

U.S.C.G. Merchant Marine Exam

QMED

Q801 Junior Engineer – Part II

(Sample Examination)

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

1. To find the relative humidity of an accommodation space, you would use a _____.
- A. Enthalpy Chart
 - B. Psychrometric Chart
 - C. Mollier Chart
 - D. Entropy Chart

Correct answer: B

2. The control of exhaust temperature on a solid waste/sludge incinerator is critical. How is this temperature normally controlled?
- A. The exhaust temperature is controlled by regulating the admission of relatively cool ambient air into the exhaust stream.
 - B. The exhaust temperature is controlled by regulating the exhaust gas flow.
 - C. The exhaust temperature is controlled by regulating the admission of combustion air into the combustion chamber.
 - D. The exhaust temperature is controlled by regulating the admission of auxiliary fuel to the burner.

Correct answer: A

3. Which of the following symptoms may be observed in a victim of cardiac arrest as a result of electric shock?
- A. weak pulse at wrist or neck
 - B. respiration is weak or has stopped
 - C. flushed face
 - D. all of the above symptoms

Correct answer: B

4. The push button on the handset of a ship's sound-powered telephone must be depressed in order to do what?
- A. listen then released to talk
 - B. both talk and listen
 - C. talk then released to listen
 - D. ring the station being called

Correct answer: B

5. Which of the following statements, concerning the cleaning maintenance of a brushless generator, is correct?
- A. Hot soapy water should be used to remove dust and grime from the windings.
 - B. Cleaning of windings should be performed on a periodic basis regardless of the state of cleanliness.
 - C. High-pressure air should be used to blow out dust and grime from the windings.
 - D. Cleaning of windings should be performed on a conditional basis using a vacuum or using a clean, dry, lint-free rag.

Correct answer: D

6. 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.

Correct answer: D

7. With a service gauge manifold set connected to a refrigerant compressor as shown in the illustration, which arrangement of the gauge manifold set valves and compressor service valves would allow for simultaneous reading of the compressor suction and discharge pressures? Illustration RA-0003
- A. Valves "2" and "5" both closed, along with valves "1" and "6" both cracked open off their backseats.
 - B. Valves "2" and "5" both closed, along with valves "1" and "6" both back-seated.
 - C. Valves "2" and "5" both open, along with valves "1" and "6" both open in the mid-position.
 - D. Valves "2" and "5" both open, along with valves "1" and "6" both front-seated.

Correct answer: A

8. If a thermometer reads 80oC, what is the equivalent temperature in oF?
- A. 12oF
 - B. 76oF
 - C. 112oF
 - D. 176oF

Correct answer: D

9. What statement is true concerning portable power tools?
- A. Unless the power tool is an approved double-insulated type, an ungrounded power tool has the potential to cause a fatal accident due to electrical shock.
 - B. Double-insulated power tools require the use of three conductor cables, three-prong plugs, and grounded receptacles.
 - C. A power tool fitted with a three-conductor cable and three-prong plug may be safely used with an ungrounded outlet as long as a three-prong receptacle to two-prong plug adapter is used.
 - D. Power tools other than those as approved as double-insulated require the use of two conductor cables, two-prong plugs, and ungrounded receptacles.

Correct answer: A

10. Electric current is the flow of electrons through a conductor. How is the rate of this flow measured?
- A. volts
 - B. watts
 - C. ohms
 - D. amperes

Correct answer: D

11. What device is best used to test for a short circuit between windings of a three-phase motor that is not running?
- A. ohmmeter
 - B. ammeter
 - C. voltage tester
 - D. infrared temperature meter

Correct answer: A

12. The output volume of a variable displacement rotary piston pump can be changed only by _____.
- A. moving the shaft trunnion block
 - B. changing the angle of the tilting plate
 - C. changing the speed of the pump
 - D. moving the slide block and rotor

Correct answer: B

13. Which of the listed conditions is a symptom of sun stroke?
- A. Temperature is high, pulse is strong and rapid, and skin is hot and dry.
 - B. Temperature falls below normal, pulse is rapid, and skin is clammy.
 - C. Temperature is high, pulse is slow and feeble, and skin is clammy.
 - D. Temperature falls below normal, pulse is rapid and feeble, and skin is cold and clammy.

Correct answer: A

14. What does "G" represent in the illustration? Illustration GS-0017
- A. The type of material used for the piece.
 - B. A dimension tabulated elsewhere.
 - C. A reference note shown elsewhere.
 - D. The surfaces to be ground.

Correct answer: D

15. 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. work schedule
 - C. all emergency signals
 - D. the time each weekly drill will be held

Correct answer: C

16. What is the purpose of running a refrigeration compressor in short intermittent spurts or throttling the suction isolation valve when starting the system after a prolonged shutdown?
- A. prevent liquid slugging or overloading the compressor
 - B. let the refrigerated compartment cool gradually
 - C. allow refrigerant vapor cycling time
 - D. determine actual compressor oil level

Correct answer: A

17. When shore power is being connected to a ship in drydock, what must be ensured, assuming that the ship's generators are rated at 450 VAC, 60 Hz with a total capacity of 5000 kW?
- A. exactly 450 volts must be supplied from shore, as no tolerance is permitted
 - B. exactly 60 Hz must be supplied from shore, as no tolerance is permitted
 - C. shore power phase sequence must agree with that of the ship
 - D. shore power must be capable of delivering a total of 5000 kW

Correct answer: C

18. A coolant is usually used when cutting metal in a power hacksaw to prevent the _____.
- A. blade from bending
 - B. blade from overheating
 - C. blade from catching on the work piece
 - D. cut from clogging

Correct answer: B

19. Using a sea anchor with the survival craft will _____.
- A. reduce your drift rate
 - B. keep the survival craft from turning over
 - C. aid in recovering the survival craft
 - D. increase your visibility

Correct answer: A

20. In a refrigeration system, the push-pull technique can be used for the recovery of the refrigerant in what state?
- A. liquid only
 - B. vapor only
 - C. both liquid and vapor
 - D. should never be used with low-pressure systems

Correct answer: A

21. On vessels exceeding 1600 GRT, who is responsible for the practical upkeep of machinery and the manning of the engine room?
- A. Chief engineer
 - B. First assistant engineer
 - C. Officer in charge of the engineering watch
 - D. Chief mate

Correct answer: B

22. A definite advantage in the use of water as a fire extinguishing agent is its ability to _____.
- A. alternate expansion and contraction as water in liquid state becomes vapor
 - B. rapidly contract as water is converted from a liquid to a vapor
 - C. vaporize and rapidly expand as water absorbs heat
 - D. absorb smoke and gases as water is converted from liquid to vapor

Correct answer: C

23. If you are given the job of adding hydraulic fluid to a mooring winch and are not certain as to the type of fluid to use, you should _____.
- A. add any oil that has the same viscosity as the hydraulic fluid
 - B. add turbine oil because it is always a good substitute
 - C. check the winch manufacturer's instruction book
 - D. add fluid that is the same color as the fluid in the reservoir

