

U.S.C.G. Merchant Marine Exam

QMED

Q802 Electrician

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions.

1. When treating a person for shock, you should wrap the victim in warm coverings to _____.

- (A) preserve present body heat
- (B) protect the person from injury during transportation
- (C) avoid self-inflicted wounds caused by spastic movement
- (D) decrease body heat

If choice A is selected set score to 1.

2. The push button on the handset of a ship's sound-powered telephone must be depressed in order to do what?

- (A) talk then released to listen
- (B) ring the station being called
- (C) listen then released to talk
- (D) both talk and listen

If choice D is selected set score to 1.

3. If a patient has an electrical burn, you would check for breathing, pulse, and _____.

- (A) remove any dirt or charred skin from the burned area
- (B) apply alcohol to the burn area and wrap with clean cloth
- (C) locate the nearest water source and flood the burn with water for five minutes
- (D) look for a second burn, which may have been caused by the current leaving the body

If choice D is selected set score to 1.

4. Which of the following statements is true concerning the cleaning of electrical contacts?

- (A) Compressed air should be used to blow out metallic dust.
- (B) The contact surfaces should be greased to increase contact resistance.
- (C) Delicate parts should be cleaned with a brush and an approved safety solvent.
- (D) Magnetic brushes should be used to remove metallic dust.

If choice C is selected set score to 1.

5. What statement is true concerning the total resistance of a parallel circuit?

- (A) The total resistance is equal to the sum of the individual branch resistances.
- (B) The total resistance is smaller than the lowest branch resistance.
- (C) The total resistance is equal to one-half the sum of the individual branch resistances.
- (D) The total resistance is larger than the greatest branch resistance.

If choice B is selected set score to 1.

6. By periodically checking the stator-to-rotor air gap clearance in an induction motor with a feeler gauge, what is prevented?

- (A) rotor contact with the stator
- (B) electrical damage to the bearings
- (C) damage to the motor bearings
- (D) axial misalignment of the rotor

If choice A is selected set score to 1.

7. If a shipboard AC generator experiences a failure to produce a voltage, what may be the cause?

- (A) a rotating slip ring
- (B) the brushes shifting out of the neutral plane
- (C) excessive locked-rotor current
- (D) an open in the rotor field circuit

If choice D is selected set score to 1.

8. Which of the following statements is true concerning the Halon 1301 fire extinguishing agent?

- (A) The agent is less effective than carbon dioxide.
- (B) The agent is highly toxic as stored in pressurized cylinders.
- (C) The agent cannot be used on electrical fires because it leaves a residue.
- (D) Halon extinguishes the fire by a chain breaking reaction.

If choice D is selected set score to 1.

9. (1.1.2.1-23) The number of cycles per second occurring in AC voltage is known as what characteristic?

- (A) phase angle
- (B) half mode
- (C) frequency
- (D) wave form

If choice C is selected set score to 1.

10. Why should battery rooms be well ventilated during the charging process?

- (A) highly poisonous gas is produced
- (B) highly combustible oxygen gas is produced
- (C) highly explosive hydrogen gas is produced
- (D) corrosive gases are produced

If choice C is selected set score to 1.

11. What is the characteristic of the mica used in the commutators of DC machinery?

- (A) it is the same hardness as the copper
- (B) it is softer than copper
- (C) it is harder than copper
- (D) it is softer than copper but wears away at a slower rate

If choice C is selected set score to 1.

12. How are AC and DC generators similar?

- (A) They both rectify the voltage before delivery.
- (B) They both supply three-phase power.
- (C) They both internally generate alternating current voltages.
- (D) They both operate at 60 cycles.

If choice C is selected set score to 1.

13. Paints and solvents used aboard a vessel should be _____.

- (A) stowed safely at the work site until work is completed
- (B) returned to the paint locker after each use
- (C) drained into a common container after each use
- (D) covered with a fine mesh screen to protect from ignition sources

If choice B is selected set score to 1.

14. What is true concerning all of the connecting conductors of a DC series circuit?

- (A) they all have the same power expended in them
- (B) they all have the same resistance to current flow
- (C) they all have the same voltage drop across them
- (D) they all have the same current passing through them

If choice D is selected set score to 1.

15. How can a shorted armature coil in a DC motor be detected?

- (A) undercut mica
- (B) shiny armature coil
- (C) sparking at the brushes
- (D) worn grooves in the armature

If choice C is selected set score to 1.

16. 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.

If choice B is selected set score to 1.

17. Which of the following statements concerning nickel-cadmium batteries is true?

- (A) Nickel-cadmium batteries should only be discharged 50% before recharging.
- (B) When mixing electrolyte always add acid to the water.
- (C) The state of charge cannot be determined by the specific gravity values.
- (D) The electrolyte of an idle nickel-cadmium battery must be replaced monthly to maintain battery condition.

If choice C is selected set score to 1.

18. If a fire hose is left unattended and under pressure with the nozzle shut off, the fire hose will _____.

- (A) become elongated by 125%
- (B) burst under pressure
- (C) remain motionless
- (D) lash about violently

If choice C is selected set score to 1.

19. What is the purpose of the squirrel-cage windings included as part of a synchronous motor?

- (A) provide more precise balancing
- (B) provide a means for starting
- (C) produce a higher power factor
- (D) eliminate arcing between the stator and the frame

If choice B is selected set score to 1.

