

U.S.C.G. Merchant Marine Exam

Chief Engineer-OSV

Q683 Engineering Safety-Environmental Protection

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions.

1. Which of the following statements is true concerning the overboard discharge of vessel sewage at sea?
- (A) The vessel may discharge disinfected and comminuted sewage into the sea, from an approved system, only if the vessel is more than three nautical miles from the nearest land.
 - (B) The vessel must have an approved sewage plant.
 - (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.

2. Which of the lifeboat parts listed must be painted bright red?
- (A) Hatches
 - (B) Releasing gear lever
 - (C) Boat hooks
 - (D) Compass

If choice B is selected set score to 1.

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

If choice D is selected set score to 1.

4. Paints and solvents used aboard a vessel should be _____.
- (A) covered with a fine mesh screen to protect from ignition sources
 - (B) returned to the paint locker after each use
 - (C) stowed safely at the work site until work is completed
 - (D) drained into a common container after each use

If choice B is selected set score to 1.

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

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

If choice C is selected set score to 1.

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

If choice B is selected set score to 1.

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

If choice A is selected set score to 1.

8. 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.

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

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

If choice D is selected set score to 1.

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

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

If choice C is selected set score to 1.

11. When a vessel is inclined, the tendency for it to return to its original position is caused by the _____.

- (A) increased free surface in the buoyant wedge
- (B) upward movement of the center of flotation
- (C) movement of the center of buoyancy toward the low side of the vessel
- (D) movement of the center of gravity

If choice C is selected set score to 1.

12. 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) Discharge water from the forepeak 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) Add ballast to a centerline double bottom tank.

If choice D is selected set score to 1.

13. Which of the following is classified as a grade "E" combustible liquid?

- (A) Bunker "C"
- (B) Very light naphtha
- (C) Benzene
- (D) Most commercial gasoline

If choice A is selected set score to 1.

- 14.** 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, after the release then try to seal the fan damper opening.
 - (B) Continue the release procedures and dump the carbon dioxide with the damper still open.
 - (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) 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.

If choice D is selected set score to 1.

- 15.** The component shown in the illustration would be installed in which of the following types of fire detection systems? Illustration SF-0004
- (A) Fixed temperature
 - (B) Line-type pneumatic
 - (C) Combined fixed temperature and rate-of-rise
 - (D) Rate-of-rise

If choice A is selected set score to 1.

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

If choice A is selected set score to 1.

- 17.** An oxygen indicator will detect _____.
- (A) the presence of harmful amounts of carbon monoxide
 - (B) an oxygen deficiency in a space
 - (C) concentrations of explosive gas
 - (D) all of the above

If choice B is selected set score to 1.

18. You notice smoke coming from an open laundry room doorway, which smells like electrical insulation. After activating the fire alarm, which of the following would be the lowest action priority?

- (A) Close the door to the room.
- (B) Locate the nearest CO₂ or dry chemical extinguisher.
- (C) Secure power to the washers and dryers.
- (D) Break out the nearest fire hose.

If choice D is selected set score to 1.

19. The motion of a vessel impacts its stability. Which of these motions shown in the illustration affects the governing "positional motion" stability? Illustration SF-0048

- (A) Surge
- (B) Sway
- (C) Pitch
- (D) Heave

If choice D is selected set score to 1.

20. The principle personnel hazard unique to Halon fire extinguishers is _____.

- (A) skin irritation
- (B) displacement of oxygen
- (C) eye irritation produced immediately after discharge from cylinder
- (D) inhaling toxic vapors produced when exposed directly to a flame for extended periods

If choice D 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 pump room

If choice D is selected set score to 1.

22. 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.

23. 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.

24. 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.

25. 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

If choice C is selected set score to 1.

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

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

If choice B is selected set score to 1.

27. The volatility of a liquid is the tendency of a liquid to _____.

- (A) explode
- (B) ignite
- (C) asphyxiate
- (D) vaporize

If choice D is selected set score to 1.

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

- (A) Halon 1301 hose reel system
- (B) CO₂ hose reel system
- (C) light water hose reel system
- (D) dry chemical hose reel system

If choice D is selected set score to 1.