Correct answer: C

24. Packing extremely soft grease into a roller bearing will cause _____.
- A. emulsification of the thickener additive
 - B. high temperatures to develop as result of churning
 - C. gelling of the base oil
 - D. excessive channeling of the grease

Correct answer: B

25. The line labeled "C", as shown in the illustration, would be identified as the _____. Illustration GS-0175
- A. oil discharge line
 - B. tank drain line
 - C. clean water flushing line
 - D. oily bilge water inlet

Correct answer: C

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

Correct answer: A

27. How does a circuit breaker differ from a fuse?
- A. a circuit breaker trips to break the circuit and may be reset, a fuse may not be reset
 - B. a circuit breaker gives no visual indication of having opened the circuit, a fuse universally does
 - C. a circuit breaker is enclosed in a tube of insulating material with metal ferrules at each end, a fuse is not
 - D. a circuit breaker melts and must be replaced, a fuse does neither

Correct answer: A

28. A vessel is in compliance with federal regulations regarding the discharge of sewage by _____.
- A. pumping the sewage ashore to an approved container
 - B. treating sewage in an approved system
 - C. holding all sewage onboard
 - D. all of the above

Correct answer: D

29. When performing routine AC motor maintenance what should be included?

- A. inspection of the motor's internals for loose rotor bars or field poles
- B. verifying RPM if a synchronous motor
- C. temperature readings at normal loads to detect abnormal temperature rises
- D. rotor balance check

Correct answer: C

30. Which of the following refrigerants is chlorine free and safe regarding atmospheric ozone depletion?

- A. R-11
- B. R-12
- C. R-22
- D. R-134a

Correct answer: D

31. When installing DANGER tags when performing a tag-out and lock-out procedure in preparation for accomplishing maintenance, what is the color of these tags?

- A. Red
- B. Yellow
- C. Orange
- D. Green

Correct answer: A

32. In the system shown in the illustration, the engine room station is unable to signal any other station, nor is any other station able to signal the engine room station. The engine room station can, however, ring itself by proper positioning of its selector switch. What is the most probable cause of this problem? Illustration EL-0093

- A. The coil of component "C" of the problem station is open-circuited.
- B. The switch at component "A" of the problem station is stuck open.
- C. There is an open between terminal "C" of the problem station and the common wire of the multi-conductor cable to the other stations.
- D. The selector switch is grounded at the problem station diverting current from the other stations' ringing devices.

Correct answer: C

33. What is the function of the electric brake on a deck cargo winch?

- A. automatically govern the lowering speed of the load
- B. automatically hold the load if power to the winch motor is disconnected
- C. automatically engage when the winch motor current is reaching full load
- D. automatically govern the hoisting speed of the load

Correct answer: B

34. Heavy pressure on the ends of a file will cause the work surface to become _____.
- A. rough
 - B. smooth
 - C. tapered
 - D. rounded

Correct answer: D

35. If the alarm provided in the fixed CO2 system sounds in the engine room, you should _____.
- A. start the fire pump
 - B. immediately assist the fixed system by discharging all portable units as well
 - C. make certain that the CO2 starts flowing into the space
 - D. leave the space immediately

Correct answer: D

36. 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

37. A tank has been sealed and unventilated for a long period of time. Which of the following statements is true?
- A. The tank is safe to enter.
 - B. The tank is especially dangerous to enter.
 - C. Carbon monoxide is present.
 - D. Water vapor present when the tank was sealed has oxidized.

Correct answer: B

38. Which of the following methods will reduce the possibility of producing an electrical spark?
- A. Connecting a bonding wire between the shoreside piping and the vessel.
 - B. Placing an insulating flange or a section of non-conducting hose in the hose setup.
 - C. Using a cargo hose with a built-in electrical bonding wire.
 - D. All of the above.

Correct answer: D

39. Enlarging one tube end so the end of another tube of the same size will fit inside is termed _____.
- A. swaging
 - B. belling
 - C. flaring
 - D. stretching

Correct answer: A

40. To minimize magnetic field interaction between electrical conductors in physical proximity, what is the best practice?
- A. at right angles and as far as practicable from each other
 - B. parallel and as close as possible to each other
 - C. at right angles and as close as possible to each other
 - D. parallel to and as far as practicable from each other

Correct answer: A

41. If both the shell-and-tube lube oil cooler and shell-and-tube jacket water cooler of a diesel engine are sea water-cooled, what statement is true?
- A. Sea water flows through the tubes of both the lube oil and jacket water coolers.
 - B. Sea water flows through the tubes of the jacket water cooler and through the shell of the lube oil cooler.
 - C. Sea water flows through the shells of both the lube oil and jacket water coolers.
 - D. Sea water flows through the tubes of the lube oil cooler and through the shell of the jacket water cooler.

Correct answer: A

42. Which of the devices shown in the illustration is designed for both inside and outside measurements?
Illustration GS-0073
- A. A
 - B. B
 - C. C
 - D. D

Correct answer: C

43. 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. filled with water
 - B. gas freed
 - C. inerted
 - D. all of the above as necessary

Correct answer: D

44. When replacing fuses, what practice should be observed?
- A. to increase the fuse rating 10% to guard against 'nuisance blowing'
 - B. to stand on a rubber mat and use rubber gloves
 - C. the fuse clips are straight, tight, and in good contact
 - D. to use insulated pliers or screwdriver

Correct answer: C

45. Refrigeration systems using forced air circulation evaporators have a tendency to cause rapid dehydration of produce in chill boxes. Which of the following will minimize this dehydration?
- A. the air is circulated slowly over a large evaporator with a maximum temperature differential
 - B. the air is circulated rapidly over a small evaporator with a minimum temperature differential
 - C. the air is circulated rapidly over a small evaporator with a maximum temperature differential
 - D. the air is circulated slowly over a large evaporator with a minimum temperature differential

Correct answer: D

46. Suppose a remote valve operator is fitted with a gearbox. What is the purpose of the gearbox?
- A. The gearbox is strictly used to change the orientation of the handwheel to the valve stem. The gearbox is never used to reduce the turning effort.
 - B. The gearbox may be used to change the orientation of the handwheel to the valve stem, or it may be used to reduce the turning effort, but NEVER both.
 - C. The gearbox may be used to change the orientation of the handwheel to the valve stem, or it may be used to reduce the turning effort, OR both.
 - D. The gearbox is strictly used to reduce the turning effort. The gearbox is never used to change the orientation of the handwheel to the valve stem.