20. Which figure represents the schematic symbol shown in figure "2"? Illustration EL-0034

- (A) figure "A"
- (B) figure "B"
- (C) figure "C"
- (D) figure "D"

If choice B is selected set score to 1.

21. Antiseptics are used principally to _____.

- (A) reduce inflammation
- (B) increase blood circulation
- (C) prevent infection
- (D) promote healing

If choice C is selected set score to 1.

22. In comparing a semiconductor diode to a vacuum tube diode, what statement is true?

- (A) The semiconductor diode has longer life, no warmup time, and is more delicate than the vacuum tube diode.
- (B) The semiconductor diode has shorter life, no warmup time, and is less delicate than the vacuum tube diode.
- (C) The semiconductor diode has longer life, longer warmup time and is less delicate than the vacuum tube diode.
- (D) The semiconductor diode has longer life, no warmup time, and is less delicate than the vacuum tube diode.

If choice D is selected set score to 1.

23. When troubleshooting a lead-acid storage battery, what is the best method for detecting a weak or dead cell?

- (A) comparing the specific gravity of the electrolyte in each cell
- (B) taking each cell's temperature with a calibrated mercury thermometer
- (C) visually inspecting the electrolyte levels of each cell
- (D) taking an open circuit voltage test of individual cells

If choice A is selected set score to 1.

24. Which of the following methods should be used to test for an 'open' stator winding coil in a wye-connected AC squirrel cage induction motor?

- (A) Use a growler, listening for noise and vibration levels to increase when the growler blade is positioned over an open stator coil.
- (B) Use an ohmmeter, placing one test lead on the shaft and the other to each of the disconnected motor leads in succession and compare resistances.
- (C) Use an ohmmeter, placing the test leads across each pair of disconnected motor leads in succession and compare resistances.
- (D) Use a growler, listening for noise and vibration levels to diminish when the growler blade is positioned over an open stator coil.

If choice C is selected set score to 1.

25. Of the following listed single-phase induction motors, which has the highest starting torque?

- (A) shaded pole motor
- (B) capacitor start induction run motor
- (C) permanent split capacitor motor
- (D) resistive start induction run motor

If choice B is selected set score to 1.

26. For routine cleaning of a commutator, what should be applied?

- (A) a fine tooth file to the commutator while running
- (B) a canvas wiper on the commutator while running
- (C) an emery cloth parallel to the axis of the commutator
- (D) coarse sandpaper in a slow back and forth motion across the commutator slots

If choice B is selected set score to 1.

27. The FIRST requirement for logical troubleshooting of any system requires the troubleshooter to do what?

- (A) recognize what is normal operation
- (B) isolate the faulty component
- (C) identify the probable cause of a symptom
- (D) collect all available data on a casualty

If choice A is selected set score to 1.

28. A fire is considered "under control" when _____.

- (A) the fixed systems are activated
- (B) all firefighting equipment is at the scene
- (C) the fire is contained and no longer spreading
- (D) all hands are at their fire stations

If choice C is selected set score to 1.

29. How does a circuit breaker differ from a fuse?

- (A) a circuit breaker melts and must be replaced, a fuse does neither
- (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 trips to break the circuit and may be reset, a fuse may not be reset

If choice D is selected set score to 1.

30. 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 selector switch is grounded at the problem station diverting current from the other stations' ringing devices.
- (C) The switch at component "A" of the problem station is stuck open.
- (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.

If choice D is selected set score to 1.

31. When replacing a defective transformer in a paralleled transformer configuration, which of the following actions must be carried out to ensure proper operation of the equipment it serves?

- (A) The iron core of the transformer must be flashed to pre-magnetize it.
- (B) The transformer connections must be made as before with regard to the indicated polarity.
- (C) The secondary leads must be grounded for 10 minutes to remove static charges.
- (D) The iron core must be grounded for 10 minutes to remove any residual magnetism.

If choice B is selected set score to 1.

32. Autotransformer starters, sometimes called starting compensators, are sometimes used with larger polyphase induction motors. What function do they perform?

- (A) they allow the voltage to be either stepped up or down, depending on the application, to ensure full torque
- (B) they provide a backup means of voltage regulation for emergency starting
- (C) they increase the voltage for 'across-the-line starting'
- (D) they reduce the voltage applied to the motor during the starting period

If choice D is selected set score to 1.

33. The blade for a power hacksaw should be installed with the teeth _____.

- (A) pointing toward the motor if using a 4 or 6 tooth blade and away from the motor if using a 10 or 14 tooth blade
- (B) pointing either toward or away from the motor end of the machine
- (C) pointing away from the motor end of the machine
- (D) pointing toward the motor end of the machine

If choice D is selected set score to 1.

34. What is the name of the type of motor control circuit that will not permit automatic restarting after power is restored, following a power failure?

- (A) low voltage protection
- (B) low voltage release
- (C) overload lockout
- (D) reduced voltage restart

If choice A is selected set score to 1.

35. With all other factors considered equal (such as voltage, conducting path through the body and the duration of contact), contact with an energized electrical system conductor of which system type would produce the most damaging effect?

- (A) DC systems
- (B) 60 Hz AC systems
- (C) 10 kHz AC systems
- (D) All the above systems would be equally as damaging

If choice B is selected set score to 1.

36. Greases used for most marine applications would have what National Lubricating Grease Institute (NLGI) grade?

- (A) 00
- (B) 2
- (C) 4
- (D) 6

If choice B is selected set score to 1.