29. If for any reason it is necessary to abandon ship while far at sea, it is important for the crew members to _____.

- (A) separate from each other as this will increase the chances of being rescued
- (B) get away from the area because sharks will be attracted to the vessel
- (C) immediately head for the nearest land
- (D) remain together in the area because rescuers will start searching at the vessel's last known position

If choice D is selected set score to 1.

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

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

If choice A is selected set score to 1.

31. In accordance with 46 CFR Part 109, the Muster List ("Station Bill") shows each crew lifeboat station, their duties during abandonment, basic instructions, and _____.

- (A) instructions for lowering the survival capsule
- (B) all emergency signals
- (C) work schedule
- (D) the time each weekly drill will be held

If choice B is selected set score to 1.

32. As chief engineer on a vessel of more than 1600 gross tons on an international voyage, you and the first engineer are planning a welding job in the cargo-hold. How would you ensure that all safety precautions are reviewed prior to starting this job?

- (A) Have the first engineer complete a hot-work permit after completing the job.
- (B) Have the first engineer review the SOLAS manual prior to starting the job.
- (C) Have the first engineer verbally review fire safety with crew working on the job.
- (D) Have the first engineer complete a hot-work permit prior to starting the job.

If choice D is selected set score to 1.

33. During fueling operations, which of the listed precautions should be taken when topping off fuel tanks?

- (A) Close all overflow valves.
- (B) Reduce the pumping rate by closing the deck filling valve.
- (C) Reduce the pumping rate and sound tanks frequently
- (D) Place 5 gallon containers under all flange connections in the fuel line.

If choice C is selected set score to 1.

34. 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.

35. If the chemical material is a mixture, what must the Material Safety Data Sheet (MSDS) identify?

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

If choice B is selected set score to 1.

36. 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) a given amount of water can absorb more heat when it is in the form of fog
- (C) it does not have to hit the seat of fire to be effective
- (D) of all of the above

If choice D is selected set score to 1.

37. As chief engineer or first assistant engineer you should be familiar with the six motions of a vessel. Which of these motions affects the governing "positional motion" stability?

- (A) Surge
- (B) Heave
- (C) Sway
- (D) Pitch

If choice B is selected set score to 1.

38. The amount of garbage disposed must be entered into the records maintained by each ship and stated in _____.

- (A) cubic yards convertible to long tons
- (B) cubic meters
- (C) weight in either kilogram or pounds
- (D) barrels, measured in 55 gallon drums

If choice B is selected set score to 1.

39. 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) an explosion is about to take place
- (C) the detector sensor is sampling a space where the cargo vapor concentration is 30 percent by volume
- (D) the detector is sampling a space in which 30 percent of the atmosphere is explosive

If choice A is selected set score to 1.

40. If the survival craft is not loaded to full capacity, the personnel should be _____.

- (A) loaded more on port side to forward
- (B) loaded equally on both sides with more forward
- (C) loaded equally on both sides with more aft
- (D) allowed to sit anywhere

If choice C is selected set score to 1.

41. The instrument shown in the illustration has not been used for several weeks. Prior to its use for testing a compartment, you should _____. Illustration SF-0003

- (A) check or renew the batteries
- (B) purge the meter
- (C) adjust the meter pointer to zero
- (D) all of the above

If choice D is selected set score to 1.

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

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

If choice C is selected set score to 1.

43. 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) Switch the salt water cooling suction to the low sea suction.
- (C) Wait until the vessel docks to sound the fuel oil tanks.
- (D) Call your port engineer.

If choice A is selected set score to 1.

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

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

If choice B is selected set score to 1.

45. Coast Guard Regulations (46 CFR) require how many 15 pound carbon dioxide fire extinguishers to be installed in the boiler room of an 8,000 horsepower steam propelled vessel?

- (A) Two
- (B) Four
- (C) Six
- (D) Eight

If choice A is selected set score to 1.

46. A vessel's center of gravity is lowered when the _____.

- (A) reserve buoyancy increases
- (B) freeboard is increased
- (C) tanks are ballasted
- (D) trim is increased

If choice C is selected set score to 1.