Correct answer: C

47. In preparing the surface of a metal for application of primers and finish coats, which of the listed hand tools is appropriate for surfaces with significant pitting?
- A. Hand scraper
 - B. Sandpaper
 - C. Chipping hammer
 - D. Wire brush

Correct answer: D

48. What is the voltage across "R1" of figure "B" of the illustrated circuit with the switch closed if the applied voltage is 24 volts and resistance of R1 is 3 ohms, R2 is 4 ohms, and R3 is 5 ohms, respectively? Illustration EL-0020
- A. 2 volts
 - B. 6 volts
 - C. 8 volts
 - D. 10 volts

Correct answer: B

49. Concerning the charging of refrigerant into a vapor compression refrigerating system, which of the following is true?
- A. when charging as a liquid it should be to the low side only
 - B. when charging as a vapor it should be directly to the receiver only
 - C. when charging as a liquid it should be to the high side only
 - D. when charging as a liquid it may be to the low or high side

Correct answer: C

50. Which of the listed characteristics of fuel oil establishes the danger point as far as transferring, pumping, and firing procedures are concerned?
- A. Fire point
 - B. Flash point
 - C. Specific gravity
 - D. Viscosity

Correct answer: B

51. To prevent oil from escaping into the sea when ballasting through the cargo piping system, you should FIRST _____.
- A. open sluice valves, then start the cargo pump
 - B. start the cargo pump, then open sea suction valves
 - C. open sea suction valves, then start the cargo pump
 - D. open block valves, then start the cargo pump

Correct answer: B

52. At a minimum threshold, how many milliamps of current through the body produces a condition where most people would be unable to let go of the energized electrical conductor due to involuntary muscular contraction?
- A. 3 to 7 mA
 - B. 10 to 16 mA
 - C. 30 mA
 - D. 75 mA for 5 sec

Correct answer: B

53. What is one benefit of maintenance of proper air circulation in an air-conditioned cargo space?
- A. increased moisture content
 - B. more temperature differential
 - C. reduced slime and mold
 - D. increased density of the air

Correct answer: C

54. Before working on an electric cargo winch master switch or controller, what should be done?
- A. open the circuit breaker in the power supply and tag-out
 - B. spray the gasket surface with a solvent
 - C. heat the switch box to remove any moisture
 - D. drain condensate from the box

Correct answer: A

55. A refrigeration compressor used in a multi-box refrigeration system, is designed with six of its eight cylinders able to be controlled for variable load conditions. If all of the reefer boxes are currently feeding, what percentage of the total number of compressor cylinders will be loaded after start up?
- A. 100%
 - B. 50%
 - C. 25%
 - D. 0%

Correct answer: A

56. Energy losses occurring in a hydraulic system are ultimately absorbed by the _____.
- A. reservoir expansion chamber
 - B. hydraulic piping flexibility
 - C. atmosphere as heat
 - D. fluid as friction

Correct answer: C

57. The individual 6 volt lead-acid batteries, when connected as shown in the illustration, as a battery bank would produce how many volts? Illustration EL-0070
- A. 6
 - B. 12
 - C. 18
 - D. 24

Correct answer: A

58. If a life raft should capsize, _____.
- A. climb onto the bottom
 - B. swim away from the raft
 - C. right the raft using the righting straps
 - D. inflate the righting bag

Correct answer: C

59. What does the component labeled "B" shown in the illustration represent? Illustration EL-0093
- A. selsyn motor
 - B. shielded lamp
 - C. bridge rectifier
 - D. hand-cranked generator

Correct answer: D

60. You are fighting a class "B" fire with a portable dry chemical extinguisher. The discharge should be directed _____.
- A. to bank off a bulkhead onto the fire
 - B. at the main body of the fire
 - C. at the seat of the fire, starting near the edge
 - D. over the top of the fire

Correct answer: C

61. How can the loss of residual magnetism in an alternator or generator be corrected?

- A. allowing the generator to run at 10% of normal speed for 5 minutes
- B. using a storage battery or battery charger to 'flash' the field
- C. running the rotor in the opposite direction for 5 minutes
- D. running the generator at normal speed with the field rheostat fully counter-clockwise

Correct answer: B

62. In terms of consistency (or "stiffness"), what is the most common grade of grease for most marine applications as set forth by the National Lubricating Grease Institute (NLGI)?

- A. NLGI 000
- B. NLGI 0
- C. NLGI 2
- D. NLGI 6

Correct answer: C

63. What would be the voltage drop across the parallel branches of the circuit shown in figure "B" of the illustration if the source voltage is 30 volts, the resistance for R1 is 10 ohms, the resistance for R2 is 10 ohms and the resistance for R3 is 10 ohms? Illustration EL-0032

- A. 5 volts
- B. 10 volts
- C. 20 volts
- D. 30 volts

Correct answer: B

64. Refrigerant entering the compressor of a refrigeration system should be in which of the following conditions?

- A. Low-pressure vapor
- B. High-pressure vapor
- C. Low-pressure liquid
- D. High-pressure liquid

Correct answer: A

65. What is the alarm signal for manning boat stations or boat drills onboard a merchant ship?

- A. Continuous blast of the whistle for not less than 10 seconds supplemented by the continuous ringing of the general alarm bells for not less than 10 seconds.
- B. Continuous blast of the whistle for not less than 3 seconds supplemented by the continuous ringing of the general alarm bells for not less than 3 seconds.
- C. General alarm sounded 3 times supplemented by 3 short blasts of the whistle.
- D. A succession of more than 6 short blasts followed by 1 long blast of the whistle supplemented by a comparable signal on the general alarm.

Correct answer: D

66. 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. The fire may warp the CO₂ piping.
- C. Updraft from the fire tends to carry the CO₂ away.
- D. Carbon dioxide takes a long time to disperse to all portions of a space.

Correct answer: C

67. What is an ammeter used to measure?

- A. the voltage between two points in a circuit
- B. total or partial circuit resistance
- C. circuit continuity
- D. current flow in a circuit

Correct answer: D

68. What determines the direction of rotation of an AC induction motor?

- A. direction of rotation is the same as the direction of the rotating magnetic field
- B. direction of rotation is opposite of the direction of the rotating field
- C. the direction of the staggering of the brushes
- D. the number of poles being even or odd

Correct answer: A

69. The fluid used as a source of actuating power against the underside of the unloader power element piston of the refrigeration compressor capacity control mechanism illustrated is obtained from where?
Illustration RA-0013

- A. gas discharge from the compressor
- B. discharge of the compressor lube oil pump
- C. high side liquid receiver
- D. discharge of a secondary hydraulic pump specifically installed for this operation

