U.S.C.G. Merchant Marine Exam

OSV - Chief Engineer

Q683 Engineering Safety & Environmental Protection

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions:

1. While reviewing emergency response plans onboard your vessel, you have questions regarding the response for damage control conditions and the ship's construction, related to mitigating risks from structural damage. Which of the following sources of information would contain what you are looking for?

- ○ (A) The Hull and Machinery Certificate.
- ○ (B) The Safety of Life at Sea Certificate (SOLAS).
- • (C) The Vessel Stability Booklet.
- ○ (D) The Cargo Ship Safety Certificate.

If choice C is selected set score to 1.

2. Which of the methods shown in the illustration is the correct way to fit shoring? Illustration SF-0016

- • (A) A
- ○ (B) B
- ○ (C) C
- ○ (D) D

If choice A is selected set score to 1.

3. While maneuvering up the East River your vessel runs aground. As the chief engineer of the vessel how would you proceed?

- • (A) Sound all fuel oil tanks and inspect the engine room bilges and void spaces.
- ○ (B) Call your port engineer.
- ○ (C) Switch the saltwater cooling suction to the low sea suction.
- ○ (D) Wait until the vessel docks to sound the fuel oil tanks.

If choice A is selected set score to 1.

4. An acceptable method of temporarily sealing a crack formed in the hull of a vessel is to _____.

- ○ (A) shore up the crack with welded braces
- ○ (B) drill holes at each end
- ○ (C) tack weld a doubler plate over the crack
- • (D) apply a patch of sheet packing backed by a strongback or shoring

If choice D is selected set score to 1.

5. Your ship has run aground and it is necessary to determine whether or not a compartment has flooded. Therefore, you should _____.

- (A) open the hatch dogs on the side away from the hinges
- (B) tap the bulkhead with a hammer to check for a water level
- (C) open the watertight door and take a quick look
- (D) feel the bulkhead to see if it is hot

If choice B is selected set score to 1.

6. Prior to entering a compartment containing an atmosphere potentially dangerous to life or health and deficient in oxygen, you should don an approved breathing apparatus. Which of the listed devices would be suitable?

- (A) A canister-type gas mask.
- (B) An SCBA.
- (C) An emergency escape hood.
- (D) A filter-type mask.

If choice B is selected set score to 1.

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.

If choice B is selected set score to 1.

8. 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.

If choice B is selected set score to 1.

9. Which of the following statements concerning immersion suits is correct?

- (A) Suits are not required to automatically turn an unconscious person face-up in the water.
- (B) The immersion suit seals in all body heat and provides protection against hypothermia for weeks.
- (C) The suit is flameproof and provides protection to the wearer while swimming through burning oil.
- (D) The suits provide for limited body movement such as walking, climbing a ladder, and picking up small objects like a pencil.

If choice D is selected set score to 1.

10. You have abandoned ship and are in charge of a life raft. How much water per day should you permit each occupant to drink after the first 24 hours?

- (A) 1 can
- (B) 1 pint
- (C) 1 quart
- (D) 1 gallon

If choice B is selected set score to 1.

11. Puncture leaks in the lower tubes, or bottom of an inflatable life raft should first be stopped by using _____.

- (A) a tube patch
- (B) sealing clamps
- (C) repair tape
- (D) sail twine and vulcanizing kit

If choice B is selected set score to 1.

12. An "on-load" release system on a survival craft means the cable can be released _____.

- (A) only when the load is taken off the cable
- (B) only when there is a load on the cable
- (C) only when activated by the controls at the lowering station
- (D) at any time

If choice D is selected set score to 1.

13. With the sprinkler system and air system on, and all hatches shut, the survival craft will be protected from _____.

- (A) a nuclear environment
- (B) a fire and toxic environment
- (C) a hurricane
- (D) a drop greater than ten feet

If choice B is selected set score to 1.

14. 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.

15. Which of the gases listed is the poisonous gas most likely to be found in a closed compartment involved in a fire?

- (A) Nitrogen
- (B) Hydrogen
- (C) Carbon dioxide
- • (D) Carbon monoxide

If choice D is selected set score to 1.