47. 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%

If choice C is selected set score to 1.

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

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

If choice D is selected set score to 1.

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

If choice C is selected set score to 1.

50. Why is it essential to introduce CO₂ 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) Updraft from the fire tends to carry the CO₂ away.
- (C) Carbon dioxide takes a long time to disperse to all portions of a space.
- (D) The fire may warp the CO₂ piping.

If choice B is selected set score to 1.

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

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

If choice D is selected set score to 1.

52. A self-righting survival craft will return to an upright position provided that all personnel _____.

- (A) are seated with seatbelts on and doors shut
- (B) are seated with seatbelts on and doors open
- (C) are to shift to one side to right it
- (D) escape from the craft

If choice A is selected set score to 1.

53. The state of charge of a stored pressure type dry chemical fire extinguisher can be readily determined by _____.

- (A) visual inspection of the pressure gage
- (B) removing the lid and checking the level of dry chemical
- (C) weighing the CO₂ cartridge
- (D) weighing the cylinder

If choice A is selected set score to 1.

54. Which of the conditions listed is necessary for a substance to burn?

- (A) The air must contain oxygen in sufficient quantity.
- (B) The temperature of the substance must be equal to or above its fire point.
- (C) The mixture of vapors with air must be between the LEL and the UEL.
- (D) All of the above.

If choice D is selected set score to 1.

55. Your vessel has just been struck by another vessel. After meeting with the captain and chief mate, you have immediately ordered the vessel specific damage control procedures in the vessel's approved stability booklet to be enacted. Which of the following statements is true?

- (A) The Certificate of Documentation issued to the vessel will be the primary reference document in order to calculate free surface corrections.
- (B) The universal station billet assigning crew member responsibilities will provide adequate reference information to determine the adequate damage control response.
- (C) The Safety Management System will provide an IMO standard response for all collision response procedures, including damage control.
- (D) The vessel general arrangement plan would be a critical reference document for your response providing accurate data showing watertight compartments, closures, vents and down flooding angles.

If choice D is selected set score to 1.

56. If a fire occurs in an electric cable, in which the inner layers of insulation, or the insulation covered by armor is burning, you should _____.

- (A) separate the two ends
- (B) secure power to the cable
- (C) cut the cable with an insulated cable cutter
- (D) all of the above

If choice D is selected set score to 1.

57. 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) at a point that is one-third from the bottom of the bulkhead
- (C) along the top of the bulkhead
- (D) along the bottom of any bulkhead

If choice D is selected set score to 1.

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

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

If choice D is selected set score to 1.

59. Which of the following statements are true regarding U.S. flag vessel response plans for the carriage of oil?

- (A) Oil is considered regulated cargo and all vessels engaged in the domestic oil trade are issued a Certificate of Inspection by the USCG. The issuance of this document satisfies all USCG requirements for vessel emergency contingency response plans.
- (B) A shipboard oil pollution emergency response plan which includes, but is not limited to, shipboard spill mitigation procedures that must be submitted to the United States Coast Guard for approval.
- (C) All domestic regulations regarding emergency response contingency plans are superseded by MARPOL, the international pollution prevention standard.
- (D) The owner of a U.S. Flag vessel engaged in the carriage of oil regardless of size and route does not need to prepare and submit a contingency plan for emergency response in the event of a spill.

If choice B is selected set score to 1.

60. 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.

- 61.** Which of the following conditions must be met before a marine chemist will issue a certificate for a compartment to be "safe for workers, safe for hot-work"?
- (A) The residues in the compartment must not be capable of producing any toxic gas under existing atmospheric conditions.
 - (B) The concentration of combustible gases in the compartment's atmosphere must be less than 10 percent of the lower flammable limit.
 - (C) The toxic gases in the compartment's atmosphere must be within permissible concentrations.
 - (D) All of the above.

If choice D is selected set score to 1.

- 62.** One of the main concerns when fighting a galley fire is _____.
- (A) the loss of stability
 - (B) spreading of fire through the engineering space
 - (C) the igniting of a grease fire in the range hood ventilation system
 - (D) contaminating food with extinguishing agent

If choice C is selected set score to 1.

