

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. Moisture is removed from recovered refrigerant using a recycling machine by what means?

- A. purging non-condensables off the top of the recovery cylinder
- B. condensing the moisture in the condenser
- C. opening a drain petcock on the oil separator
- D. circulating the refrigerant through a dehydrator

Correct answer: D

2. The multiplier prefix 'giga' (G) such as used in "gigabytes" represents what multiplication factor?

- A. thousand (10 to the 3rd power)
- B. million (10 to the 6th power)
- C. billion (10 to the 9th power)
- D. trillion (10 to the 12th power)

Correct answer: C

3. The term "oil foaming" in refrigeration practice, is used to describe what event?

- A. release of miscible refrigerant from the lubricant in the crankcase
- B. sudden evaporation of entrapped air from the refrigerant liquid
- C. release of dissolved lubricant from the refrigerant in the crankcase
- D. sudden evaporation of entrapped moisture from the crankcase lubricant

Correct answer: A

4. 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

5. When an aluminum plate is bolted to a steel plate, what is required at the bolted joint to minimize bimetallic corrosion?

- A. The plates should be bolted together in such a way as to ensure good electrical contact between the plates.
- B. The plates should be electrically insulated from one another by use of non-conductive gaskets and non-conductive ferrule sleeves with the bolts.
- C. Steel and aluminum are so close together on the Noble series that no particular provision need be made for bolting steel and aluminum plates together.
- D. The plates should be bonded together electrically by joining the plates by a bonding strap in addition to bolting together.

Correct answer: B

6. In what application is an emergency shutdown most likely to be located outside the machinery space when the pump itself is located within the machinery space?
- A. Lube oil circulating pump
 - B. Steering pump
 - C. Fuel oil transfer pump
 - D. Fire pump

Correct answer: C

7. When treating a person for third degree burns, you should _____.
- A. cover the burns with thick sterile dressing
 - B. submerge the burn area in cold water
 - C. make the person stand up and walk to increase circulation
 - D. break blisters and remove dead tissue

Correct answer: A

8. Which of the following statements is true concerning the gauge labeled "A" of the illustrated gauge manifold set? Illustration RA-0001
- A. The gauge labeled "A" is a standard pressure gauge and is usually color-coded blue.
 - B. The gauge labeled "A" is a compound gauge and is usually color-coded red.
 - C. The gauge labeled "A" is a compound gauge and is usually color-coded blue.
 - D. The gauge labeled "A" is a standard pressure gauge and is usually color-coded red.

Correct answer: C

9. What is the drive arrangement of refrigeration compressor shown in figure "B" of the illustration? Illustration RA-0041
- A. external drive
 - B. open
 - C. serviceable, bolted, accessible semi-hermetic
 - D. welded, fully hermetic

Correct answer: D

10. The discharge capacity of the axial piston hydraulic pump, shown in the illustration, is _____. Illustration GS-0058
- A. fixed by the pump housing angle
 - B. variable set by angle determined by operator
 - C. variable set by adding shorter or longer cylinder block
 - D. fixed by length of the shaft

Correct answer: A

11. Which practices should be followed at all times when using an electric grinding machine?

- A. Be properly trained in the use of this tool.
- B. Wear goggles or face shield.
- C. Be certain that the frame is properly grounded.
- D. Each of the above practices.

Correct answer: D

12. Mechanical shaft seals used on water service pumps require lubrication of the seal faces to minimize deposits of foreign matter on those surfaces. Which of the following pressures and lubricants are required?

- A. Water under negative pressure.
- B. Oil under positive pressure.
- C. Oil under negative pressure.
- D. Water under positive pressure.

Correct answer: D

13. In actual applications, electrical connections associated with "R1, R2 and R3" of the transmitter to "R1, R2, and R3" of the indicators shown in figure "C" of the illustration are made by what means? Illustration EL-0092

- A. solderless crimp-on connectors
- B. soldered contacts
- C. spliced and taped connections
- D. slip rings and brushes

Correct answer: D

14. What is the current flow through R1 of the circuit in figure "B" of the illustration with the switch closed if the resistance of R1 is 2 ohms, R2 is 3 ohms and R3 is 6 ohms and the battery voltage is 12 VDC? Illustration EL-0019

- A. 2 amps
- B. 4 amps
- C. 6 amps
- D. 12 amps

Correct answer: C

15. A dial indicator is used to measure _____.

- A. scribed layout lines on vertical surfaces
- B. shaft eccentricity
- C. positive readings only
- D. torque of a shaft

Correct answer: B

- 16.** What is a useful instrument for checking 3-phase AC motor performance by measuring possible unbalanced currents?
- A. vibrating-reed frequency meter
 - B. clamp-on ammeter
 - C. D'Arsonval iron-vane probe
 - D. hand or battery-operated megger

Correct answer: B

- 17.** After extinguishing a paint locker fire using the fixed CO₂ system, the next immediate action is for the space to be _____.
- A. opened and doused with water to prevent reflash
 - B. opened and burned material removed
 - C. left closed with ventilation off until all boundaries are cool
 - D. checked for the proper oxygen level

Correct answer: C

- 18.** The state of charge of a stored pressure type dry chemical fire extinguisher can be readily determined by _____.
- A. weighing the cylinder
 - B. removing the lid and checking the level of dry chemical
 - C. weighing the CO₂ cartridge
 - D. visual inspection of the pressure gage

Correct answer: D

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

Correct answer: B

- 20.** 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

21. Which lathe tool shown in the illustration would best be used on a workpiece to perform a right-hand facing operation? Illustration GS-0090

- A. P
- B. V
- C. Q
- D. R

Correct answer: D

22. 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 rapidly over a small evaporator with a maximum temperature differential
- B. the air is circulated slowly over a large evaporator with a minimum temperature differential
- C. the air is circulated rapidly over a small evaporator with a minimum temperature differential
- D. the air is circulated slowly over a large evaporator with a maximum temperature differential

Correct answer: B

23. If you see an individual fall overboard, you should _____.

- A. pass the word to the bridge
- B. hail "Man Overboard"
- C. throw a life ring overboard
- D. all of the above

Correct answer: D

24. Which of the following direct reading pressure gauges is capable of measuring and displaying both positive and negative pressures?

- A. Simplex gauge
- B. Differential pressure gauge
- C. Duplex gauge
- D. Compound gauge

Correct answer: D

25. A thermal expansion valve installed in a refrigeration system is controlled by the action of what device?

- A. the box solenoid valve operating coil
- B. the receiver level controller
- C. the TEV sensing bulb mounted on the evaporator tail coil
- D. the compressor unloader mechanism

Correct answer: C

26. When troubleshooting AC motors, what can a portable growler be used to locate?

- A. grounded stator coils
- B. open field coils
- C. grounded field coils
- D. shorted stator coils

Correct answer: D

27. The property of a fuel oil which is a measurement of its available energy, is known as its _____.

- A. cetane number
- B. cetane index
- C. heating value
- D. viscosity index

Correct answer: C

28. In a two-stage centrifugal air conditioning system such as the one illustrated, the liquid refrigerant passes from the condenser directly to what component? Illustration RA-0064

- A. economizer
- B. expansion valve
- C. evaporator
- D. chiller

Correct answer: A

29. What does the component labeled "B" shown in the illustration represent? Illustration EL-0093

- A. bridge rectifier
- B. shielded lamp
- C. selsyn motor
- D. hand-cranked generator

Correct answer: D

30. With regard to the number of passes through the tubes of shell-and-tube heat exchangers, what statement is true?

- A. In two-pass and four-pass heat exchangers, the inlet and outlet tube-side fluid connections are at the same end.
- B. In single-pass and two-pass heat exchangers, the inlet and outlet tube-side fluid connections are at the same end.
- C. In two-pass and four-pass heat exchangers, the inlet and outlet tube-side fluid connections are at opposite ends.
- D. In single-pass and two-pass heat exchangers, the inlet and outlet tube-side fluid connections are at opposite ends.