37. What is the current flow through R_1 of the circuit in figure "B" of the illustration with the switch closed if the resistance of R_1 is 2 ohms, R_2 is 3 ohms and R_3 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

If choice C is selected set score to 1.

38. Which of the following statements is correct concerning antifriction bearings installed on pumps?

- (A) The inner race should be free to turn on the shaft.
- (B) The outer race should be free to turn in its housing.
- (C) Alignment is not a critical factor in their installation.
- (D) They are usually pressed onto their shafts.

If choice D is selected set score to 1.

39. The valve depicted in the illustration shown is a _____. Illustration GS-0055

- (A) gate valve
- (B) butterfly valve
- (C) globe valve
- (D) check valve

If choice B is selected set score to 1.

40. For what purpose is the variable resistance placed in the rotor circuit of a wound-rotor induction motor provided?

- (A) frequency control
- (B) voltage control
- (C) torque control
- (D) speed control

If choice D is selected set score to 1.

41. What is the primary means by which an electrical maintenance worker is protected from electrical hazards while performing work on an electrical circuit?

- (A) using the appropriate personal protective equipment
- (B) shutting down the necessary equipment
- (C) performing a lock-out/tag-out procedure
- (D) posting of safety warning signs

If choice C is selected set score to 1.

42. AC circuits can possess characteristics of resistance, inductance, and capacitance. In terms of units of measure, how is the capacitive reactance of the circuit expressed?

- (A) mhos
- (B) henrys
- (C) ohms
- (D) farads

If choice C is selected set score to 1.

43. A hand portable CO₂ fire extinguisher is effective on burning oil only _____.

- (A) if applied in connection with foam
- (B) if applied promptly
- (C) to prevent rekindling
- (D) if attempts to extinguish the fire with low velocity fog have failed

If choice B is selected set score to 1.

44. An internal resistance is placed in series with the meter movement of which of the following instruments?

- (A) DC voltmeter
- (B) AC ammeter
- (C) AC frequency meter
- (D) DC ammeter

If choice A is selected set score to 1.

45. What is a useful instrument for checking 3-phase AC motor performance by measuring possible unbalanced currents?

- (A) clamp-on ammeter
- (B) vibrating-reed frequency meter
- (C) D'Arsonval iron-vane probe
- (D) hand or battery-operated megger

If choice A is selected set score to 1.

46. 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

If choice A is selected set score to 1.

47. 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

If choice A is selected set score to 1.

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

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

If choice C is selected set score to 1.

49. What statement is true concerning the specific gravity of the electrolyte solution in a lead-acid battery?

- (A) the specific gravity is not effected during charging
- (B) the specific gravity would read close to 1.830 when discharged
- (C) the specific gravity gives an indication of the state of charge of the battery
- (D) the specific gravity remains the same during discharge

If choice C is selected set score to 1.

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

- (A) open field coils
- (B) grounded field coils
- (C) shorted stator coils
- (D) grounded stator coils

If choice C is selected set score to 1.

51. What practice could potentially damage a multimeter?

- (A) placing the test leads across a de-energized and isolated resistance to measure resistance while in the voltmeter mode
- (B) placing the test leads across a de-energized and isolated resistance to measure resistance while in the ammeter mode
- (C) placing the test leads across a voltage source to measure voltage while in the resistance mode
- (D) placing the test leads in series with the load of a circuit to measure current while in the voltmeter mode

If choice C is selected set score to 1.

52. After extinguishing a paint locker fire using the fixed CO₂ system, the next immediate action is for the space to be _____.

- (A) opened and burned material removed
- (B) left closed with ventilation off until all boundaries are cool
- (C) checked for the proper oxygen level
- (D) opened and doused with water to prevent reflash

If choice B is selected set score to 1.

53. Double cut files are most effective when used for _____.

- (A) finish work
- (B) rough work
- (C) draw filing
- (D) sharpening tools

If choice B is selected set score to 1.

54. What type of feedback is featured in the transistor amplifier shown in figure "B" of the illustration assuming that the phase relationship between input and output is identical to the transistor amplifier shown in figure "A"? Illustration EL-0045

- (A) positive feedback also known as degenerative feedback
- (B) positive feedback also known as regenerative feedback
- (C) negative feedback also known as regenerative feedback
- (D) negative feedback also known as degenerative feedback

If choice D is selected set score to 1.

55. Which of the following statements, concerning the cleaning maintenance of a brushless generator, is correct?

- (A) High-pressure air should be used to blow out dust and grime from the windings.
- (B) Hot soapy water should be used to remove dust and grime from the windings.
- (C) Cleaning of windings should be performed on a periodic basis regardless of the state of cleanliness.
- (D) Cleaning of windings should be performed on a conditional basis using a vacuum or using a clean, dry, lint-free rag.

If choice D is selected set score to 1.

56. How can the nominal resistance value of a typical carbon resistor in a circuit best be determined?

- (A) by the band markings on the resistor
- (B) by the resistance value written on the resistor
- (C) by the physical size of the resistor
- (D) by the single solid body color of the resistor

If choice A is selected set score to 1.

57. A single-phase capacitor-start induction motor starts, comes up to about 75% rated speed, slows down to a lower speed, and accelerates again. Where is the problem most likely to be?

- (A) running centrifugal switch
- (B) starting capacitor
- (C) running winding
- (D) starting winding

If choice C is selected set score to 1.

