

U.S.C.G. Merchant Marine Exam

DDE – Unlimited HP

Q623 Engineering Safety & Environmental Protection

(Sample Examination)

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

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

Correct answer: D

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

Correct answer: A

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

Correct answer: C

4. When fighting a liquefied natural gas fire, you should _____.
- A. use only dry chemical
 - B. secure the source of gas, then extinguish the fire
 - C. extinguish the fire, then secure the source of gas
 - D. use only carbon dioxide

Correct answer: B

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

Correct answer: C

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

Correct answer: D

7. 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

Correct answer: A

8. Your vessel has run aground and upon taking fuel oil tank soundings, you find that a fuel tank level has increased. You therefore should suspect _____.
- A. a crack in the hull portion of the fuel tank
 - B. a load of bad fuel
 - C. condensation in the fuel tank
 - D. contamination from the saltwater flushing system

Correct answer: A

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

Correct answer: A

10. 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

11. 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

Correct answer: C

12. 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

13. In heavy seas the helmsman should steer the survival craft _____.

- A. into the seas
- B. broadside to the seas
- C. in the same direction as the seas
- D. in a series of figure-eights

Correct answer: A

14. The survival craft engine is fueled with _____.

- A. Kerosene
- B. Unleaded gasoline
- C. Diesel oil
- D. Liquefied gas

Correct answer: C

15. When personnel are lifted by a helicopter from an inflatable life raft, the personnel on the raft should _____.

- A. Deflate the floor of the raft to reduce the danger of capsizing
- B. Inflate the floor of the raft to provide for additional stability
- C. Remove their life jackets to prepare for the transfer
- D. Take in the sea anchor to prevent fouling of the rescue sling

Correct answer: A

16. 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

17. 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

18. 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

19. An LNG carrier has an approved type of gas detecting system to detect methane leaks. What area(s) would this be NOT used in?

- A. Boiler burner supply piping
- B. Barrier spaces
- C. Cargo handling rooms
- D. Habitability Spaces

Correct answer: D

20. 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

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

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

Correct answer: D

22. 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

23. The spreading of fire as a result of heat being carried through a vessel's ventilation system, is an example of heat transfer by what method?

- A. conduction
- B. convection
- C. radiation
- D. windage

Correct answer: B

- 24.** 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

Correct answer: D

- 25.** The upper explosive limit (UEL) of a mixture of flammable vapors and air is defined as _____.
- A. that concentration above which there is just enough flammable vapor to produce an explosion
 - B. that concentration above which the mixture is too rich to burn
 - C. the percentage of flammable vapor by volume in air sufficient to create an explosion
 - D. the percentage of oxygen present in the air sufficient to support combustion

Correct answer: B

- 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

Correct answer: D

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

Correct answer: C

- 28.** 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 should be applied slowly to a large engine room fire.
 - C. Carbon dioxide is corrosive when exposed to fire.
 - D. Its smothering effect is excellent for class "B" fires.

Correct answer: D

- 29.** A hand portable CO₂ fire extinguisher is effective on burning oil only _____.
- A. To prevent rekindling
 - B. If applied promptly
 - C. If applied in connection with foam
 - D. If attempts to extinguish the fire with low velocity fog have failed

Correct answer: B

30. Which of the following statements is true concerning the fire extinguisher shown in the illustration? Illustration SF-0006

- A. There is no danger of reflash in using the illustrated extinguisher on a class "B" fire.
- B. The illustrated extinguisher must never be used in conjunction with water.
- C. The initial discharge of the extinguisher should be at close range to scatter the burning material.
- D. The agent may be applied in short bursts by squeezing and releasing the lever on the nozzle.

Correct answer: D

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

Correct answer: D

32. A high velocity fog nozzle will produce the most effective spray pattern when the water pressure is not less than _____.