Correct answer: A

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

Correct answer: D

32. What happens to the current in a series circuit when the voltage remains constant and the resistance increases?

- A. remains the same
- B. increases by the square
- C. decreases
- D. increases

Correct answer: C

33. 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. Using a cargo hose with a built-in electrical bonding wire.
- C. Placing an insulating flange or a section of non-conducting hose in the hose setup.
- D. All of the above.

Correct answer: D

34. Winch gears must be maintained in proper alignment to prevent _____.

- A. damage to the teeth
- B. wear on the braking system
- C. overheating of the lube oil
- D. overspeeding of the motor

Correct answer: A

35. Why can CFC or HCFC refrigerants leaking into a confined space or in limited surroundings cause suffocation?

- A. Refrigerants lighter than air will rise.
- B. Refrigerants obnoxious odor prevents breathing.
- C. Refrigerants are heavier than air and displace oxygen.
- D. Refrigerants contain an acidic substance.

Correct answer: C

36. When administering first aid you should avoid _____.

- A. instructing bystanders
- B. any conversation with the patient
- C. touching the patient
- D. unnecessary haste and appearance of uncertainty

Correct answer: D

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

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

Correct answer: A

38. During the initial cooling down of a box temperature in a refrigeration system, which of the devices listed is used to prevent excessive gas pressure at the compressor suction for the purpose of prevention of overloading of the compressor driver?

- A. High-pressure cut-out
- B. Low-pressure cut-out
- C. Solenoid valve
- D. Crankcase pressure regulator

Correct answer: D

39. In performing routine maintenance of a ship's service alternator, what should be included?

- A. megger testing of all rectifying diodes
- B. lubricating exciter slip rings
- C. periodic cleaning of the air filters or screens
- D. changing the pedestal bearing insulation yearly

Correct answer: C

40. What type of eye protection affords the best protection from dust and airborne abrasives?

- A. Side-shielded safety glasses
- B. Full-face shield
- C. Standard safety glasses
- D. Eyecup safety goggles

Correct answer: D

41. Traditionally, which of the listed refrigerants has been more suitable than the others for use in a centrifugal refrigeration compressor?

- A. R-11
- B. R-12
- C. Ammonia
- D. Carbon dioxide

Correct answer: A

42. In a compression type automatic grease cup, the lubricant is forced into the bearing by _____.

- A. a pressure gun
- B. gravity flow
- C. a Zerk fitting
- D. spring force

Correct answer: D

43. 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

Correct answer: D

44. 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

45. Water ballast placed in a tank that has been crude oil washed, but not water rinsed, shall be regarded as _____.

- A. dirty ballast
- B. segregated ballast
- C. clean ballast
- D. crude oil

Correct answer: A

46. Under what circumstance would a hand-held portable phase sequence indicator be used should the main switchboard mounted fixed phase sequence indicator be inoperative?

- A. installing a new synchroscope
- B. replacing a defective solenoid
- C. paralleling alternators
- D. preparing to make the shore power connection

Correct answer: D

47. Which of the illustrated motors has a totally enclosed, fan-cooled (TEFC) motor enclosure? Illustration EL-0001

- A. A
- B. B
- C. C
- D. D

Correct answer: A

48. When changing fuses, what safety precaution should be taken after ensuring that the circuit is dead?

- A. use a fuse puller
- B. wear safety glasses
- C. stand on a rubber mat
- D. wear rubber boots

Correct answer: A

49. Under what conditions is a CAUTION tag installed at equipment control stations in preparation for performing maintenance or repairs?

- A. When operation of the equipment will harm the equipment ONLY.
- B. When operation of the equipment will endanger personnel ONLY.
- C. When operation of the equipment will endanger personnel OR harm the equipment.
- D. When operation of the equipment requires temporary special instructions to be provided.

Correct answer: D

50. 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. Soda acid
- B. Foam
- C. CO2
- D. Dry chemical

Correct answer: C

51. 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

52. An oxygen indicator will detect _____.

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

Correct answer: B

53. What statement below summarizes an engine lubricating oil's viscosity given as 20W-50?

- A. It is formulated for a metric weight of 20 milligrams at 50°F.
- B. It is formulated for both a low temperature and a high temperature based on viscosities determined at 100°C.
- C. The "W" designates what the additives are that are added to this oil.
- D. It is formulated for hot summer days when the cooling water temp is 50°F higher than the oil temperature.

Correct answer: B

54. Which of the following procedures reduces the possibility of an interior ventilation duct fire from rapidly spreading?

- A. Having a fire hose charged at each duct opening.
- B. Keeping the duct interior clean.
- C. Having a portable CO2 ready at each duct opening.
- D. Keeping the duct exterior clean.

Correct answer: B

55. Which of the following shoring materials is a short flat block that is placed under the end of a shore for the purpose of distributing pressure?

- A. Wedge
- B. Beam
- C. Strongback
- D. Shole

Correct answer: D

56. On a ship with a continuously manned engine room, with a three-person watch rotation, what is the watch and rest period rotation?

- A. 4 hours on watch followed by 8 hours rest
- B. 6 hours on watch followed by 6 hours rest
- C. 8 hours on watch followed by 4 hours rest
- D. 8 hours on watch followed by 8 hours rest

Correct answer: A

57. As shown in the illustration, which of the following statements is correct concerning the circuits in a sound-powered telephone system? Illustration EL-0093

- A. Both the talking and ringing circuits are common circuits.
- B. The talking circuit is a common circuit and the ringing circuit is a selective circuit.
- C. The talking circuit is a selective circuit and the ringing circuit is a common circuit.
- D. Both the talking and ringing circuits are selective circuits.

Correct answer: B

58. The purpose of try-cocks used on an auxiliary boiler is to _____.

- A. provide an alternate means of determining the water level, if the gage glass fails
- B. provide a means of adding chemical feed to the boiler water
- C. provide a means for blowing down the gage glass
- D. act as a steam sentinel valve, if any of the fusible plugs should melt

Correct answer: A

59. What is an engine room bilge oily-water separator designed to do?

- A. Remove small amounts of water from large amounts of oil.
- B. Remove small amounts of water from small amounts of oil.
- C. Remove small amounts of oil from large amounts of water.
- D. Remove small amounts of oil from small amounts of water.

Correct answer: C

60. In a refrigeration system, from what location would air and non-condensable gases be removed?

- A. the bottom of the receiver drain connection
- B. compressor oil fill connection
- C. expansion valve equalizer connection
- D. the top of the condenser purge connection

Correct answer: D

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

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

Correct answer: D

62. What could be the cause of water hammer in a steam heating system?

- A. filling the auxiliary boiler with cold water
- B. steam admitted to a cold pipe
- C. filling the auxiliary boiler with hot water
- D. draining a sootblower line before cracking the steam supply valve

Correct answer: B

63. Which of the following statements describes the difference between the primary windings and the secondary windings of an ideal 2:1 stepdown voltage transformer?

- A. The secondary windings use smaller wires than the primary windings.
- B. The secondary windings have half as many turns as the primary windings.
- C. The secondary windings can only provide half as much current as the primary windings.
- D. The secondary windings have twice as much resistance as the primary windings.