58. What is an ammeter used to measure?

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

If choice D is selected set score to 1.

59. (1.1.9-3) What does the symbol labeled "OL" represent as shown in the power circuit on lines T₁ and T₃ to the motor as shown in figure "A" of the illustration? Illustration EL-0011

- (A) non-renewable fusible link
- (B) overload relay normally closed contacts
- (C) overload relay thermal heater
- (D) overload relay magnetic coil

If choice C is selected set score to 1.

60. At a minimum threshold, how many milliamps of current through the body produces a condition where most people would experience respiratory paralysis and be unable to breathe while still in contact with the energized conductor?

- (A) 3 to 7 mA
- (B) 10 to 16 mA
- (C) 30 mA
- (D) 75 mA for 5 sec.

If choice C is selected set score to 1.

61. It is necessary to cool the bulkheads and decks surrounding a compartment where there is a fire in order to _____.

- (A) cool the metal below its ignition temperature
- (B) form a dense coating of smothering steam
- (C) prevent oxygen from reaching the flames
- (D) prevent the fire from spreading by the conduction of heat

If choice D is selected set score to 1.

62. Which of the listed instruments can be best used to locate a grounded field coil in a synchronous motor onboard ship?

- (A) Megohmmeter
- (B) Voltmeter
- (C) Frequency meter
- (D) Multimeter

If choice A is selected set score to 1.

63. When troubleshooting a magnetic controller, it is found that the contacts are welded together. What is the most probable cause?

- (A) high voltage on the operating coil
- (B) high ambient temperature
- (C) low voltage on the operating coil
- (D) excessive operation at low load

If choice C is selected set score to 1.

64. The basic function of the centrifugal pump impeller is to _____.

- (A) separate air from the liquid being pumped
- (B) directly increase the velocity of the liquid being pumped
- (C) directly increase the pressure of the liquid being pumped
- (D) convert the potential energy of the liquid to kinetic energy

If choice B is selected set score to 1.

65. Which unit will provide excellent mobility to the wearer in an unsafe atmosphere and provide oxygen to sustain life?

- (A) A self-contained breathing apparatus
- (B) An ammonia gas mask
- (C) A fresh air breathing apparatus
- (D) All of the above

If choice A is selected set score to 1.

66. If the supply voltage is 220 volts 60 Hz, what is the operating voltage of the motor controller control circuit illustrated in figure "A" of the illustration? Illustration EL-0011

- (A) 110 volts DC
- (B) 110 volts AC
- (C) 220 volts DC
- (D) 220 volts AC

If choice D is selected set score to 1.

67. Pressure in an operating hydraulic system is developed _____.

- (A) solely by the charge applied by the accumulators
- (B) by resistance to the fluid flow through the system
- (C) only by the pump as its primary function
- (D) by the thermal input to the system's fluid

If choice B is selected set score to 1.

68. Which of the following devices would be forbidden to use as a primary means of electrical isolation?

- (A) start/stop push button station
- (B) non-fused disconnect switch
- (C) circuit breaker
- (D) fused disconnect switch

If choice A is selected set score to 1.

69. As demand on the device shown in the illustration fluctuates in the pressure range of 100 to 110 psi, the output of the unit is controlled by _____. Illustration GS-0119

- (A) proportional modulation of the compressor speed
- (B) the modulation of the opening of a butterfly valve located in the air intake
- (C) change in control pressure to modulate the discharge of compressed air to the atmosphere
- (D) complete shut down until the lower pressure limit is reached causing it to restart

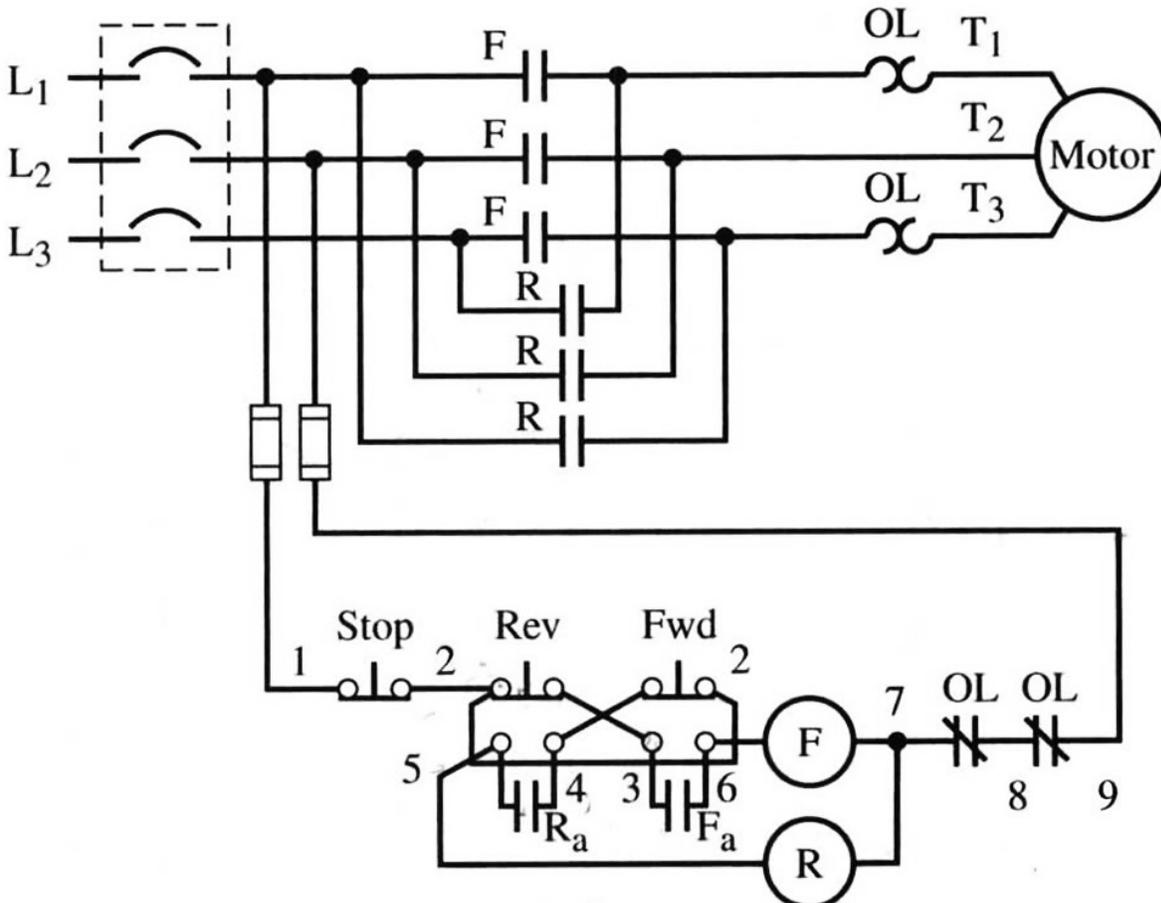
If choice B is selected set score to 1.