- A. 35 psi (241.3 kPa)
- B. 60 psi (413.6 kPa)
- C. 75 psi (517.0 kPa)
- D. 100 psi (689.4 kPa)

Correct answer: D

33. The device shown in the illustration is carried aboard tankships for _____. Illustration SF-0028

- A. adapting ANSI and non-ANSI fuel hose flanges
- B. blanking cargo hoses after transfer operations are completed
- C. use as a universal oil transfer connection
- D. connecting shoreside and ship's fire main

Correct answer: D

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

Correct answer: D

35. The most effective method of extinguishing a class "A" fire is by _____.

- A. using a sodium based dry chemical
- B. quenching and cooling
- C. blanketing and smothering
- D. using non-conducting extinguishers

Correct answer: B

- 36.** When fighting a shipboard fire, crew members securing doorways, hatches, and applying cooling water to adjacent decks and bulkheads, while monitoring the spread of heat and smoke, are setting a _____.
- A. cooling zone
 - B. safety perimeter
 - C. buffer zone
 - D. fire boundary

Correct answer: D

- 37.** 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. Cut the cable with an insulated cable cutter
 - B. Separate the two ends
 - C. Secure power to the cable
 - D. All of the above

Correct answer: D

- 38.** Which extinguishing agent is the best for use on electrical fires?
- A. Water fog
 - B. CO₂
 - C. Dry chemical
 - D. Foam

Correct answer: B

- 39.** In fighting a fire in a fuel tank, the FIRST action you should attempt is to _____.
- A. station someone at the fixed CO₂ release controls
 - B. begin transferring the fuel to other tanks
 - C. top off the tank to force out all vapors
 - D. secure all sources of fresh air to the tank

Correct answer: D

- 40.** The longer an oil fire is permitted to burn, the _____.
- A. easier it is to control
 - B. easier it is to extinguish
 - C. harder it is to extinguish
 - D. less chance there is of reignition

Correct answer: C

- 41.** 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 vapor is about to explode.
 - C. The mixture is too lean to burn.
 - D. Conditions are perfect for combustion.

Correct answer: A

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

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

Correct answer: C

43. If you see an individual fall overboard, what is the FIRST thing you should do?

- A. throw a life ring overboard
- B. hail "Man Overboard"
- C. pass the word to the bridge
- D. sound three prolonged blasts

Correct answer: A

44. Combustible gas indicators incorporate the use of a/an _____.

- A. Inflatable bag
- B. Wheatstone bridge
- C. Vapor-detecting carbon compound
- D. Sensitive liquid chemical

Correct answer: B

45. 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

46. When required to work in an area where explosive gases may accumulate, you should use tools which are _____.

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

Correct answer: D

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

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

Correct answer: B

- 48.** When discharging clean ballast, prior to entering the loading port, if the ballast is determined by the oil monitor to exceed 15 parts per million of oil, the deballasting must _____.
- A. be completed only after "load on top" has been completed
 - B. be terminated automatically
 - C. be completely discharged in order to load
 - D. be stopped until the oil can settle out, then resumed at a slower discharge rate

Correct answer: B

- 49.** In cleaning up an oil spill, the use of straw or reclaimed paper fibers would be an example of which type of oil removal?
- A. Chemical agent removal
 - B. Mechanical removal
 - C. Absorbent removal
 - D. None of the above

Correct answer: C

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

Correct answer: A

- 51.** To determine if all requirements of the Declaration of Inspection are met for oil transfer operations just prior to bunkering from a shoreside facility, _____.
- A. facility is inspected by the designated person in charge of the vessel and vice versa for the vessel
 - B. vessel and facility are independently inspected by their respective designated person in charge
 - C. vessel and facility are jointly and independently inspected by the designated persons in charge
 - D. vessel and facility must be inspected by a representative of the Coast Guard captain of the port

Correct answer: C

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

Correct answer: B

53. One consideration for determining the safest maximum rate at which bunker fuel may be received is by the _____.

- A. distance to the fuel storage tanks ashore
- B. number of tanks to be filled
- C. size of the fuel storage tanks ashore
- D. type of fuel transfer pump

Correct answer: B

54. When amendments are made to the shipboard oil pollution emergency plan, all revisions must be submitted to the Coast Guard _____.