Correct answer: B

64. An across-the-line starter is typically used for which of the following applications?

- A. Full voltage starting of motors
- B. Low torque starting of small motors
- C. Reduced current starting of large motors
- D. Low resistance starting of DC motors

Correct answer: A

65. The component labeled "A", as shown in the illustration, would be identified as the _____. Illustration GS-0175

- A. water sensing probe
- B. oily-water content monitor
- C. oil level sensing probe
- D. pressure tank relief valve

Correct answer: C

66. The amount of voltage induced in the stator windings of a modern AC generator is primarily dependent upon which of the following?

- A. the number of field poles energized
- B. the cross-sectional area of the stator windings
- C. the strength of the rotating magnetic field
- D. the number of brushes associated with the commutator

Correct answer: C

67. At a minimum threshold, how many milliamps of current through the body produces a painful sensation that most people would perceive as an electric shock?

- A. 3 to 7 mA
- B. 10 to 16 mA
- C. 30 mA
- D. 100 mA for 2.5 sec.

Correct answer: A

68. The seat of a butterfly valve will most likely be constructed of _____.

- A. stellite
- B. Monel
- C. a resilient material
- D. admiralty metal

Correct answer: C

69. Using a sea anchor when in a life raft will _____.

- A. reduce the drift rate of the life raft
- B. keep the life raft from turning over
- C. aid in recovering the life raft
- D. increase your visibility

Correct answer: A

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Illustrations: 12

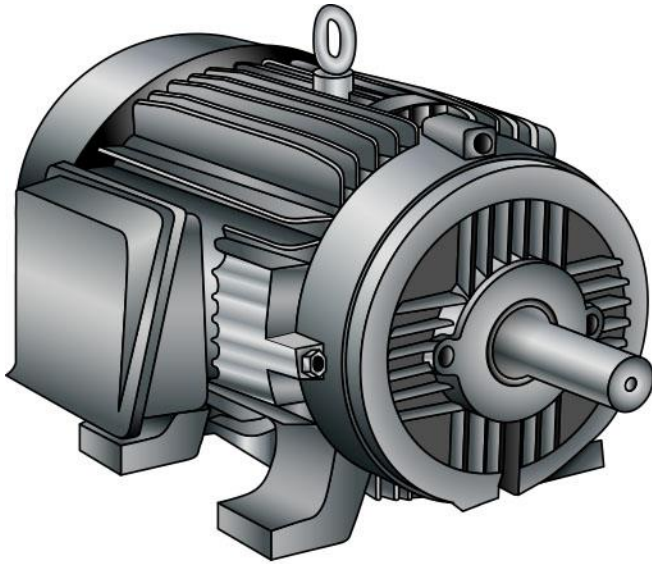
70. In order for the automatic lifeboat drain to operate properly _____.

- A. the cap should be removed to drain the boat when it is waterborne
- B. the cage must be free of rubbish or the ball may not seat properly
- C. there is an automatic ball check located in a siphon tube
- D. the small lever to release the rubber ball float must be turned counterclockwise

Correct answer: B



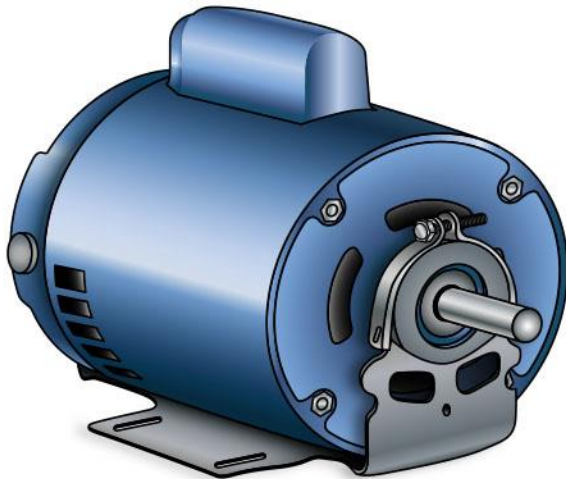
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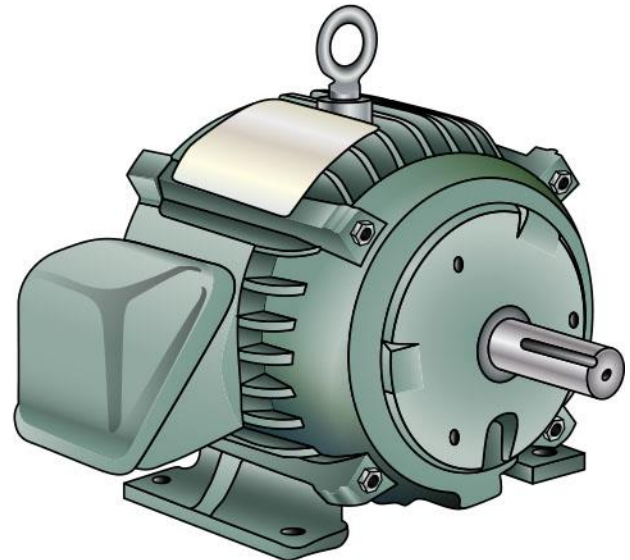
A



B



C

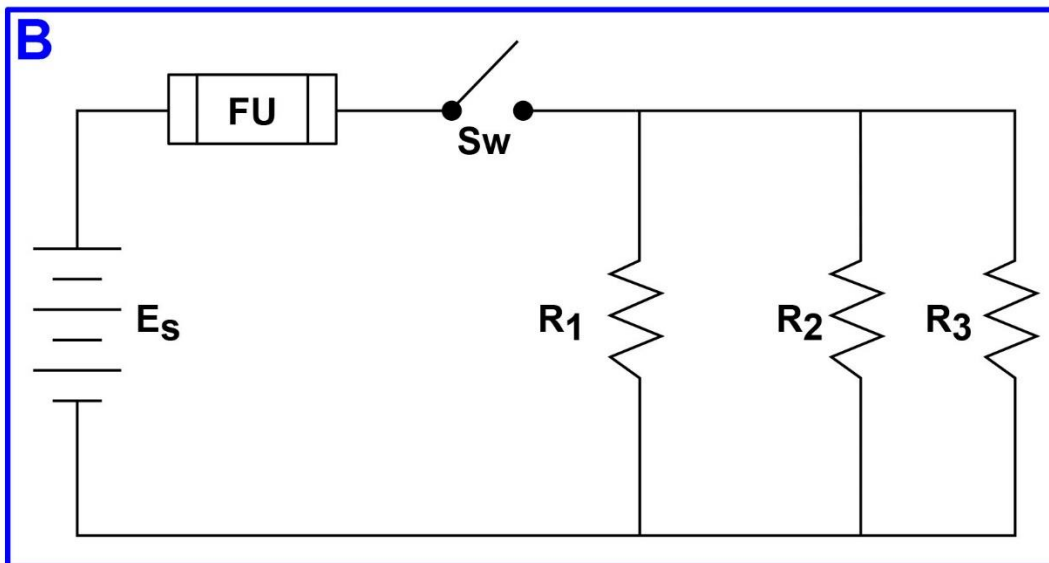
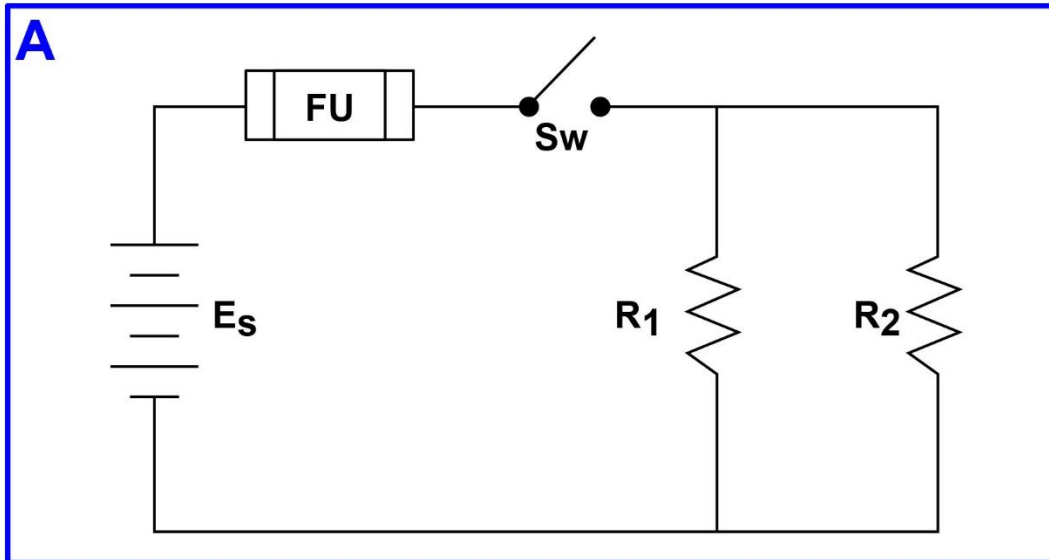