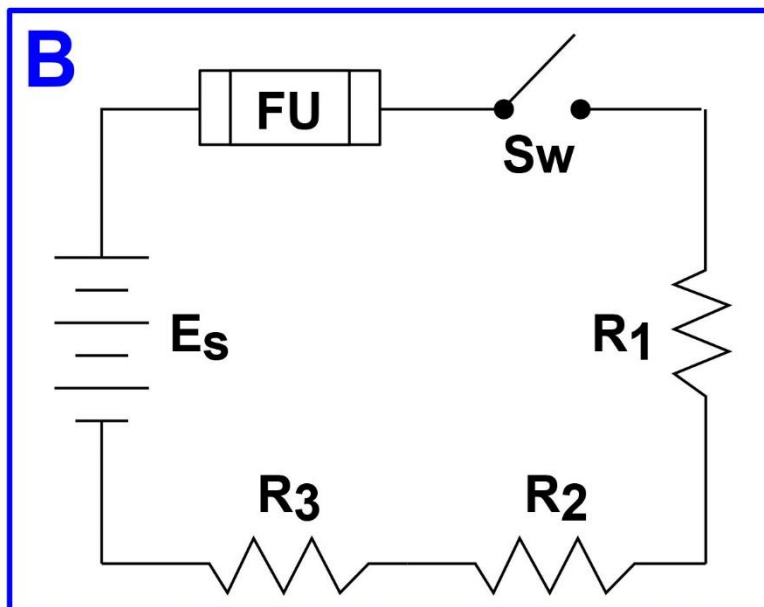
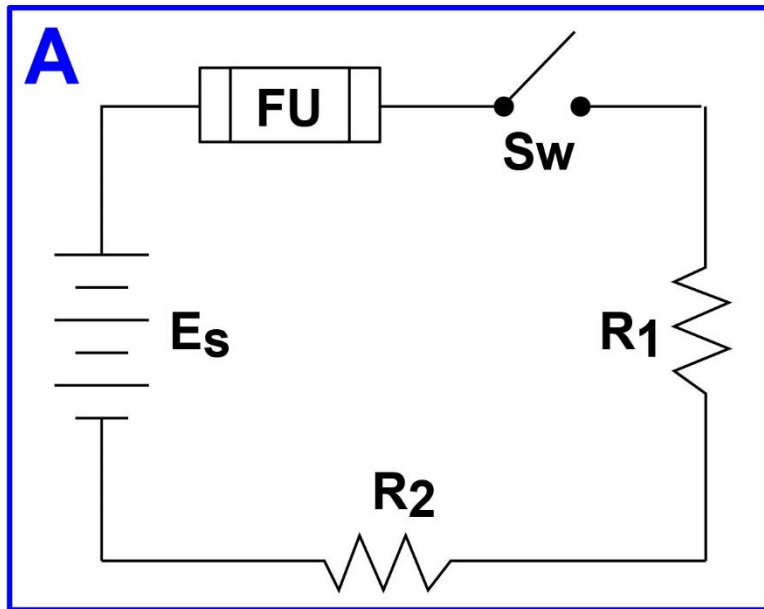
Correct answer: B

70. Personnel servicing refrigeration systems and subject to the exposure to commonly used refrigerants should wear what type of personal protective equipment?

- A. goggles and gloves
- B. rubber soled shoes
- C. a respirator
- D. an all-purpose gas mask

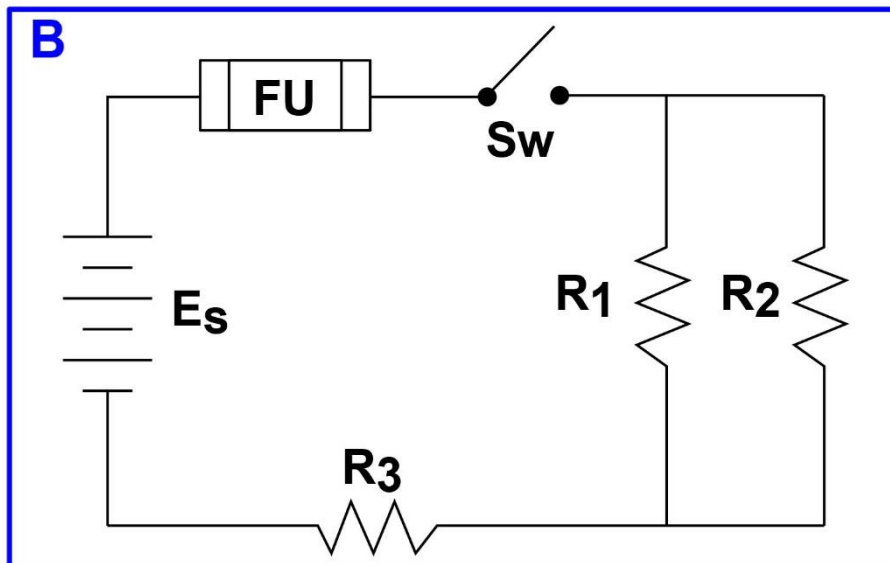
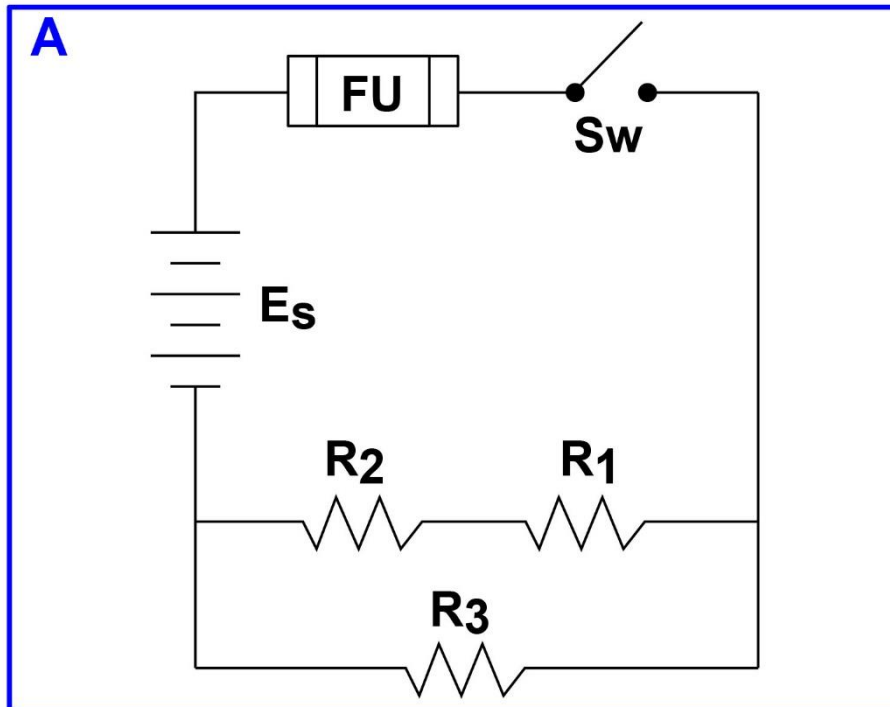
Correct answer: A