- 63.** Puncture leaks in the lower tubes, or bottom of an inflatable life raft should first be stopped by using _____.
- (A) a tube patch
 - (B) sail twine and vulcanizing kit
 - (C) sealing clamps
 - (D) repair tape

If choice C is selected set score to 1.

- 64.** 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.

- 65.** Kapok life jackets require proper care and should NOT be _____.
- (A) stowed near open flame or where smoking is permitted
 - (B) used as seats, pillows, or foot rests
 - (C) left on open decks
 - (D) all of the above

If choice D is selected set score to 1.

66. 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.

67. 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) Ordinary combustibles where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance
- (C) Metals
- (D) Flammable liquids, greases, etc., where a blanketing effect is essential

If choice B is selected set score to 1.

68. 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.

69. The physical difference of the water spray patterns developed by the high velocity tip and low velocity applicator is due to _____.

- (A) the method of breaking up the water stream
- (B) the type of fire being fought
- (C) the capacity of the fire pump
- (D) a difference in water pressure

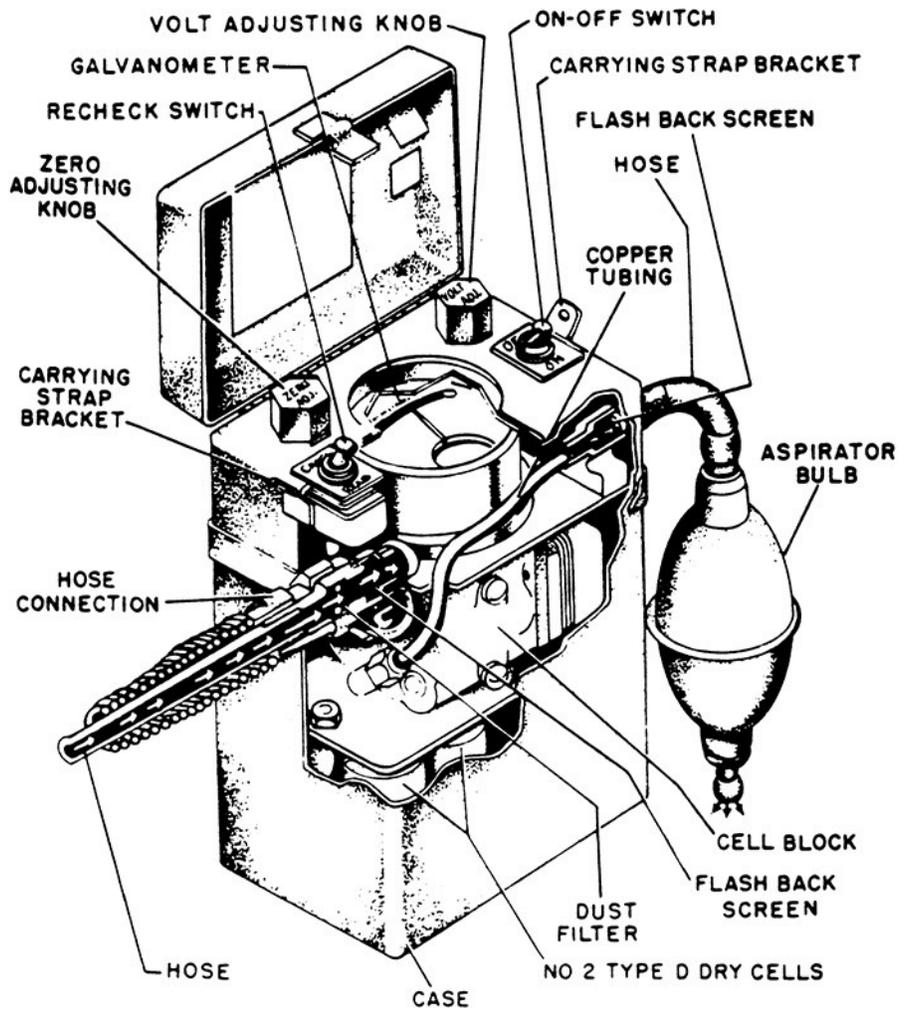
If choice A is selected set score to 1.