70. How would a circuit with a blown fuse be described?

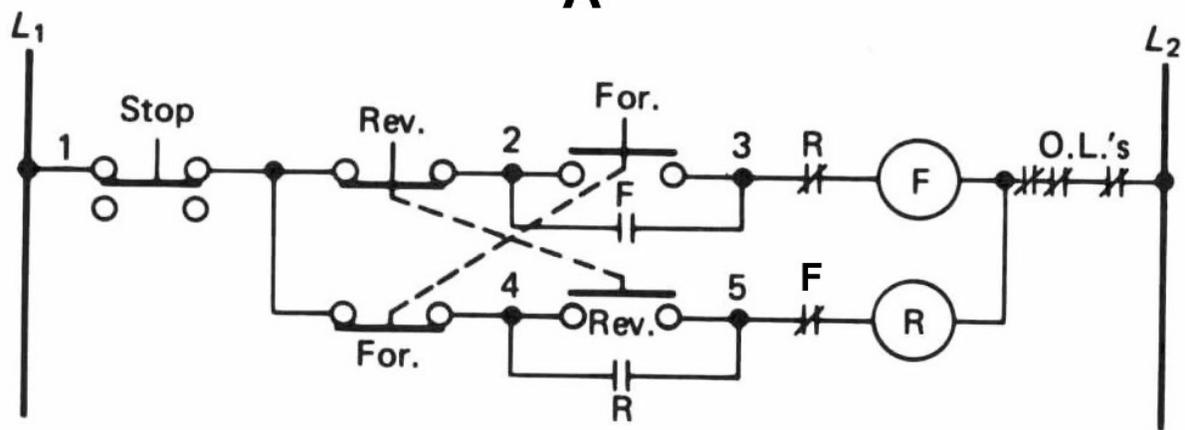
- (A) an open circuit
- (B) a bonded circuit
- (C) a grounded circuit
- (D) a short circuit

If choice A is selected set score to 1.