EL-0020



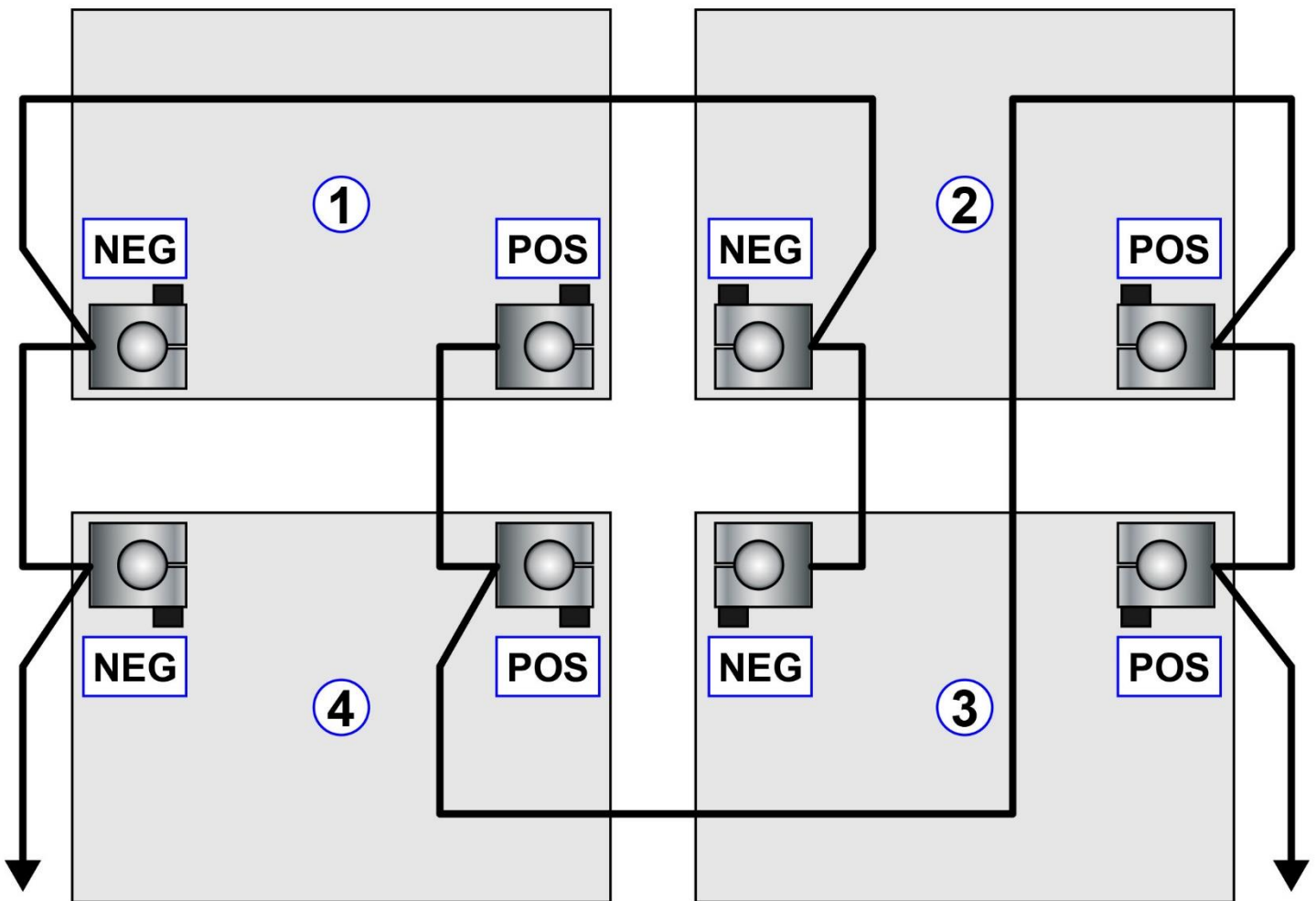
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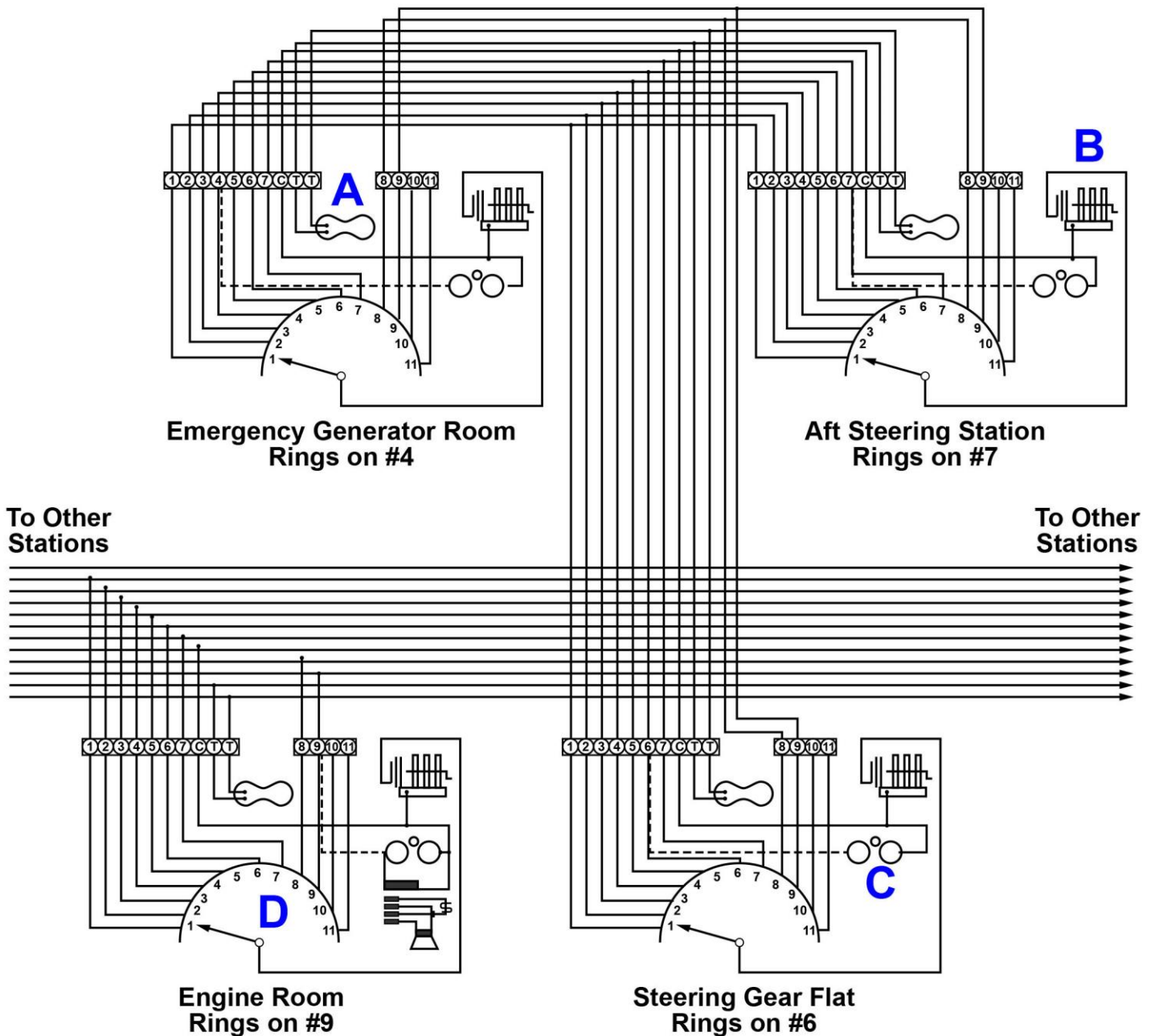
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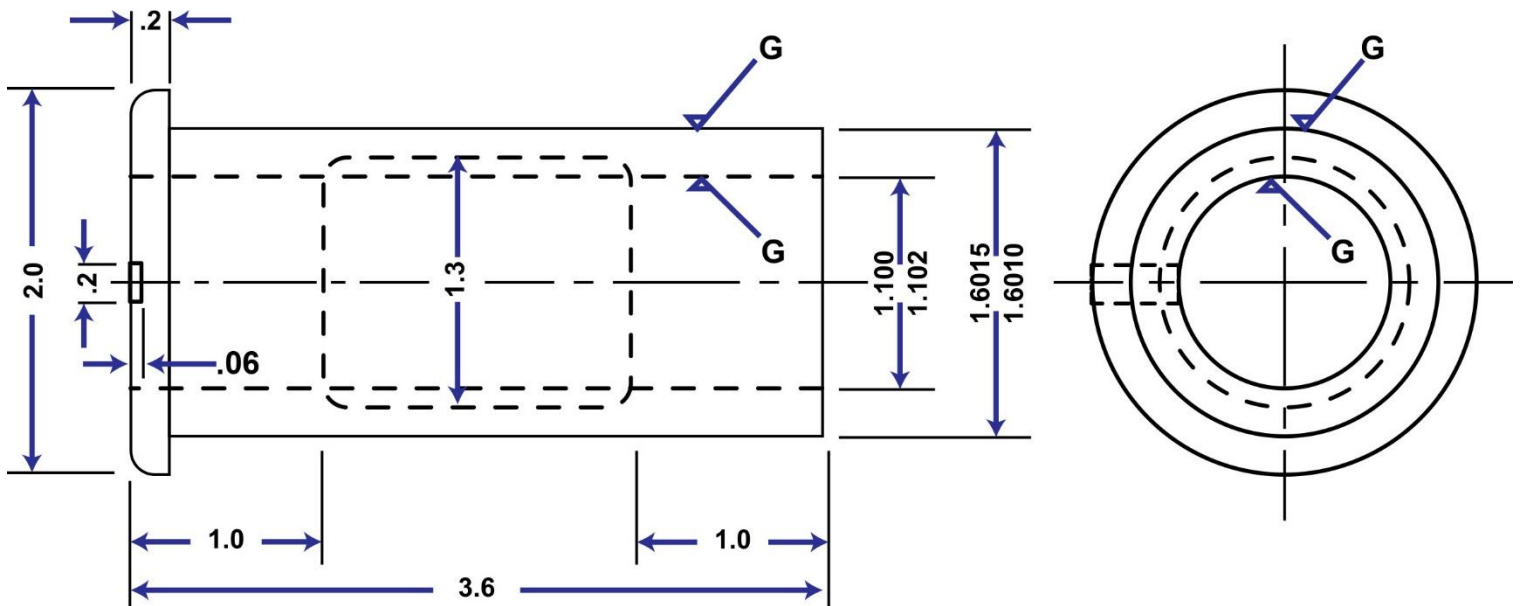