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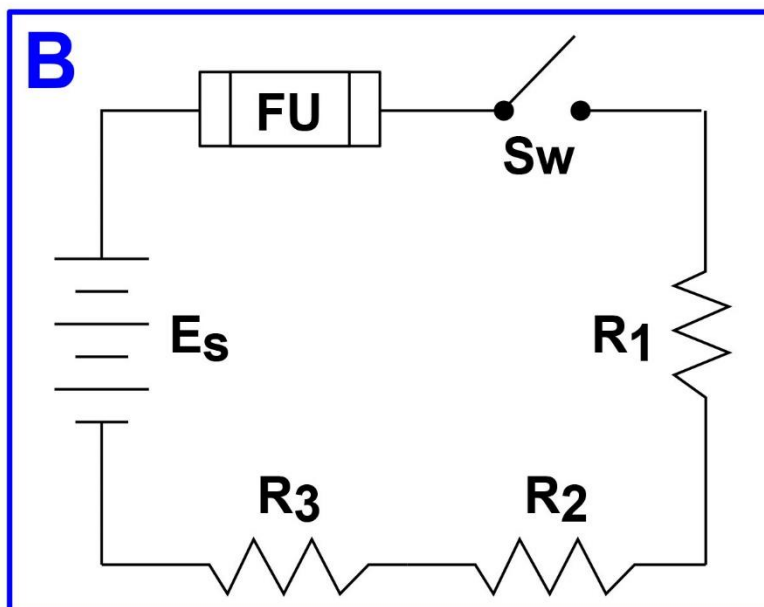
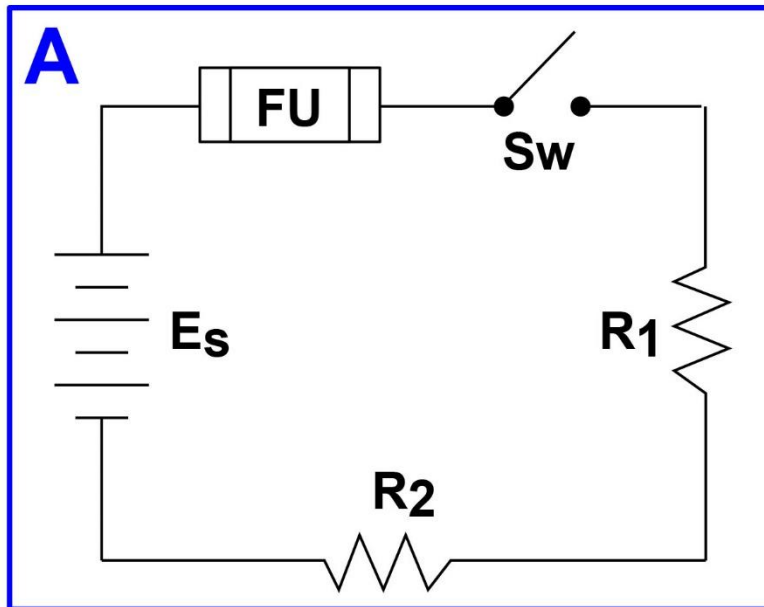
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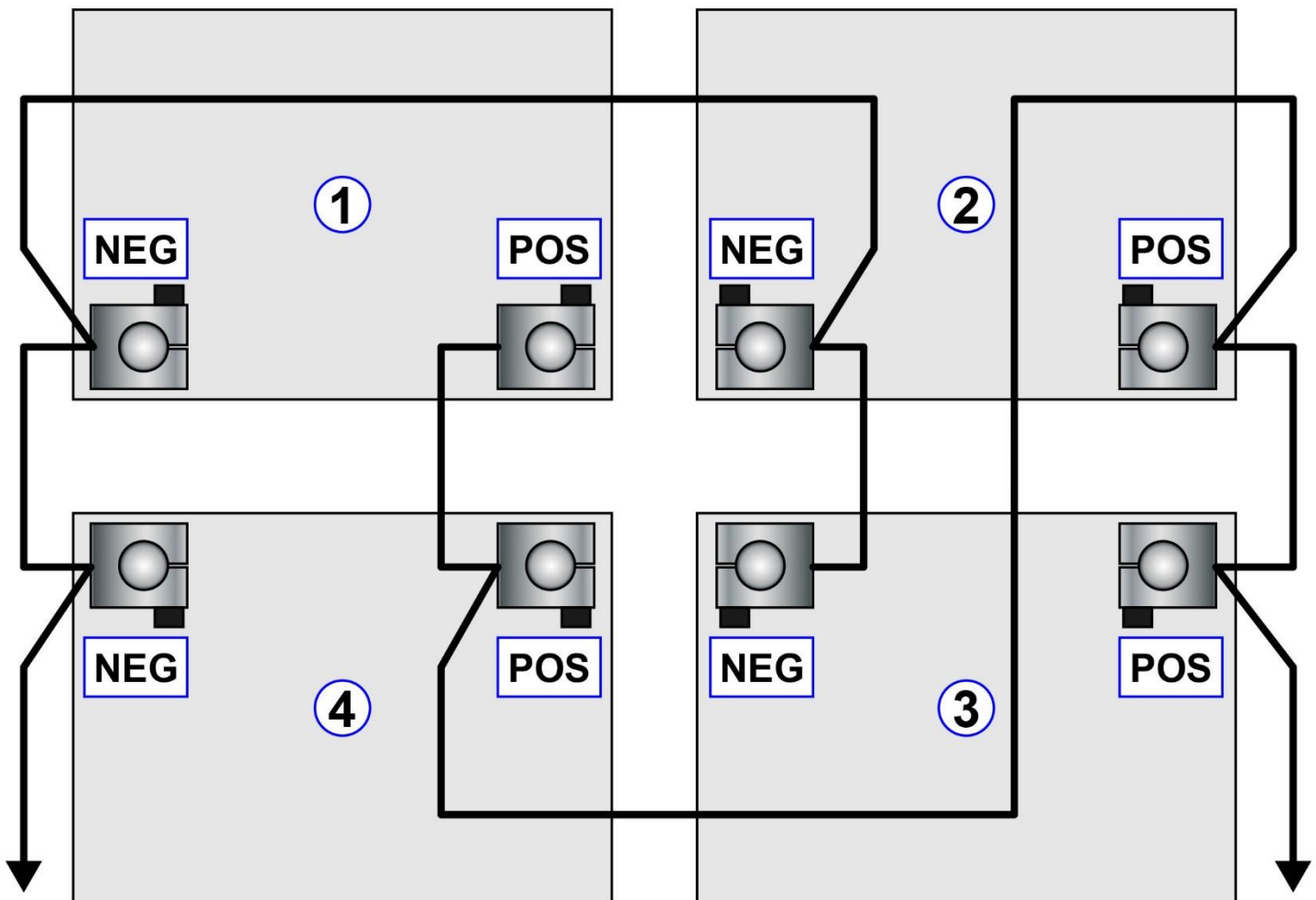