- A. One month prior to the anniversary date of the plan
- B. And cannot be implemented without approval
- C. Six months prior to the end of the approval period
- D. And can be implemented without immediate approval as long as final approval is received within six months of submittal

Correct answer: B

55. 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

Correct answer: C

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

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

Correct answer: C

57. 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

58. Individuals who have consumed alcohol within 24 hours of exposure to H₂S can tolerate _____.

- A. unusually large concentrations of H₂S
- B. smaller than normal concentrations of H₂S
- C. moderate concentrations of H₂S without the usual reactions
- D. longer exposure to H₂S concentrations

Correct answer: B

59. What information can be obtained from a marine chemist's certificate on a tank barge?

- A. The tanks which are safe to enter when the certificate was issued.
- B. The number of fire extinguishers required onboard.
- C. The quality of the barge's cargo.
- D. The barge's stability information.

Correct answer: A

60. A health hazard term listed on a Safety Data Sheet (SDS) that indicates allergic-like reaction in some people after repeated exposure is _____.

- A. pyrophoric hazard
- B. oxidizer
- C. sensitizer
- D. skin contact hazard

Correct answer: C

61. In the absence of external forces, the center of gravity of a floating vessel is located directly above the _____.

- A. geometric center of the displaced volume
- B. center of flotation
- C. metacenter
- D. amidships

Correct answer: A

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

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

Correct answer: A

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

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

Correct answer: C

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

Correct answer: D

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

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

Correct answer: D

66. 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. movement of the center of gravity
- C. upward movement of the center of flotation
- D. movement of the center of buoyancy toward the low side of the vessel

Correct answer: D

67. A vessel trimmed down by the bow has _____.

- A. a greater draft aft than forward
- B. a low mean draft
- C. zero trim
- D. a greater draft forward than aft

Correct answer: D

68. Adverse effects due to free surface will result when _____.

- A. a portion of liquid is removed from a full tank
- B. the vessel's draft is decreased exposing more surface area to the wind and current
- C. the vessel's draft is increased, thus increasing the vessel's wetted surface area
- D. the vessel is trimmed by the stern

Correct answer: A

69. In accordance with 46 CFR Subchapter W, the fuel tanks of motor-propelled lifeboats shall be _____.

- A. Emptied and gas freed when the ship is dry-docked
- B. Emptied and the fuel changed at least once each year
- C. Hydrostatically tested at each inspection for certification
- D. Constructed so as to be completely spill proof