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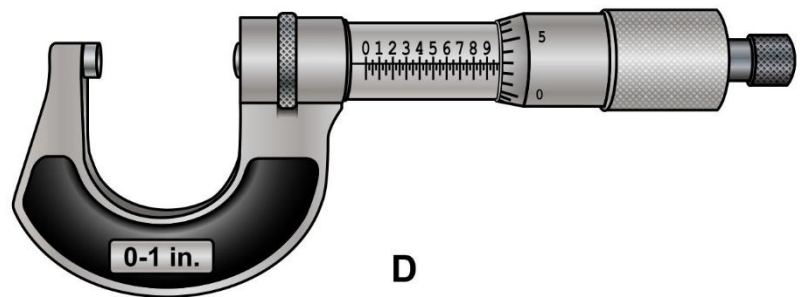
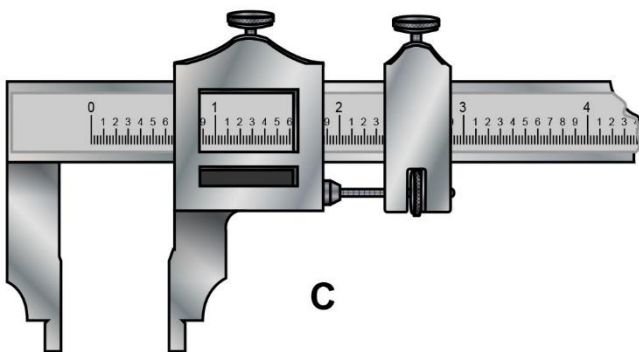
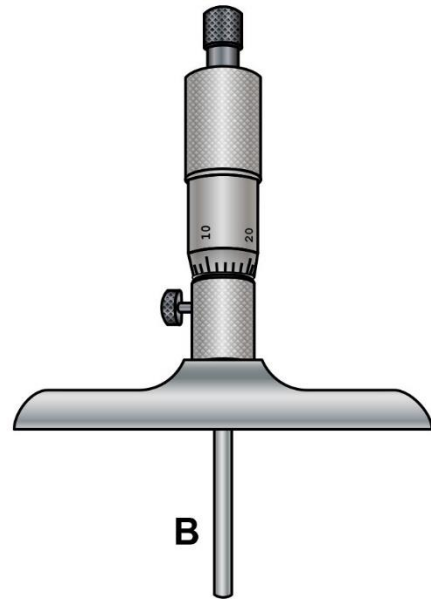
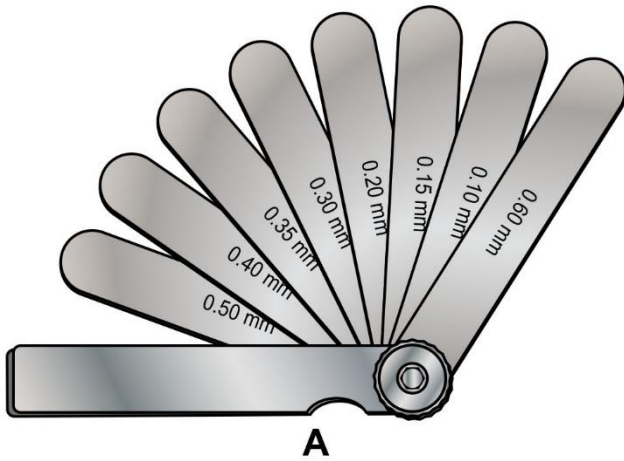
GS-0017



