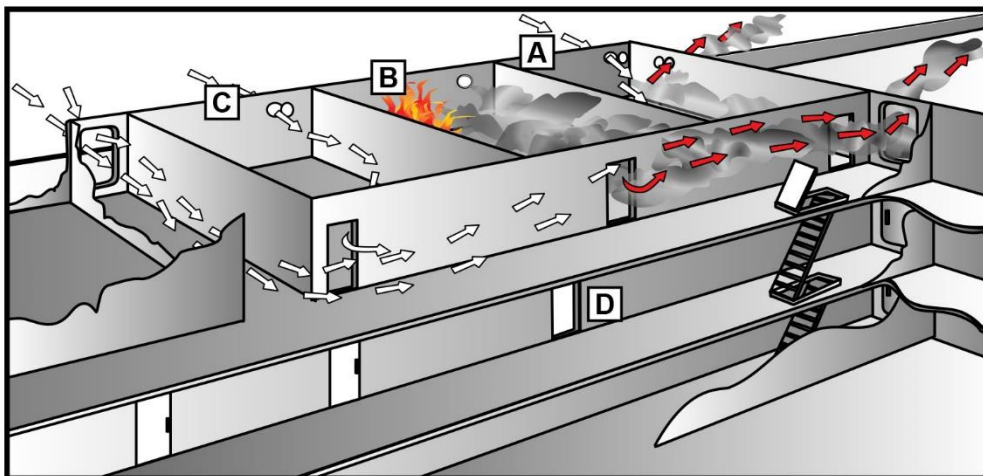


Figure 2

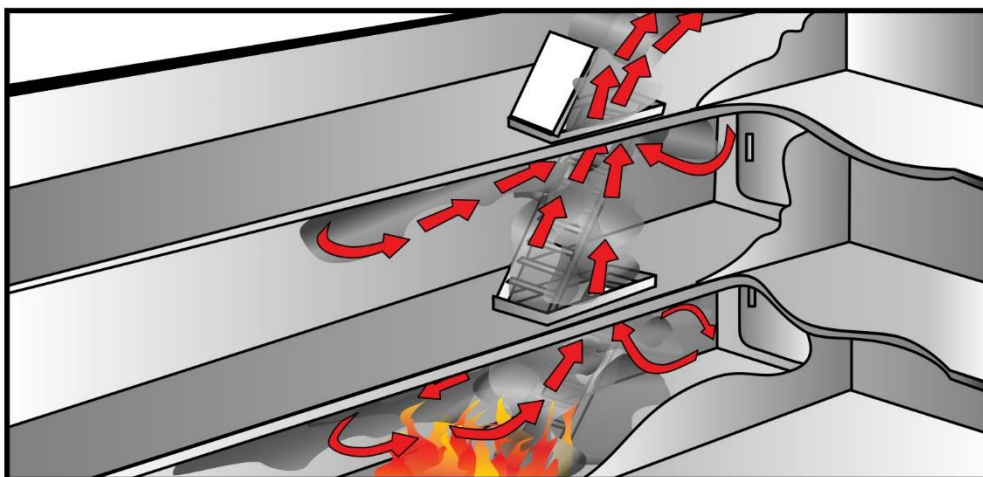
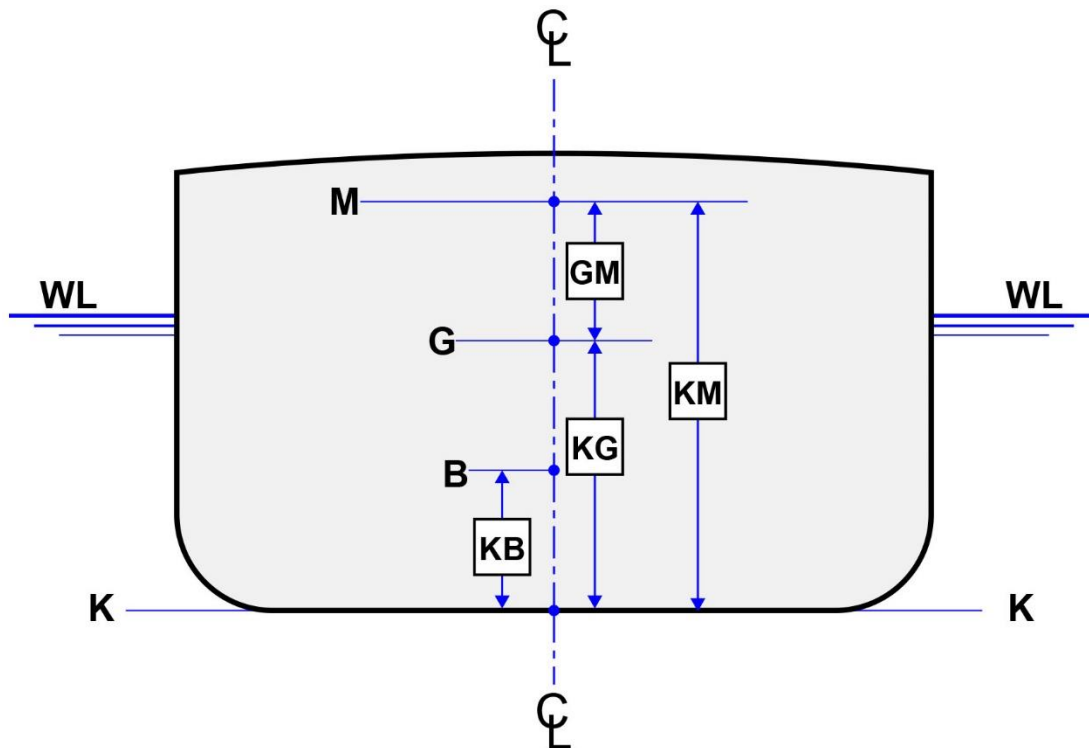


Figure 3

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SF-0023

## Stability Calculations



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