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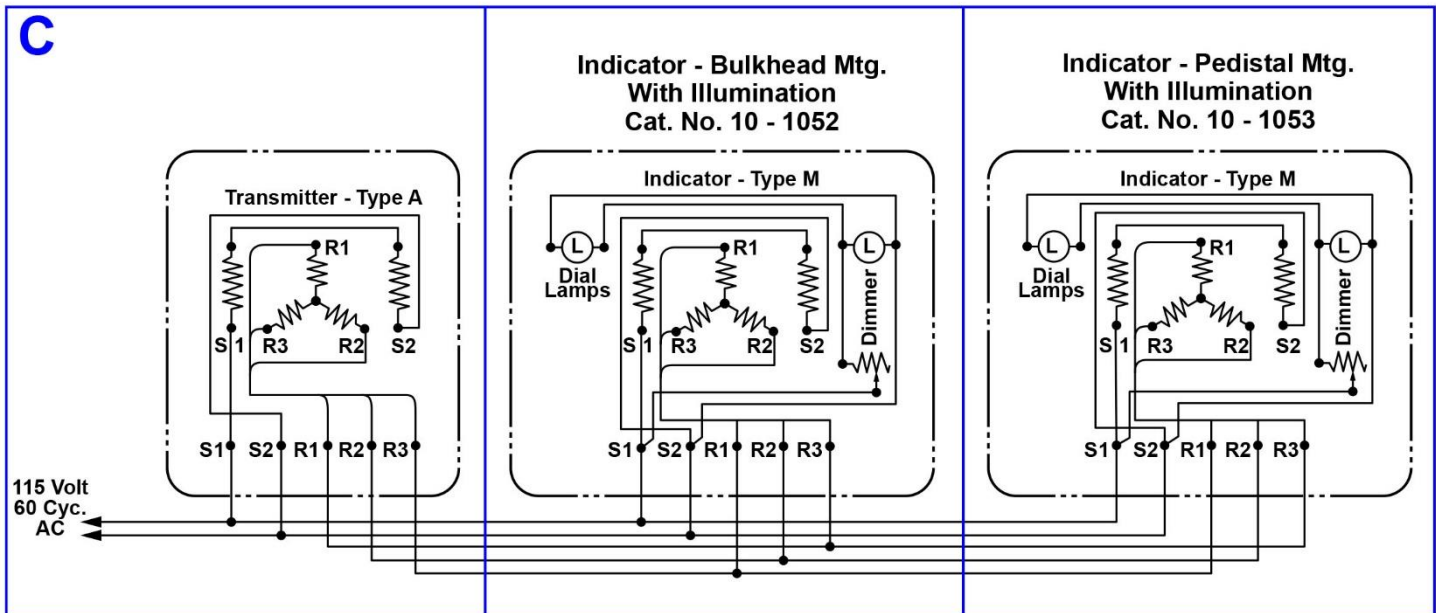
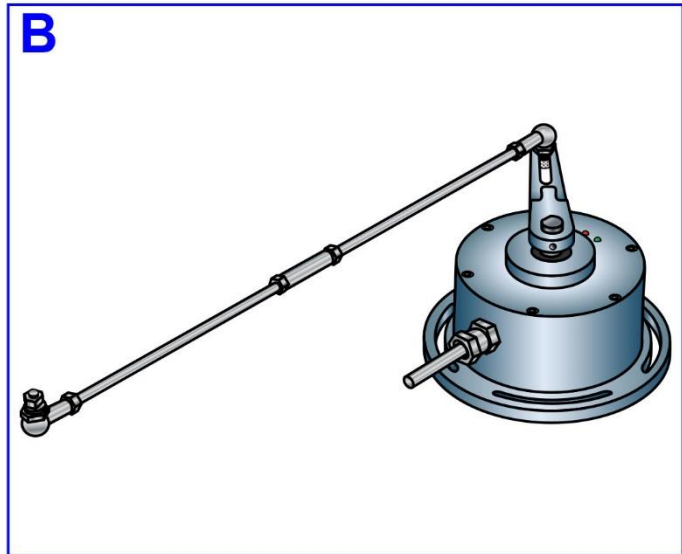
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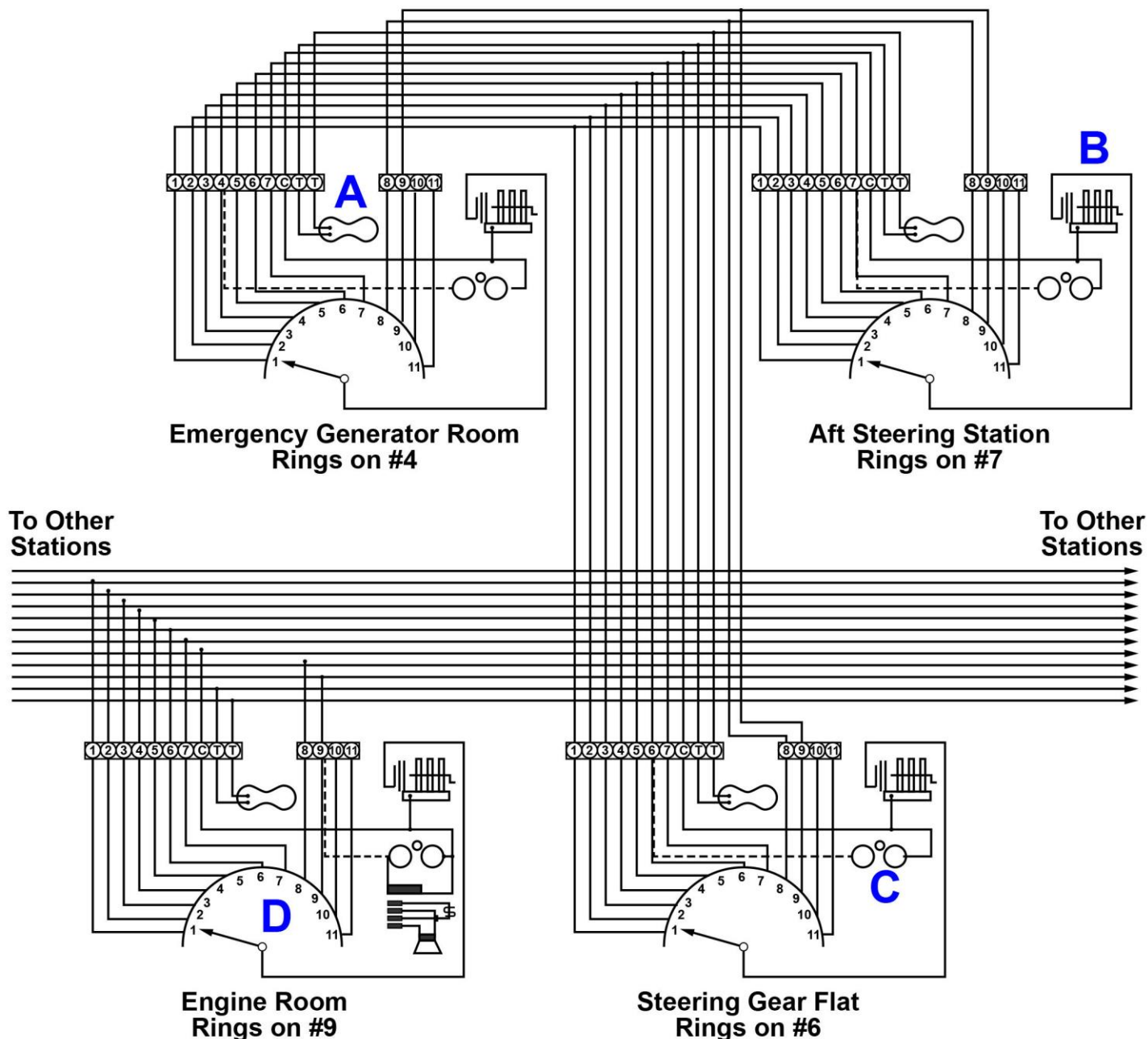