16. A fire can be extinguished by removing _____.

- (A) the heat
- (B) the fuel
- (C) the oxygen
- • (D) any of the above

If choice D is selected set score to 1.

17. Through which of the listed processes is sufficient heat produced to cause spontaneous ignition?

- (A) Aeration
- (B) Anaerobic decomposition
- (C) Putrefaction
- • (D) Oxidation

If choice D is selected set score to 1.

18. In the event of a fire, the doors to a stair tower must be closed to prevent the spread of fire by _____.

- • (A) convection
- (B) conduction
- (C) radiation
- (D) ventilation

If choice A is selected set score to 1.

19. A Type C fire has been reported onboard your vessel. What type of materials would your fire teams expect to find at the scene?

- (A) Metals
- (B) Ordinary combustible materials where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance
- (C) Flammable liquids, greases, etc., where a blanketing effect is essential
- • (D) Electrical equipment where the use of nonconducting extinguishing agent is of first importance

If choice D is selected set score to 1.

20. A Type A fire has been reported onboard your vessel. What type of materials would your fire teams expect to find at the scene?

- (A) Electrical equipment where the use of a non-conducting extinguishing agent is of first importance
- (B) Metals
- (C) Ordinary combustible materials where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance
- (D) Flammable liquids, greases, etc., where a blanketing effect is essential

If choice C is selected set score to 1.

21. 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

If choice D is selected set score to 1.

22. 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

If choice D is selected set score to 1.

23. 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

If choice B is selected set score to 1.

24. You are reviewing emergency procedures with new crew members. How would you direct them to proceed if they hear the fire and emergency signal on the ship's general alarm or whistle?

- (A) Report to the bridge and wait further instructions.
- (B) Report to their stateroom and wait further instructions.
- (C) Report directly to the scene of the emergency to help.
- (D) Report to their assigned duty station as posted on the Station Bill, so an accurate muster can be taken.

If choice D is selected set score to 1.

25. Your ship is leaving port after almost a complete crew change out. The captain has ordered a fire drill simulating a fire in the engine room with full emergency gear and all hoses run out. What is the reason for drilling with this kind of simulation?

- (A) The World Health Organization requires crews to get regular exercise in the form of fire drills.
- (B) This ensures that your crew is prepared to combat a shipboard fire using ship's equipment.
- (C) Regulations require a full fire drill when more than half the crew changes out.
- (D) It provides a quick method to inventory all of the firefighting gear.

If choice B is selected set score to 1.

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

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

If choice D is selected set score to 1.

27. When an oil fire has been extinguished, the surface of the oil should be kept covered with foam to prevent _____.

- (A) boiling of the heated oil
- (B) toxic fumes from escaping to the surface
- (C) air from contacting the oil vapors permitting reignition
- (D) spontaneous combustion below the oil surface

If choice C is selected set score to 1.

28. The most common cooling agent used for fighting fires on tank vessels is _____.

- (A) steam smothering
- (B) carbon dioxide
- (C) flue gas
- (D) water

If choice D is selected set score to 1.

29. If a fire broke out in an automation console, you would first secure the power and then proceed to use which of the listed hand portable fire extinguishers?

- (A) Dry chemical
- (B) Soda acid
- (C) CO_2
- (D) Foam

If choice C is selected set score to 1.

30. Which of the listed methods, is the most effective to fight a fire on the open deck of a vessel if using a dry chemical type fire extinguisher?

- (A) Approach the fire from the windward side.
- (B) Direct the extinguisher discharge at the base of the fire.
- (C) Move the discharge stream back and forth in a rapid sweeping motion.
- (D) All of the above.

If choice D is selected set score to 1.

31. The fire extinguishing equipment shown in the illustration is a large _____. Illustration SF-0009

- (A) Halon 1301 hose reel system
- (B) light water hose reel system
- (C) dry chemical hose reel system
- (D) CO_2 hose reel system

If choice C is selected set score to 1.