EL-0011



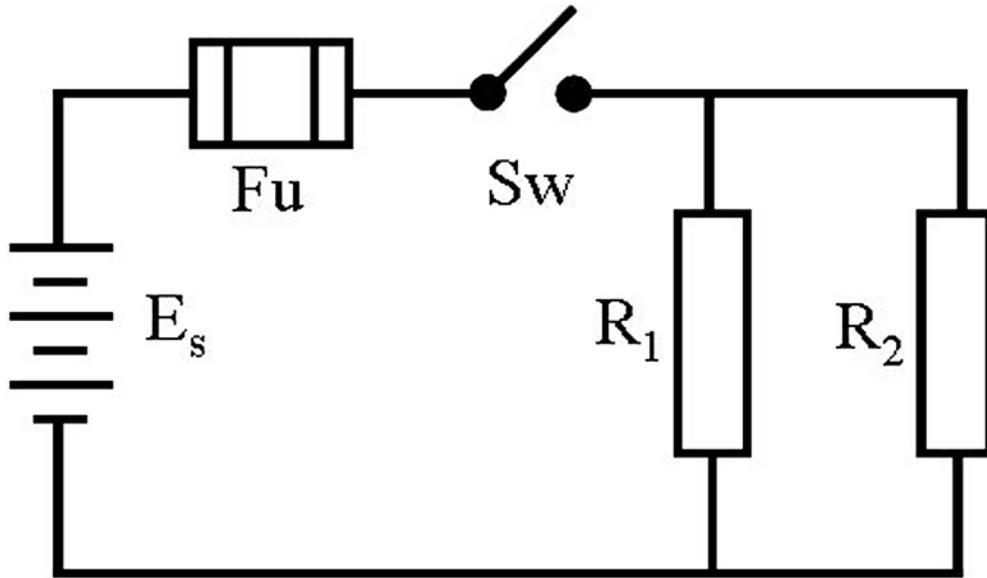
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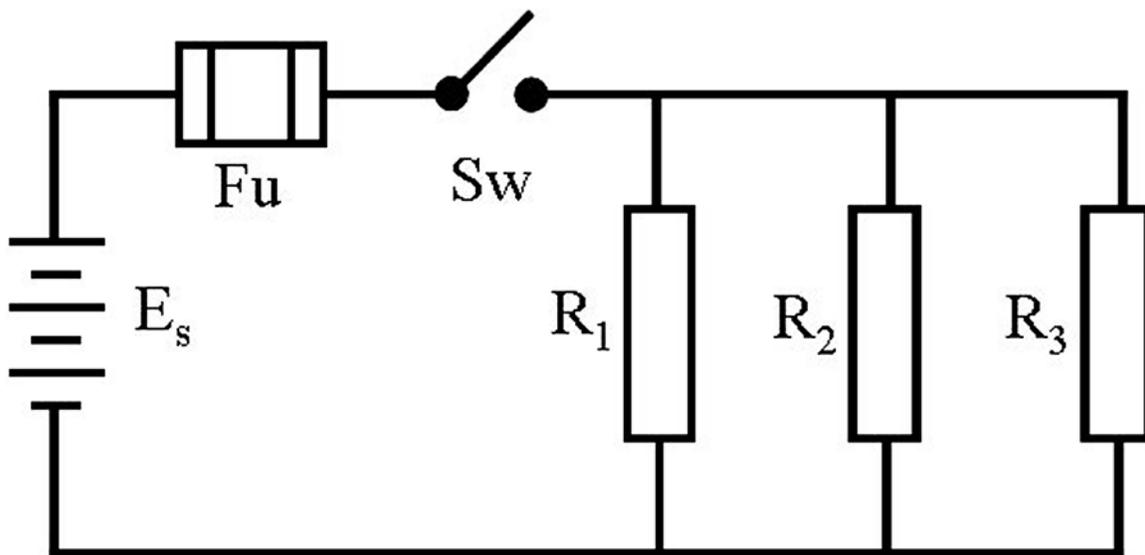
B

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EL-0019



A



B

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EL-0034



A



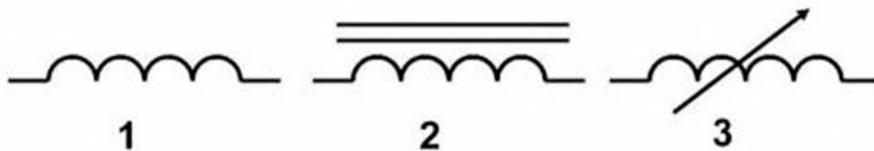
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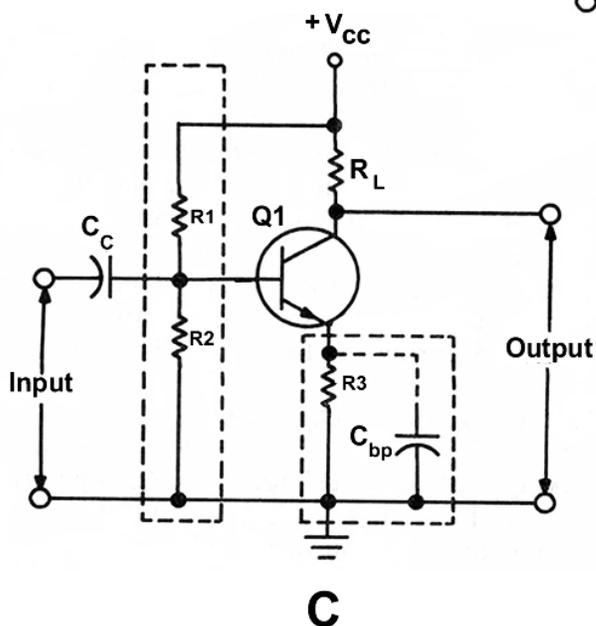
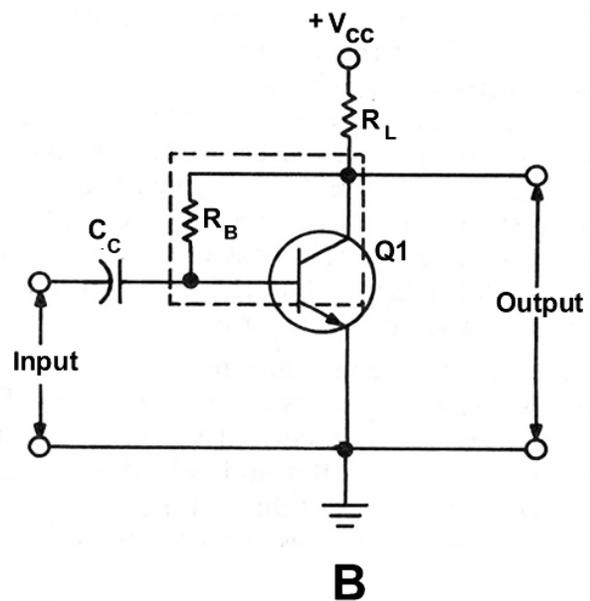
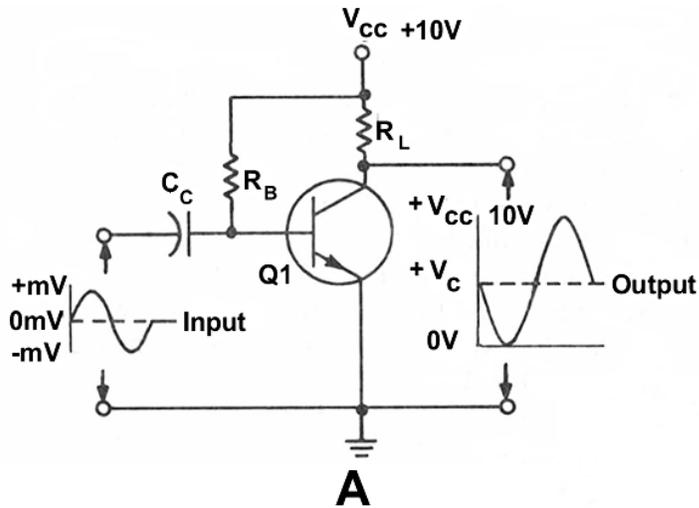