Bushing
AISI 1095 SAE Carbon Steel
Hardened and Tempered
Designated Surfaces Ground
To Specified Tolerances

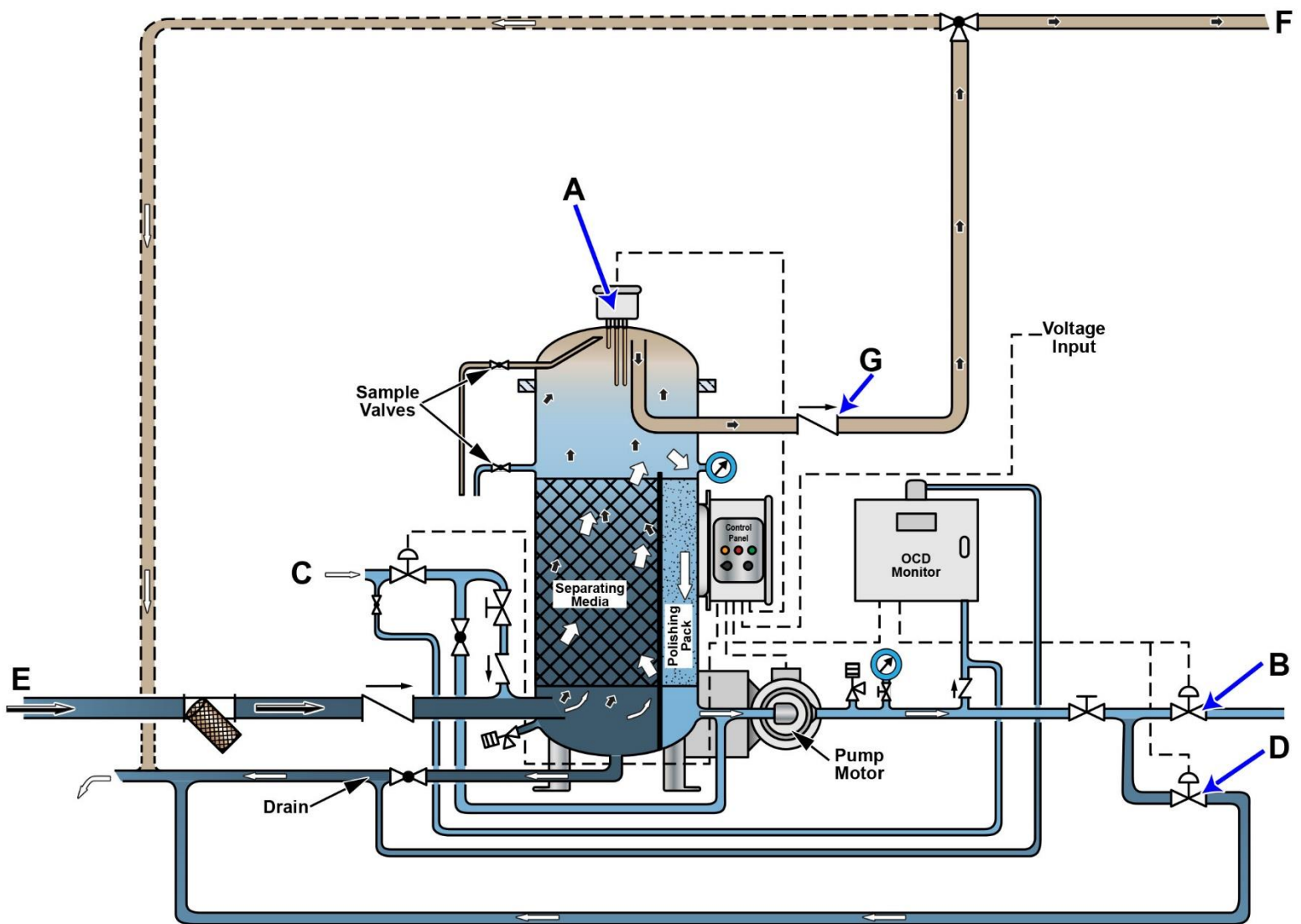
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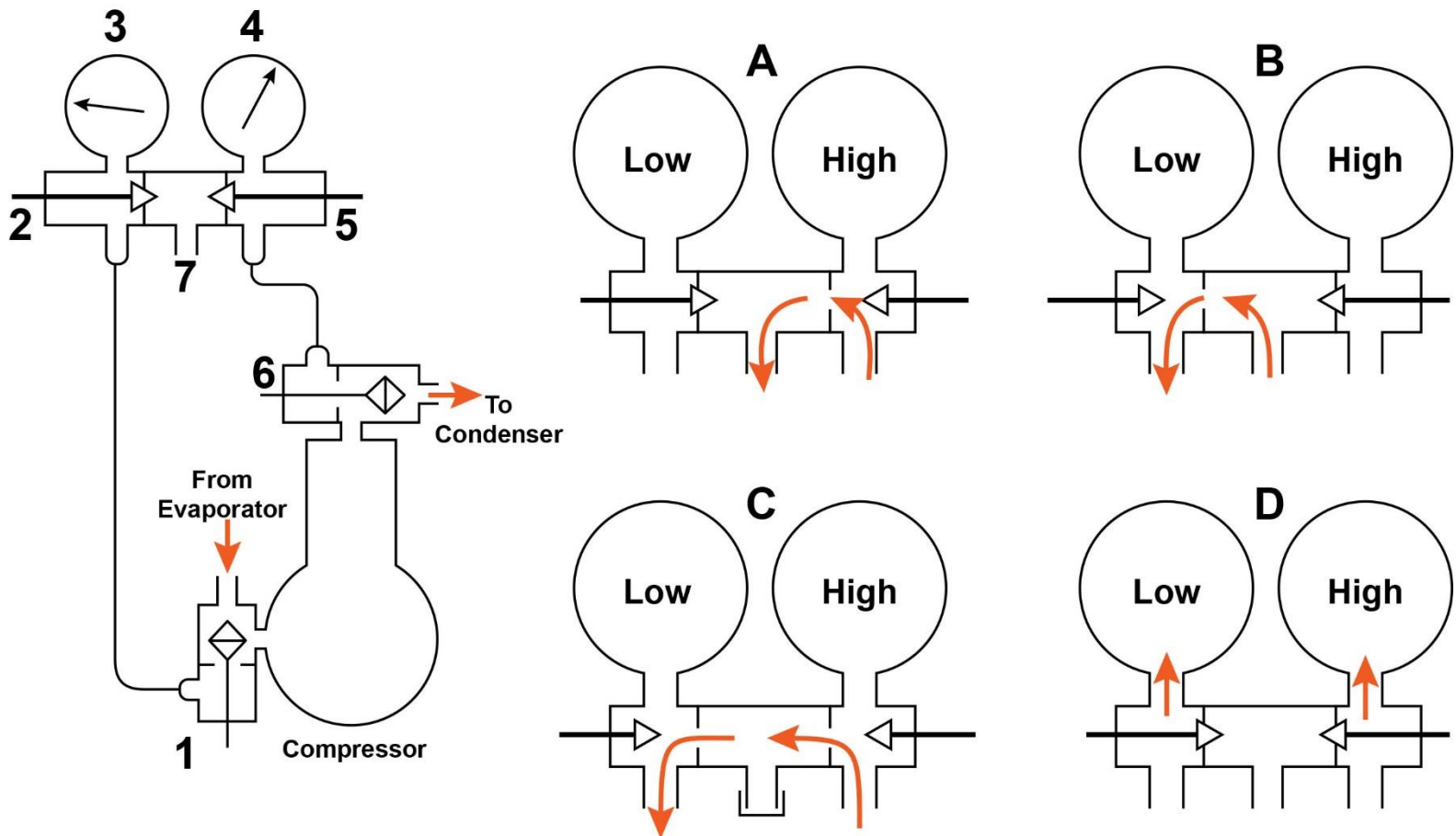
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GS-0175