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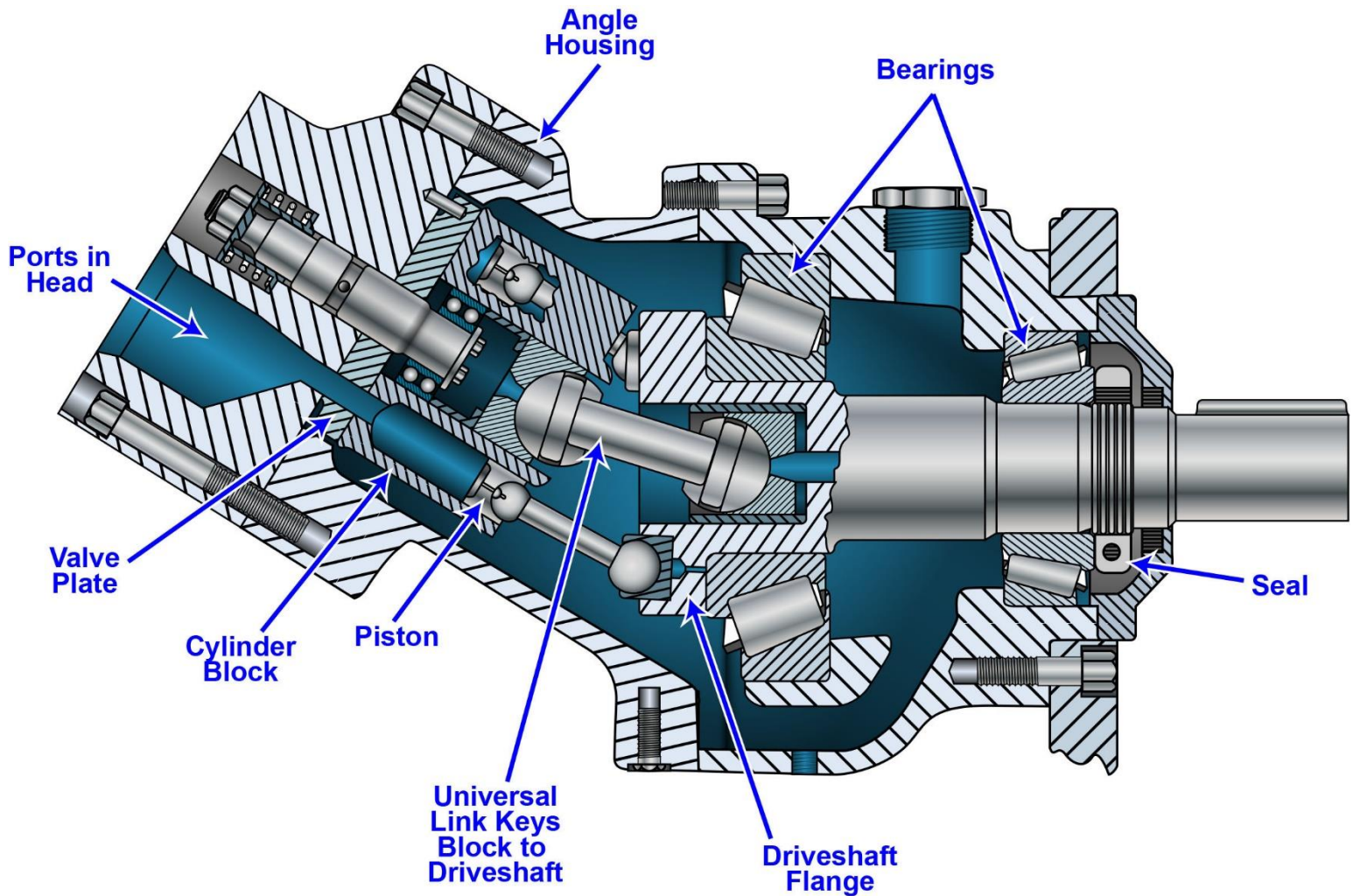
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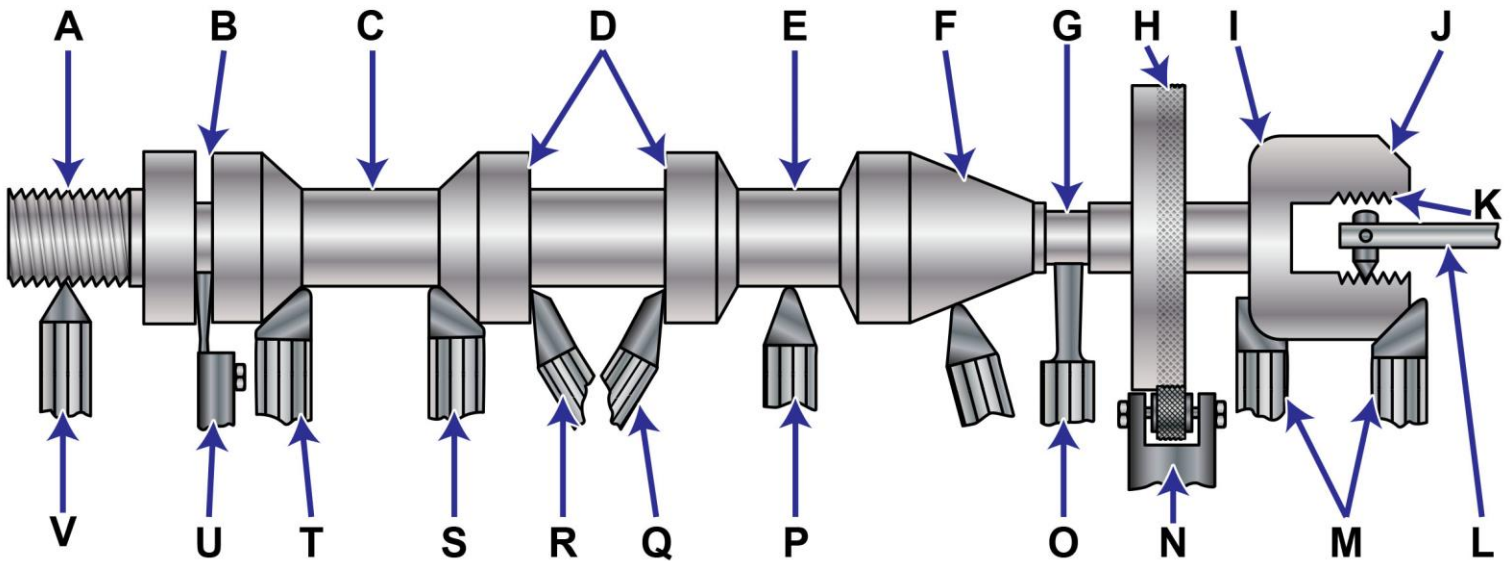