Correct answer: B

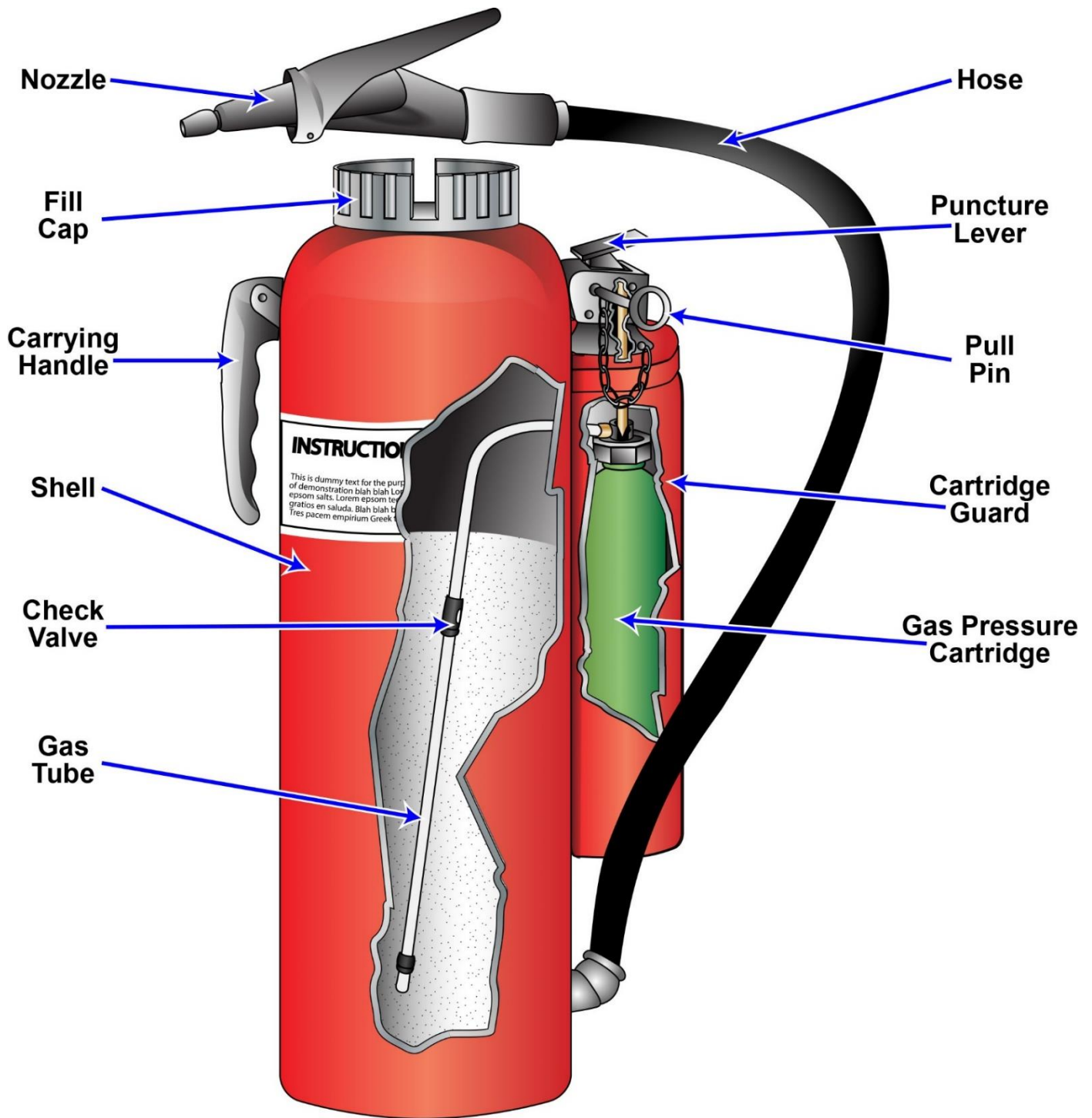
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Illustrations: 4

- 70.** In accordance with 33 CFR Subchapter O (Pollution), who makes the final decision of when oil transfer may begin?
- A. The senior deck officer present
 - B. The designated person in charge
 - C. Any local Coast Guard representative
 - D. The captain of the port