D



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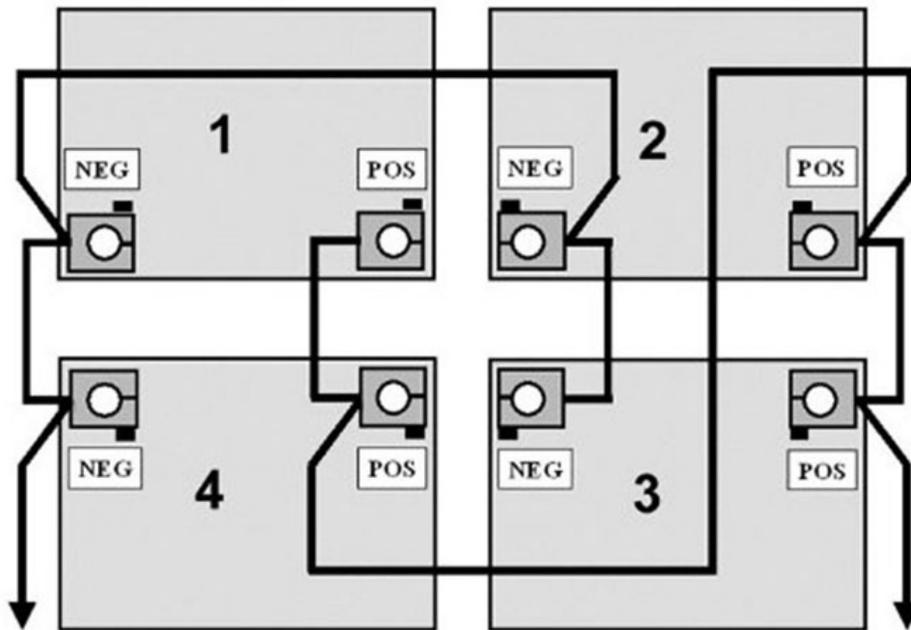