32. Water applied as a "fog" can be more effective than water applied as a "solid stream", because _____.

- (A) it reduces the total amount of water that must be pumped into the ship to fight a given fire
- (B) it does not have to hit the seat of fire to be effective
- (C) a given amount of water can absorb more heat when it is in the form of fog
- (D) of all of the above

If choice D is selected set score to 1.

33. There is always a lower water pressure at the fire hose outlet than is found at the discharge of the pump. Which of the following reasons is the common cause of this loss in pressure?

- (A) Friction in the piping and valves
- (B) Leaky pilot valve
- (C) Wear in the hydrant
- (D) Leaky pump suction valve

If choice A is selected set score to 1.

34. The primary function of an automatic sprinkler system is to _____.

- (A) limit the spread of the fire and control the amount of heat produced
- (B) protect people in the areas which have had sprinkler heads installed
- (C) instantaneously extinguish the fire which triggered it
- (D) alert the crew to the fire

If choice A is selected set score to 1.

35. Why is it essential to introduce CO_2 from a fixed fire extinguishing system, into a large engine room, as quickly as possible?

- (A) To keep the fire from spreading through the bulkheads.
- (B) Carbon dioxide takes a long time to disperse to all portions of a space.
- (C) The fire may warp the CO_2 piping.
- (D) Updraft from the fire tends to carry the CO_2 away.

If choice D is selected set score to 1.

36. Your ship has a low-pressure carbon dioxide system that covers the engine room. Fire has been reported in the engine room and the decision has been made to dump the carbon dioxide system into the engine room. While following the procedures to release carbon dioxide you find one engine room supply fan damper that will not close. How should you proceed?

- (A) Continue the release procedures and dump the carbon dioxide with the damper still open.
- (B) Cover the fan damper opening with a plastic tarp to stop the flow of air into the engine room and then continue with the release procedures.
- (C) Cover the fan damper opening with burlap bags to slow the flow of air into the engine room and then continue with the release procedures.
- (D) Continue the release procedures and dump the carbon dioxide, after the release then try to seal the fan damper opening.

If choice B is selected set score to 1.

37. 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

If choice C is selected set score to 1.

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

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

If choice A is selected set score to 1.

39. 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

If choice A is selected set score to 1.

40. As team leader of the ship's No.2 emergency squad, you have just informed the bridge that the fire in the galley has been extinguished. What would you instruct your squad to do next?

- (A) Restock the emergency locker; replacing any equipment used during the fire.
- (B) Send them to coffee.
- (C) Refill any SCBA bottles used during the fire.
- (D) Set a reflash watch in the galley.

If choice D is selected set score to 1.

41. As first engineer you are the senior engineering officer in Emergency Squad #1. The fire alarm sounds and you report to the muster station where the bridge informs you smoke has been reported coming from the ship's laundry room. What should your first action be?

- (A) Start boundary cooling the area.
- (B) Charge the ship's fire main.
- (C) Help dress out other crew members in fireman's outfit.
- (D) Secure power and ventilation to the laundry room and inform the bridge once this is done.

If choice D is selected set score to 1.

42. According to Coast Guard Regulations (46 CFR 30), a flammable liquid with a Reid vapor pressure of 8-1/2 psi or less, and a flash point of 80°F or below, is a grade _____.

- (A) A
- (B) E
- (C) C
- (D) D

If choice C is selected set score to 1.

43. The "flammable limits" of an atmosphere are the _____.

- (A) upper and lower pressures between which an atmosphere will not burn
- (B) two temperatures between which an atmosphere will self-ignite
- (C) upper and lower percentage of vapor concentrations in an atmosphere which will burn if an ignition source is present
- (D) two temperatures between which an atmosphere will burn if an ignition source is present

If choice C is selected set score to 1.

44. When preparing to pump flammable liquids with a centrifugal pump, you should _____.

- (A) lift the relief valve by hand to check its operation
- (B) check for gland leakage and any fire hazard
- (C) draw a small quantity of liquid to prime the pump
- (D) have a standby pump running with the discharge valve closed

If choice B is selected set score to 1.