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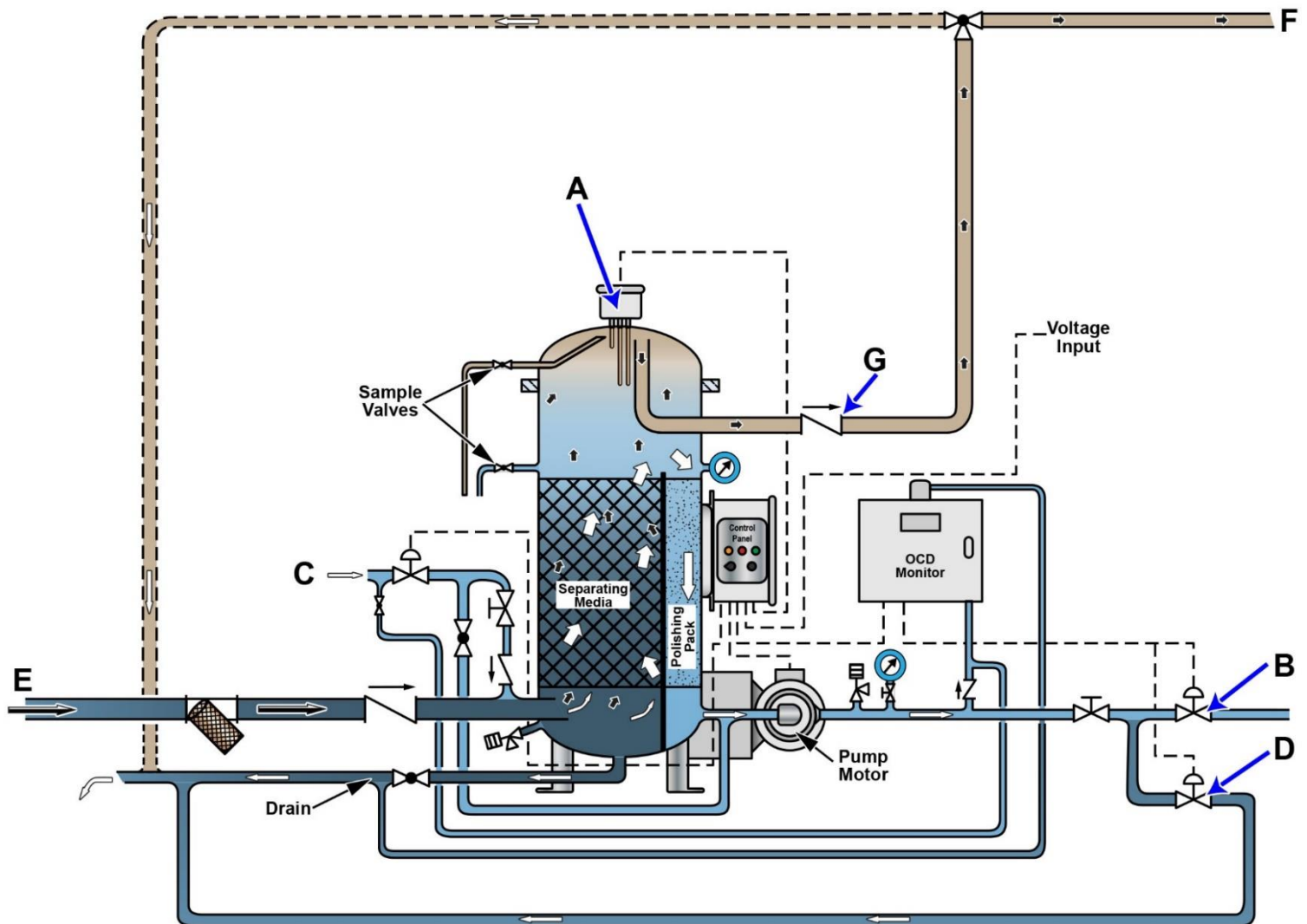
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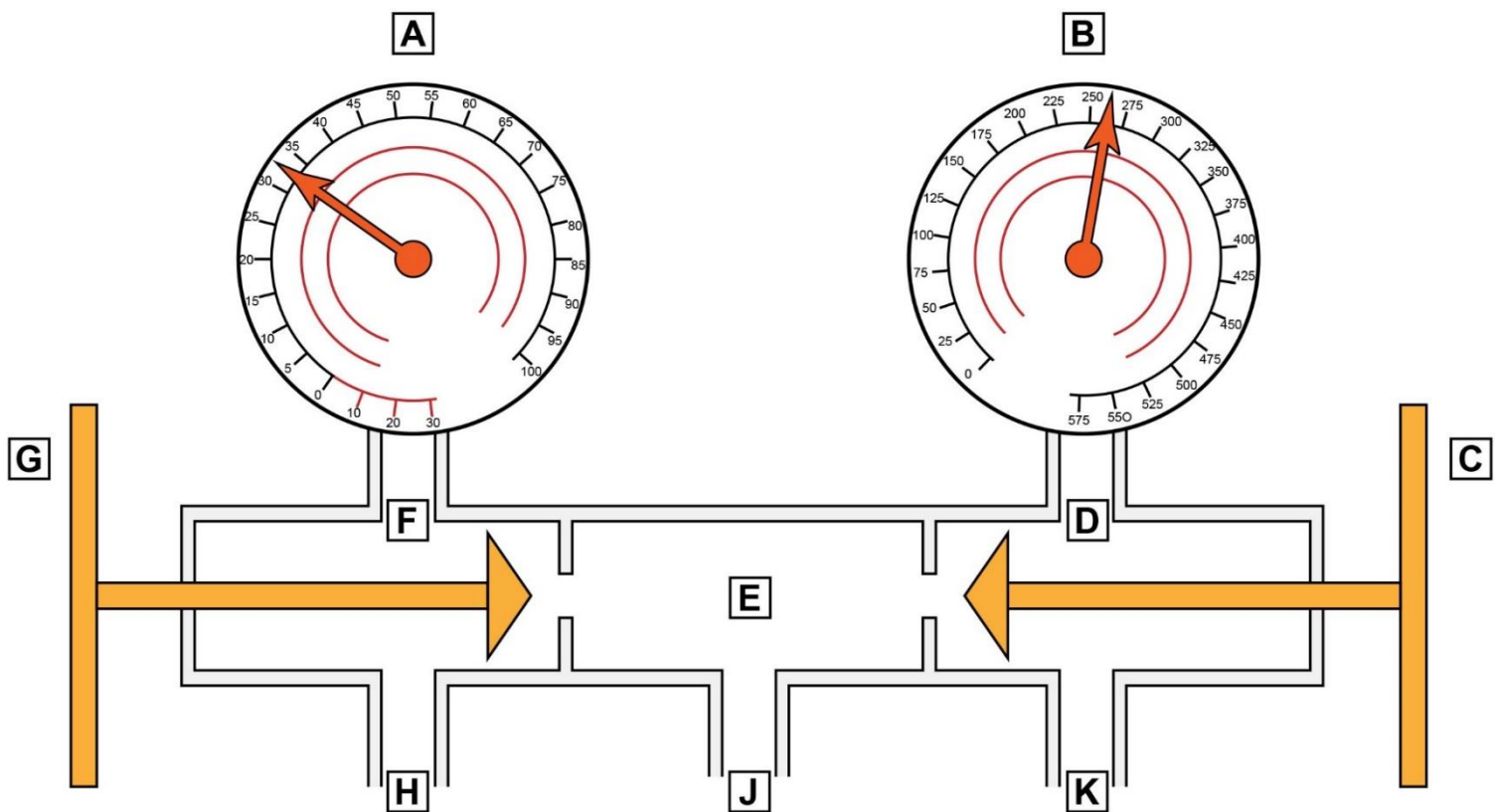
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