Correct answer: B



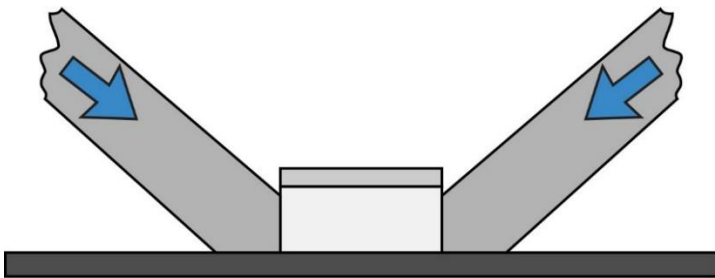
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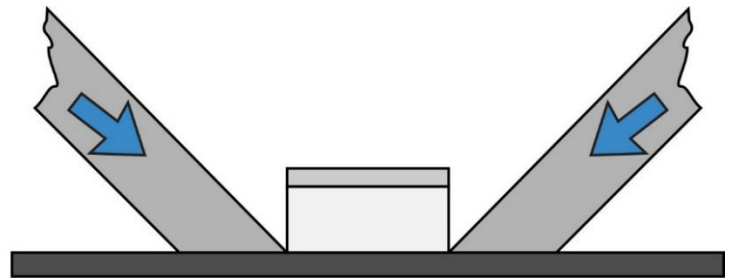
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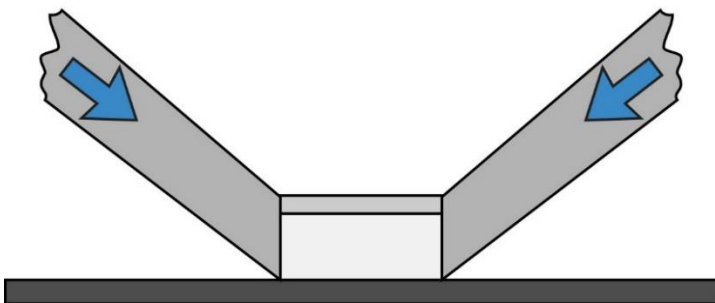
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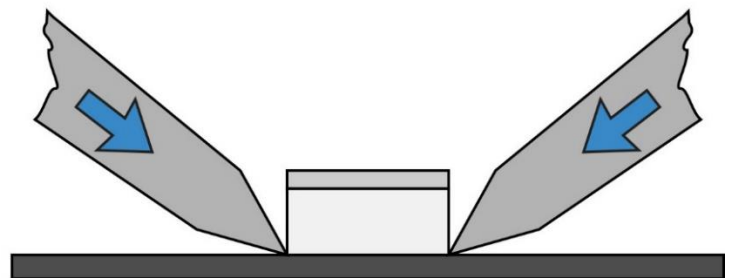