45. If diesel fuel vapors in a compartment are considered to be within the flammable range _____.

- (A) an explosion may occur if a source of ignition is present
- (B) the vapor air mixture is too lean to burn
- (C) the upper explosive limit has been exceeded
- (D) the vapor air mixture is too rich to burn

If choice A is selected set score to 1.

46. High concentrations of hydrogen sulfide gas are most dangerous to personnel because they can _____.

- (A) cause involuntary skeletal muscle contractions
- (B) paralyze your breathing system
- (C) cause eye inflammation
- (D) cause dizziness

If choice B is selected set score to 1.

47. Tankers carrying cryogenic cargoes, such as LNG, are fitted with gas detector systems alarmed at 30% of the lower explosive limit. If the gas detector alarm sounds, this means _____.

- (A) a flammable vapor concentration exists at the sample point, but it is too lean to burn
- (B) the detector sensor is sampling a space where the cargo vapor concentration is 30 percent by volume
- (C) the detector is sampling a space in which 30 percent of the atmosphere is explosive
- (D) an explosion is about to take place

If choice A is selected set score to 1.

48. The atmosphere of an empty fuel tank is tested and designated "gas free". Which of the following statements is correct concerning this tank?

- (A) The gas free status is good as long as the initial conditions remain unchanged.
- (B) The concentration of flammable gas in the compartment is less than 10% of the lower flammable limit.
- (C) The tank should be frequently retested.
- (D) All of the above.

If choice D is selected set score to 1.

49. What term is listed on a Safety Data Sheet (SDS) to describe a chemical that can produce life-threatening or seriously disabling health hazards?

- (A) Recommended toxicity
- (B) Low toxicity
- (C) Moderate toxicity
- (D) High toxicity

If choice D is selected set score to 1.

50. Which of the following machinery space operations is required to be logged in the Oil Record Book?

- (A) Shifting suction of main fuel pump to reserve fuel oil tank.
- (B) Ballasting or cleaning of fuel oil tanks.
- (C) Daily inspection of engine room bilges.
- (D) Changing out sprayer plates to adjust for steam demand.

If choice B is selected set score to 1.

51. With regards to a ship's Oil Record Book, an oil tanker of 150 gross tons and above must maintain entries in _____.

- (A) Part I only
- (B) Part II only
- (C) Both Part I and Part II
- (D) Part III

If choice C is selected set score to 1.

52. The Oil Record Book must be maintained onboard the vessel for _____.

- (A) an annual inspection
- (B) the duration of the ship's active employment
- (C) 6 months and then submitted to the nearest Marine Safety Office for review
- (D) not less than 3 years and be readily available for inspection

If choice D is selected set score to 1.

53. Where will you find the procedures for the reporting of oil discharge into the water?

- (A) The vessel's Certificate of Inspection
- (B) The vessel's International Oil Pollution Prevention Certificate
- (C) The vessel's Oil Transfer Procedures
- (D) The vessel's Oil Record Book

If choice C is selected set score to 1.

54. Which of the following methods will reduce the possibility of producing an electrical spark?

- (A) Placing an insulating flange or a section of non-conducting hose in the hose setup.
- (B) Using a cargo hose with a built-in electrical bonding wire.
- (C) Connecting a bonding wire between the shoreside piping and the vessel.
- (D) All of the above.

If choice D is selected set score to 1.

55. While loading bulk oil, you notice oil on the water near the barge. Which of the following actions should you carry out FIRST?

- (A) Stop loading
- (B) Notify terminal superintendent
- (C) Search the vessel for leaks
- (D) Notify the Coast Guard

If choice A is selected set score to 1.

56. Victual waste is _____.

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

If choice A is selected set score to 1.