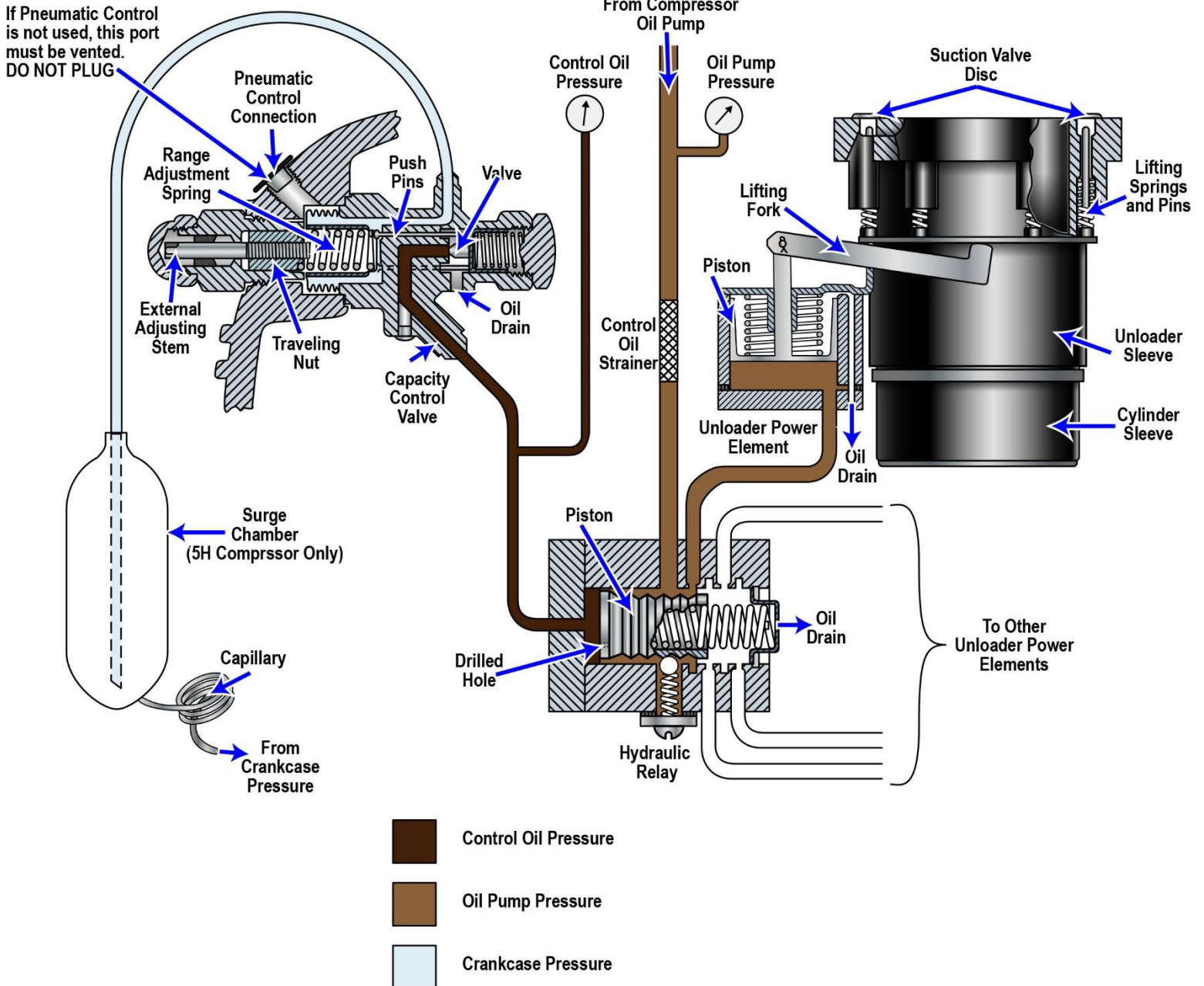
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RA-0003



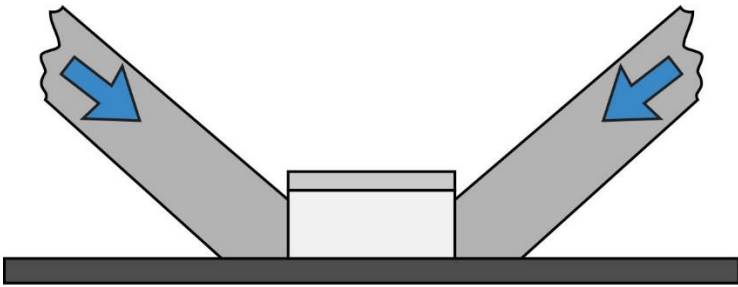
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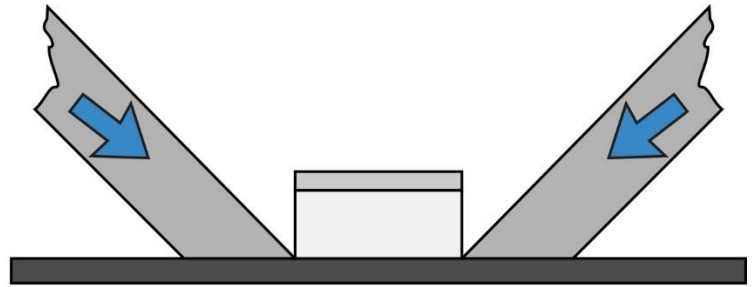


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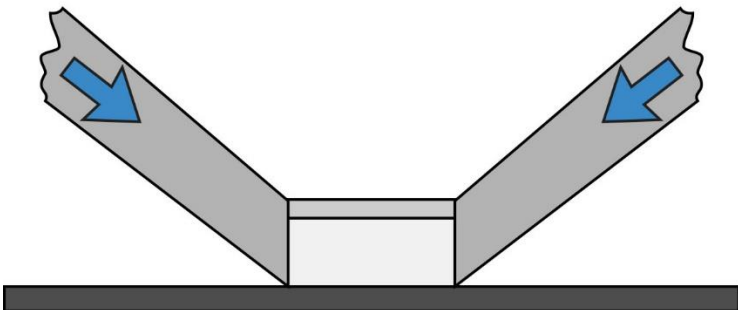
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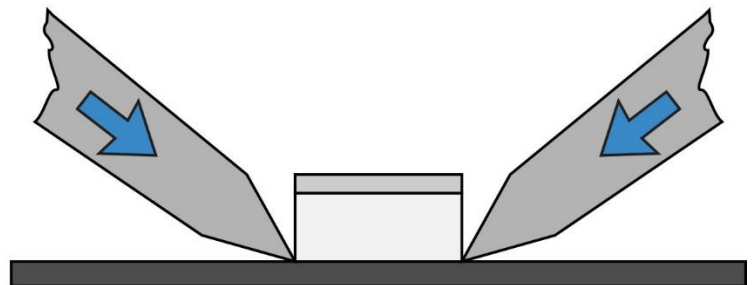
A



B



C



D

Adapted for testing purposes only from Damage Controlman
NAVEDTRA 14057
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