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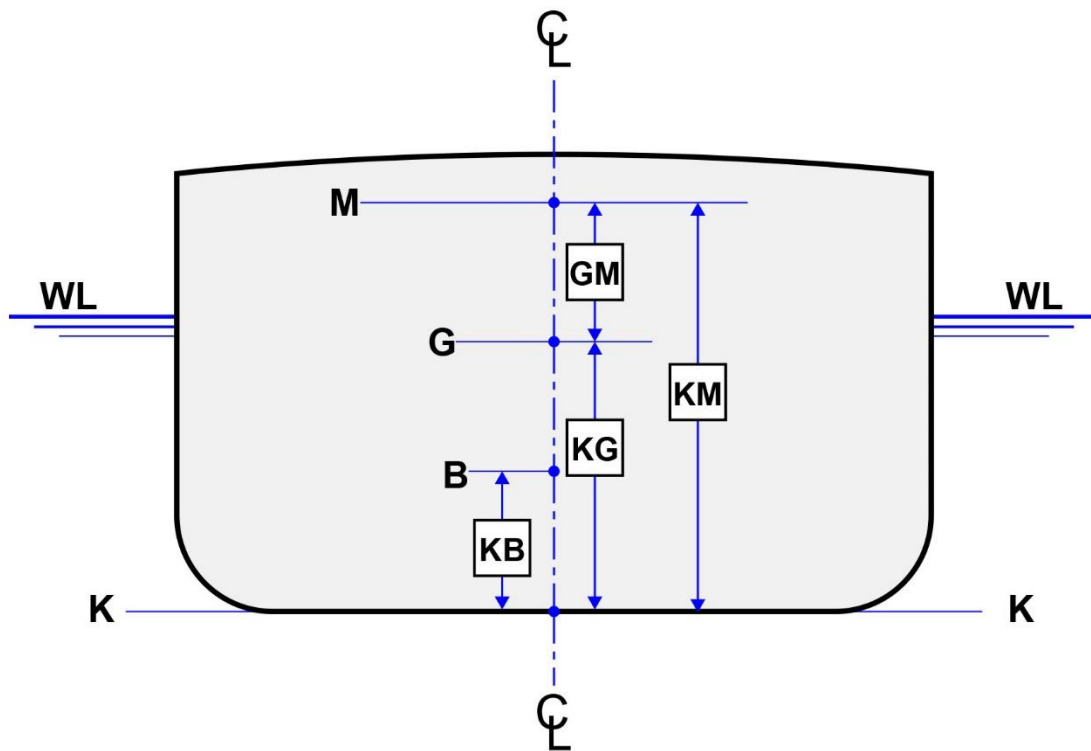
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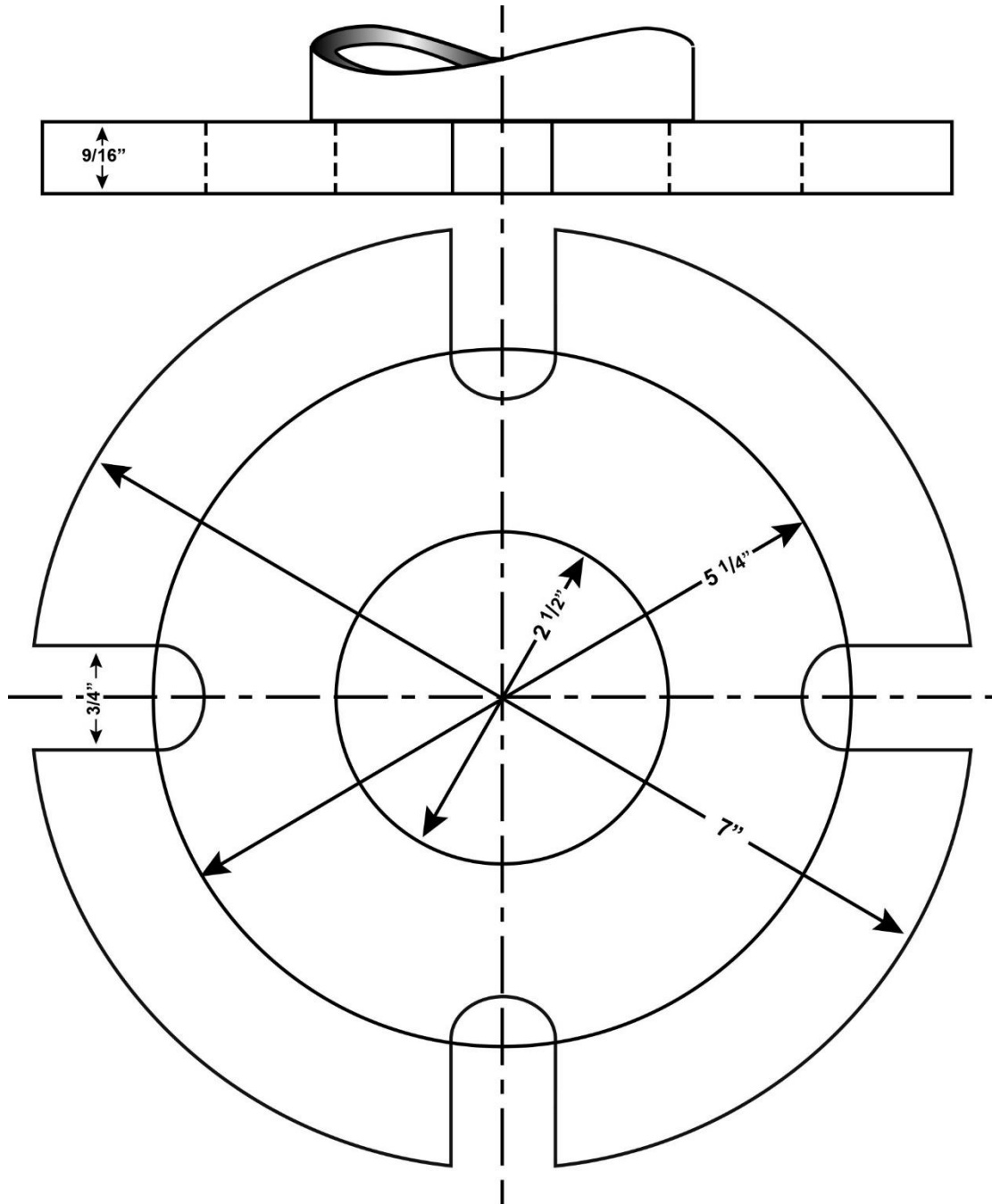
Stability Calculations



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