57. Which of the following statements is true concerning the overboard discharge of vessel sewage at sea?

- (A) The vessel must have an approved sewage plant.
- (B) The vessel may discharge disinfected and comminuted sewage into the sea, from an approved system, only if the vessel is more than 3 nautical miles from the nearest land.
- (C) The vessel may discharge sewage into the sea, from an approved system which is not comminuted or disinfected, only if the vessel is more than 12 nautical miles from the nearest land.
- (D) All of the above.

If choice D is selected set score to 1.

58. Your vessel was damaged in a collision and one compartment has partially flooded. The vessel has free communication with the sea with water flowing in and out as the vessel rolls. Which of the following is the most important factor contributing to free communication loss of stability?

- (A) Whether or not the damaged compartment on the opposite side of the vessel is full or empty.
- (B) Distance from the vessel centerline to the centerline of the damaged compartment.
- (C) Breadth of the damaged compartment affected.
- (D) Depth from the bottom of the damaged compartment to the waterline.

If choice B is selected set score to 1.

59. As chief engineer you should understand the fundamental principles of ship construction and theory and factors affecting trim and stability, including the concept of loll and its cause. An angle of loll is commonly caused by which of the following conditions?

- (A) A negative GM.
- (B) An off-center weight.
- (C) Free surface with G remaining below M.
- (D) High external force such as wind and current.

If choice A is selected set score to 1.

60. You are providing onboard training to your engineers on the factors affecting trim and stability. What instructions do you give your engineers to stabilize the ship should it experience an unstable rolling behavior?

- (A) Add ballast to a centerline double bottom tank.
- (B) Discharge dirty ballast from a centerline double bottom tank.
- (C) Add ballast to wing tank to the side of the ship with an angle of list.
- (D) Discharge water from the forepeak tank.

If choice A is selected set score to 1.

61. As chief engineer of an oceangoing passenger vessel, it is important to know the effect of trim and stability of your ship in the event of damage to a compartment. To minimize the impact of flooding in the event of a grounding, what should be your ship's safe practice regarding watertight doors and hatches?

- (A) All watertight doors in subdivision bulkheads shall be kept closed during navigation except when necessarily opened for working of the vessel, and in such cases they shall always be ready to be immediately closed.
- (B) All watertight doors in subdivision bulkheads shall be kept closed when the vessel is anchored except when necessarily opened for working of the vessel, and in such cases they shall always be ready to be immediately closed.
- (C) All watertight doors in subdivision bulkheads shall be kept open during navigation to facilitate crew movement and in all cases they shall always be ready to be immediately closed.
- (D) All watertight doors in subdivision bulkheads shall be kept open during normal operation, except during adverse weather when they shall be closed.

If choice A is selected set score to 1.

62. 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) longitudinal centerline
- (C) metacenter
- (D) center of flotation

If choice A is selected set score to 1.

63. The water in which a vessel floats provides vertical upward support. The point through which this support is assumed to act is known as the center of _____.

- (A) flotation
- (B) gravity
- (C) effort
- (D) buoyancy

If choice D is selected set score to 1.

64. 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.

65. As first engineer, you are standing by the #3 deep fuel oil storage tank as a crew member is working inside the tank. Before entering the tank, the atmosphere was checked and determined safe for men to work. While standing by you notice that the crew member is not moving. After attempts to communicate with the downed mariner receives no response, what action would you take?

- (A) Send two additional crew members, without a SCBA on, into the tank to retrieve the unconscious crew member.
- (B) Have additional crew members don a SCBA to enter the tank, to aid in the removal of the unconscious crew member.
- (C) Call the captain and ask him how you should proceed.
- (D) Send another crew member, without a SCBA on, into the tank to retrieve the unconscious crew member.

If choice B is selected set score to 1.

66. 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

If choice C is selected set score to 1.

67. When taking samples of a tank atmosphere with an explosimeter, you should _____.

- (A) sample only near the ullage openings as all vapors accumulate there
- (B) sample as much of the tank as possible, especially at the bottom
- (C) avoid sampling in the vicinity of deep webs to prevent false readings
- (D) only sample around the deck longitudinals as gases are lighter than air

If choice B is selected set score to 1.