70. You are the chief engineer of a vessel of more than 1600 gross tons on an international voyage. While bunkering lube oil in port, the hose fails and oil is spilled into the harbor. After securing the transfer, how would you proceed?

- (A) Perform post incident drug and alcohol testing on engine crew members not involved in the transfer operation.
- (B) Set out a boom around the ship to control the spread of the oil.
- (C) Call the local news outlets and report the oil spill.
- (D) Fill out a Declaration of Inspection for the transfer operation.

If choice B is selected set score to 1.

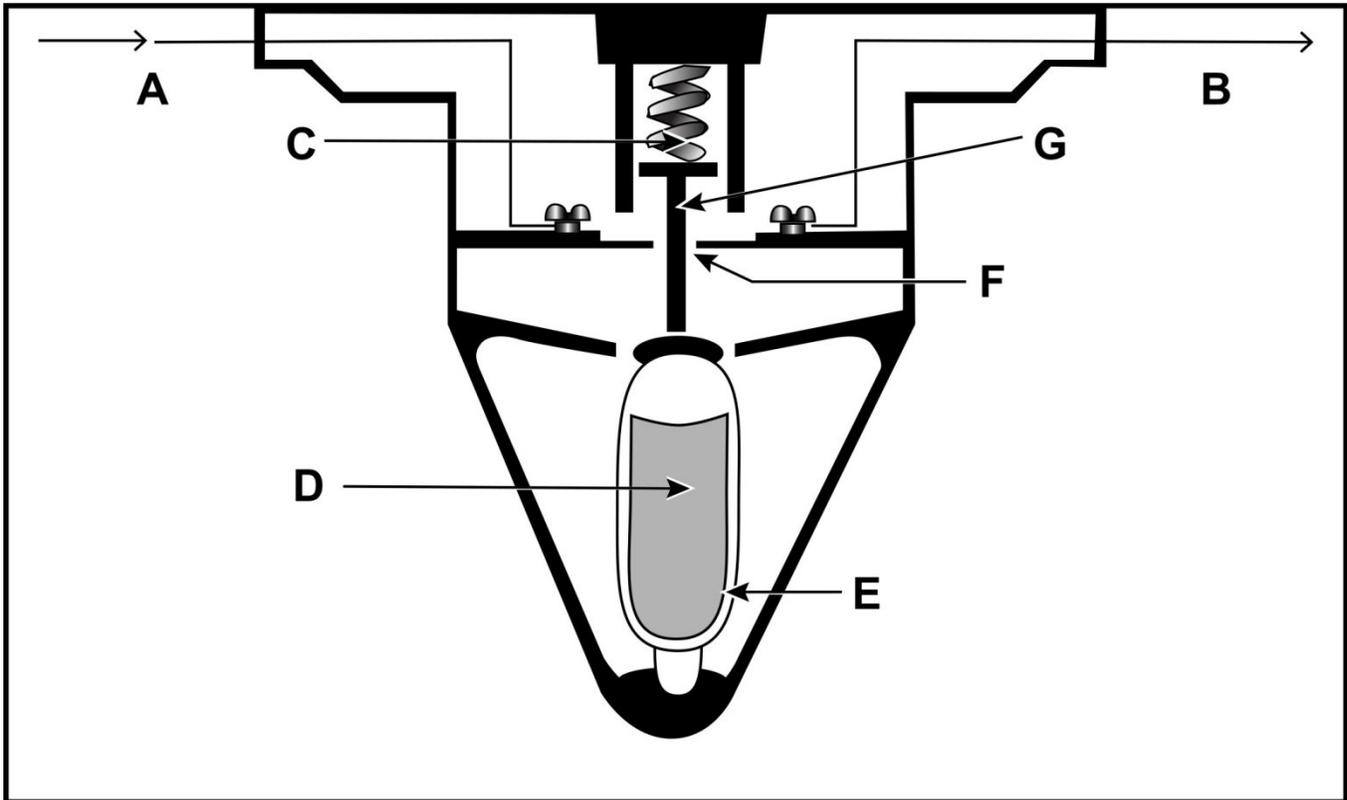
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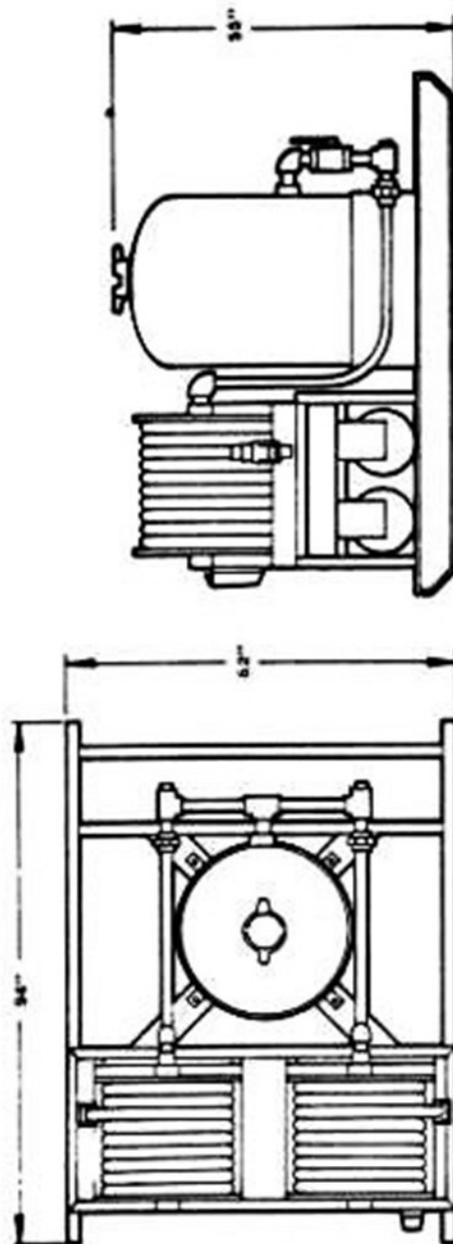
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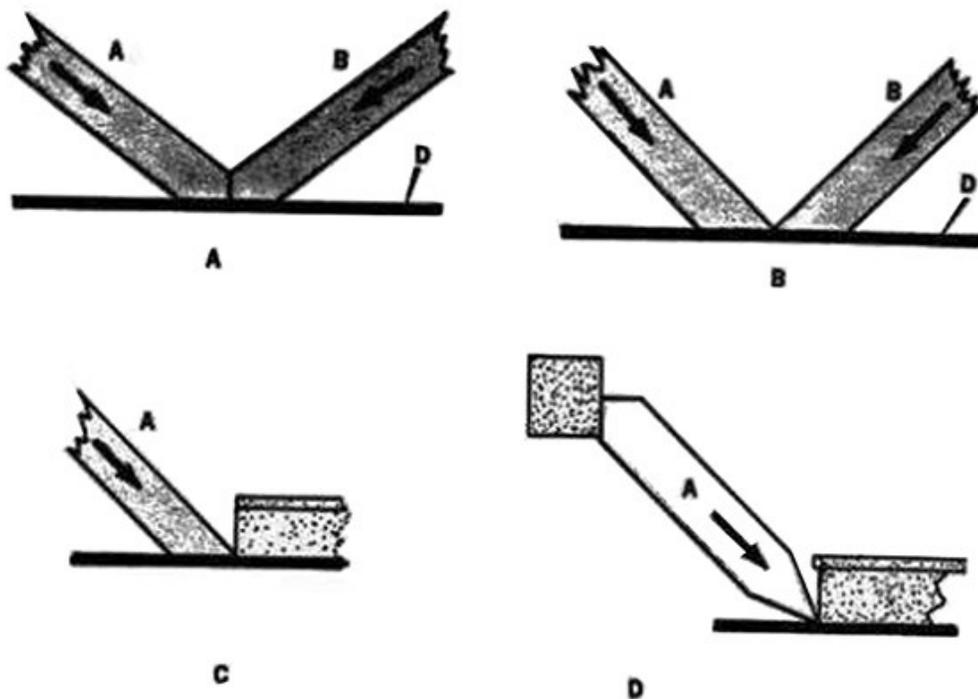


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