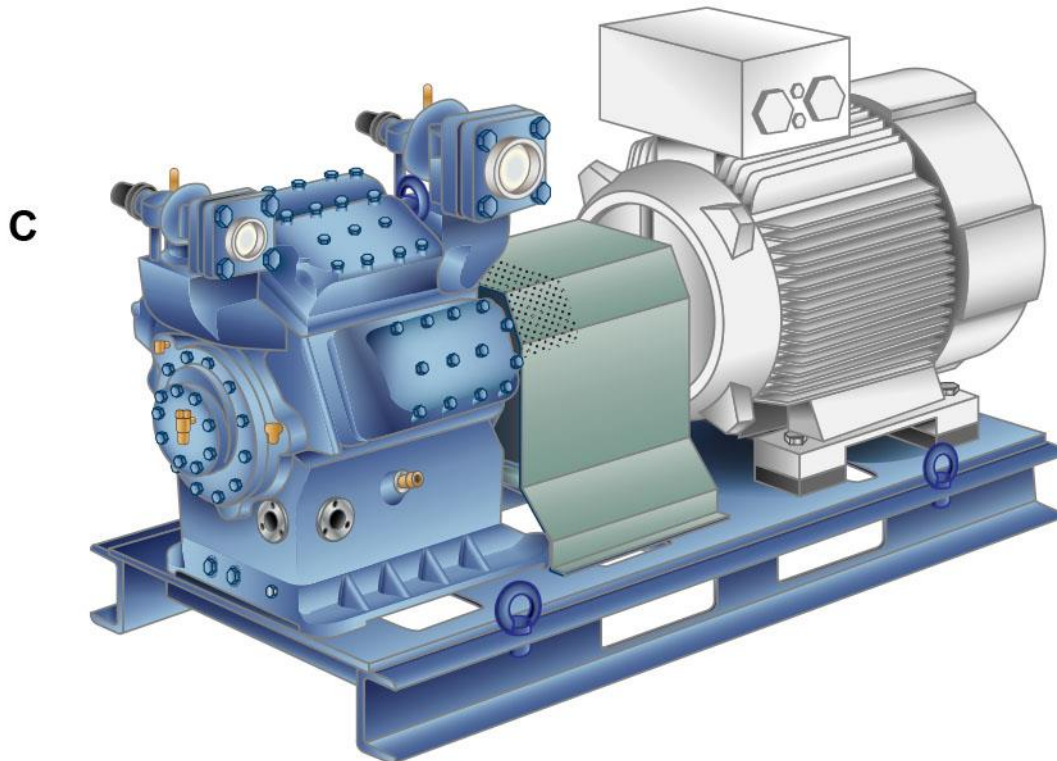
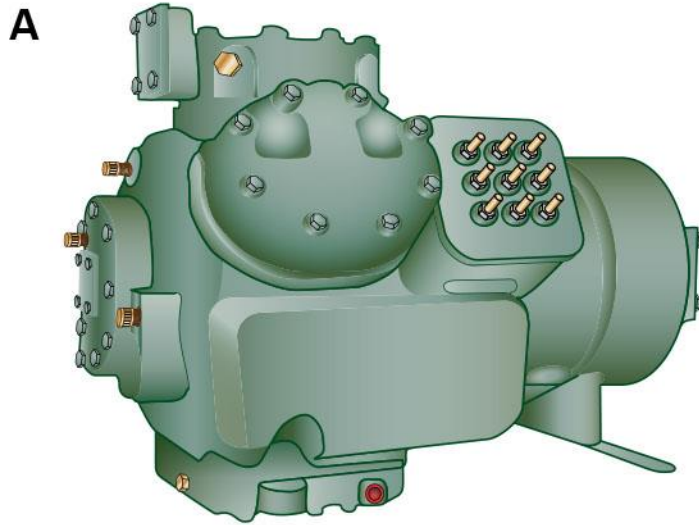
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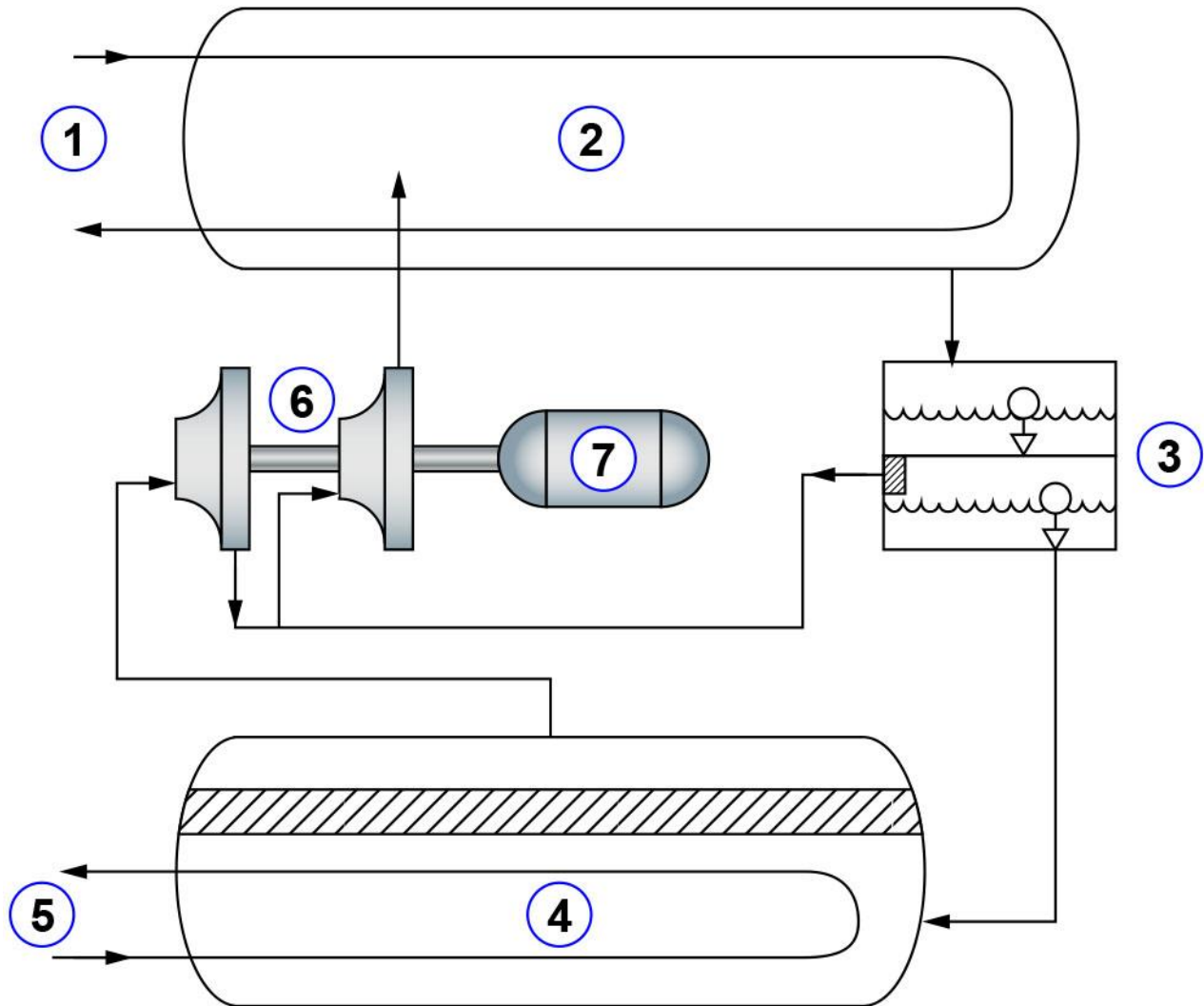
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