68. Yawing is the angular motion of the vessel about what axis?

- (A) Transverse
- (B) Longitudinal
- (C) Centerline
- (D) Vertical

If choice D is selected set score to 1.

69. According to Coast Guard Regulations (46 CFR), portable and semi-portable fire extinguishers are classified by a letter and numeric designator. The letter designation indicates _____.

- (A) the size of the extinguisher
- (B) whether this type of extinguisher is to be used on deck or in machinery spaces
- (C) the type of extinguishing agent
- (D) the type of fire the unit could be expected to extinguish

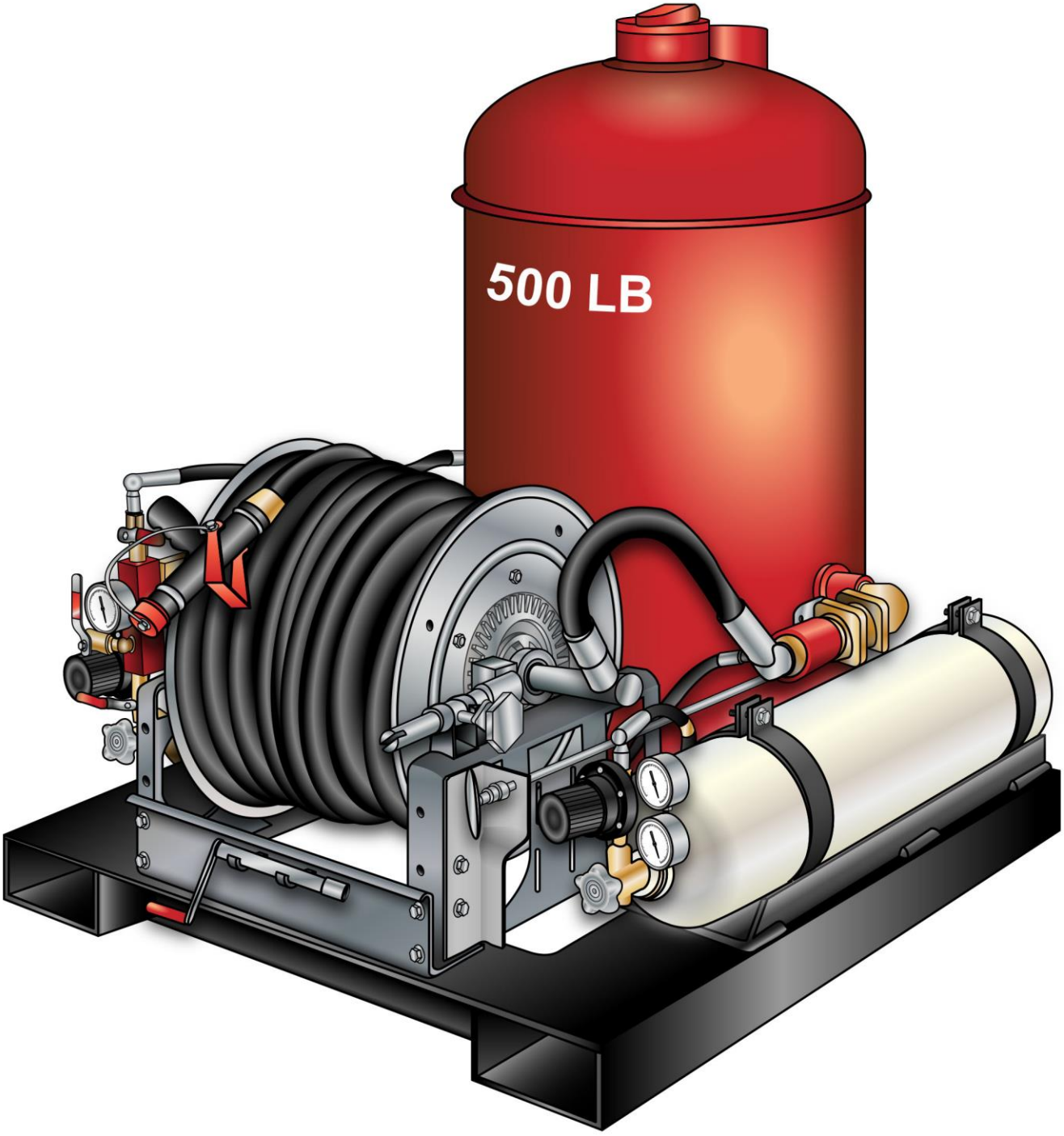
If choice D is selected set score to 1.

70. According to Coast Guard Regulations (46 CFR), no vessel can come alongside or remain alongside a tank vessel while it is loading A, B, or C grade cargo without having the permission of the _____.

- (A) officer in charge of the vessel which is loading
- (B) tank vessel owner
- (C) terminal manager
- (D) USCG captain of the port

If choice A is selected set score to 1.

SF-0009



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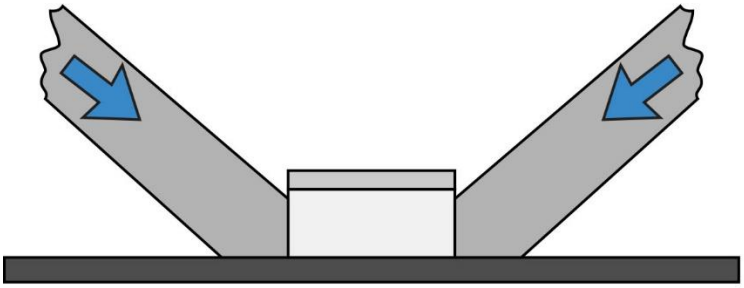

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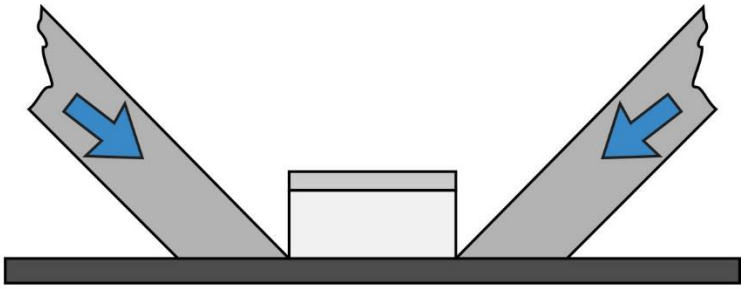

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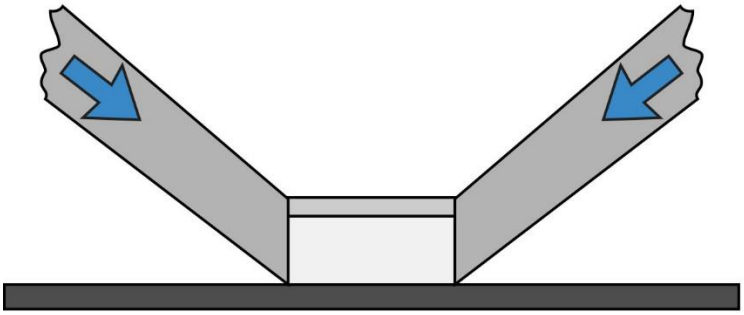

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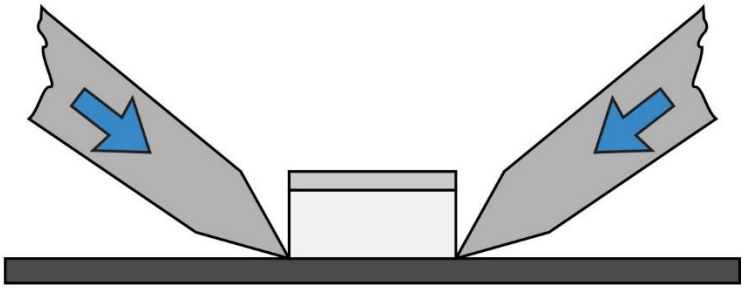

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