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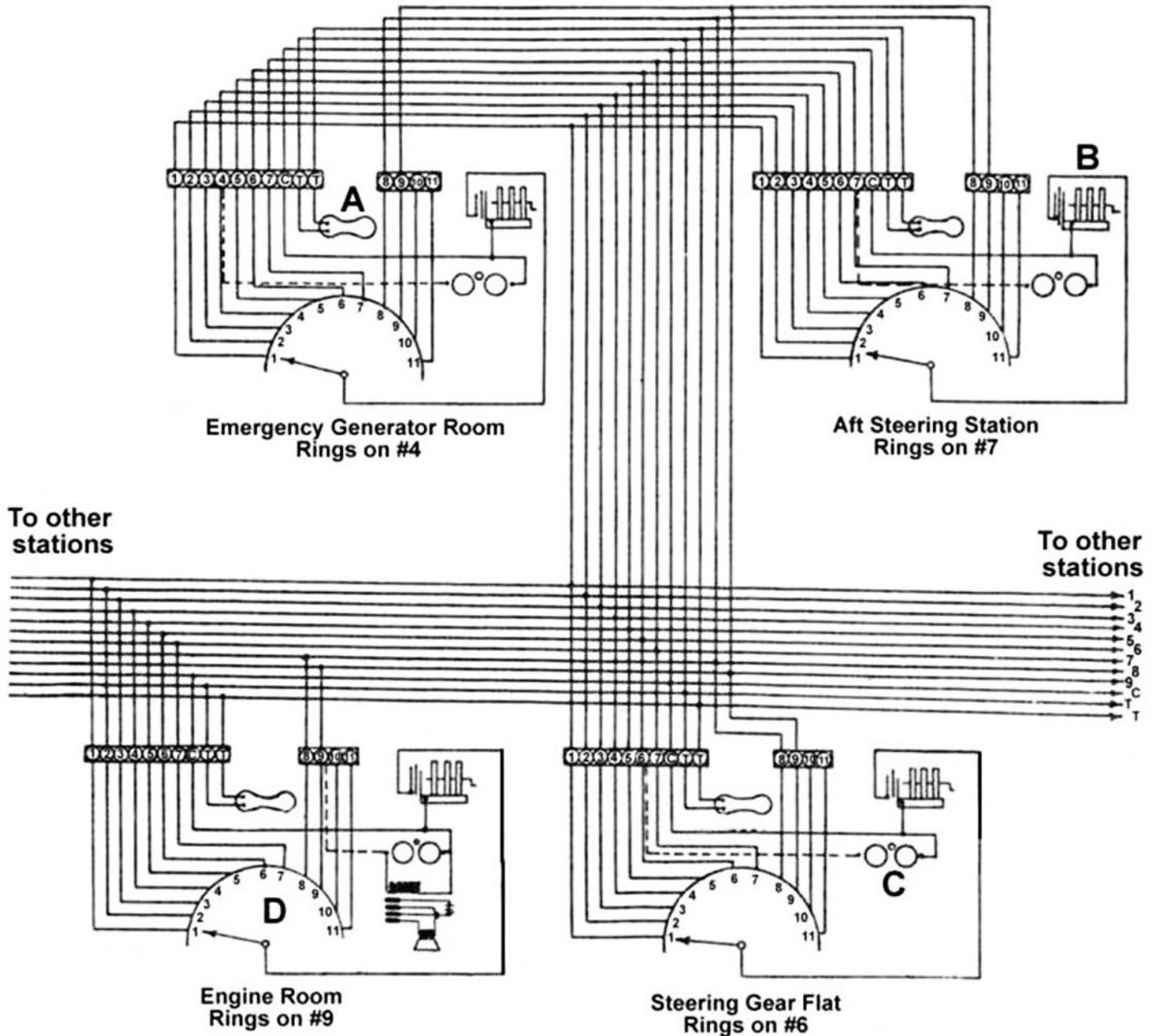
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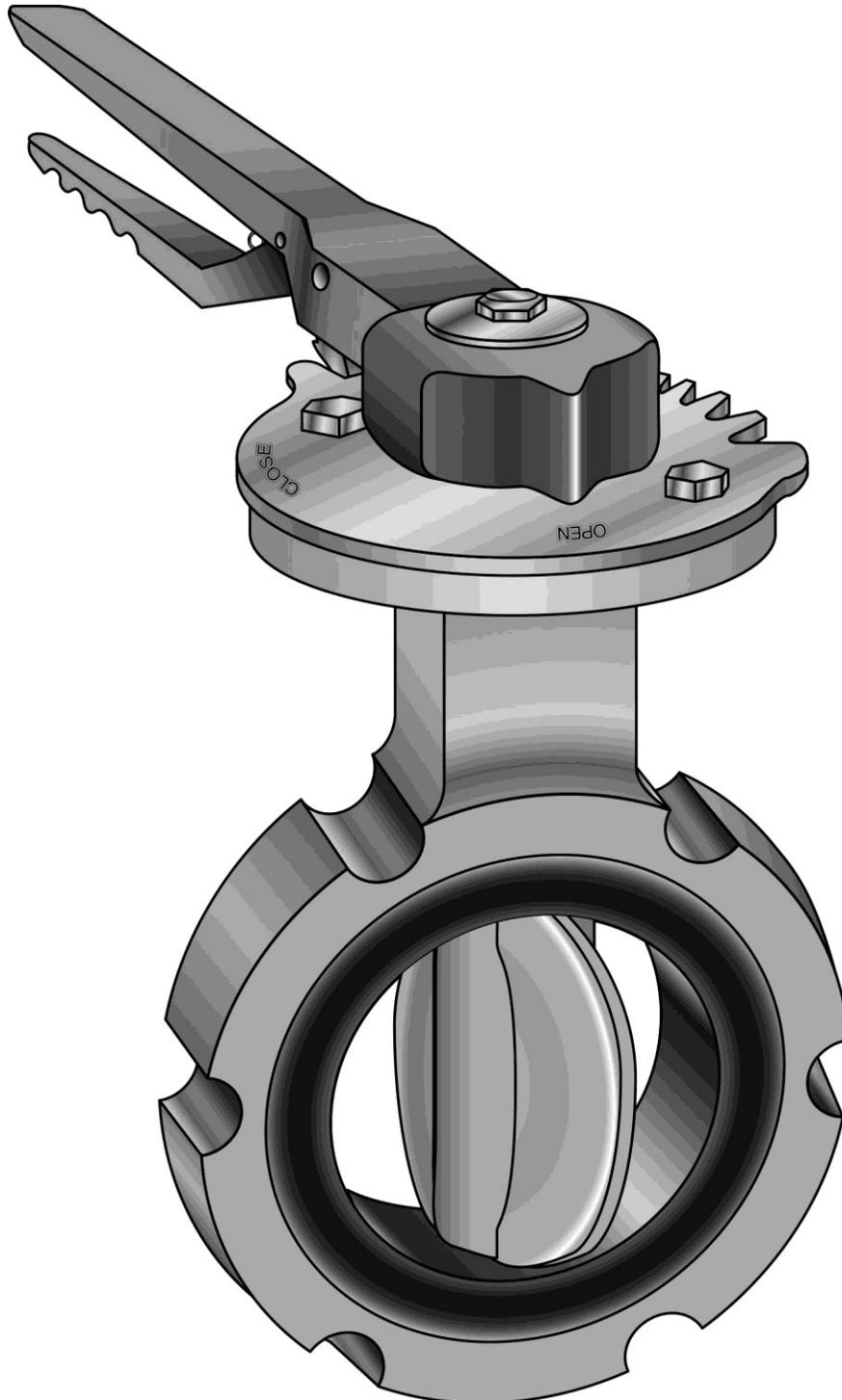
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EL-0093



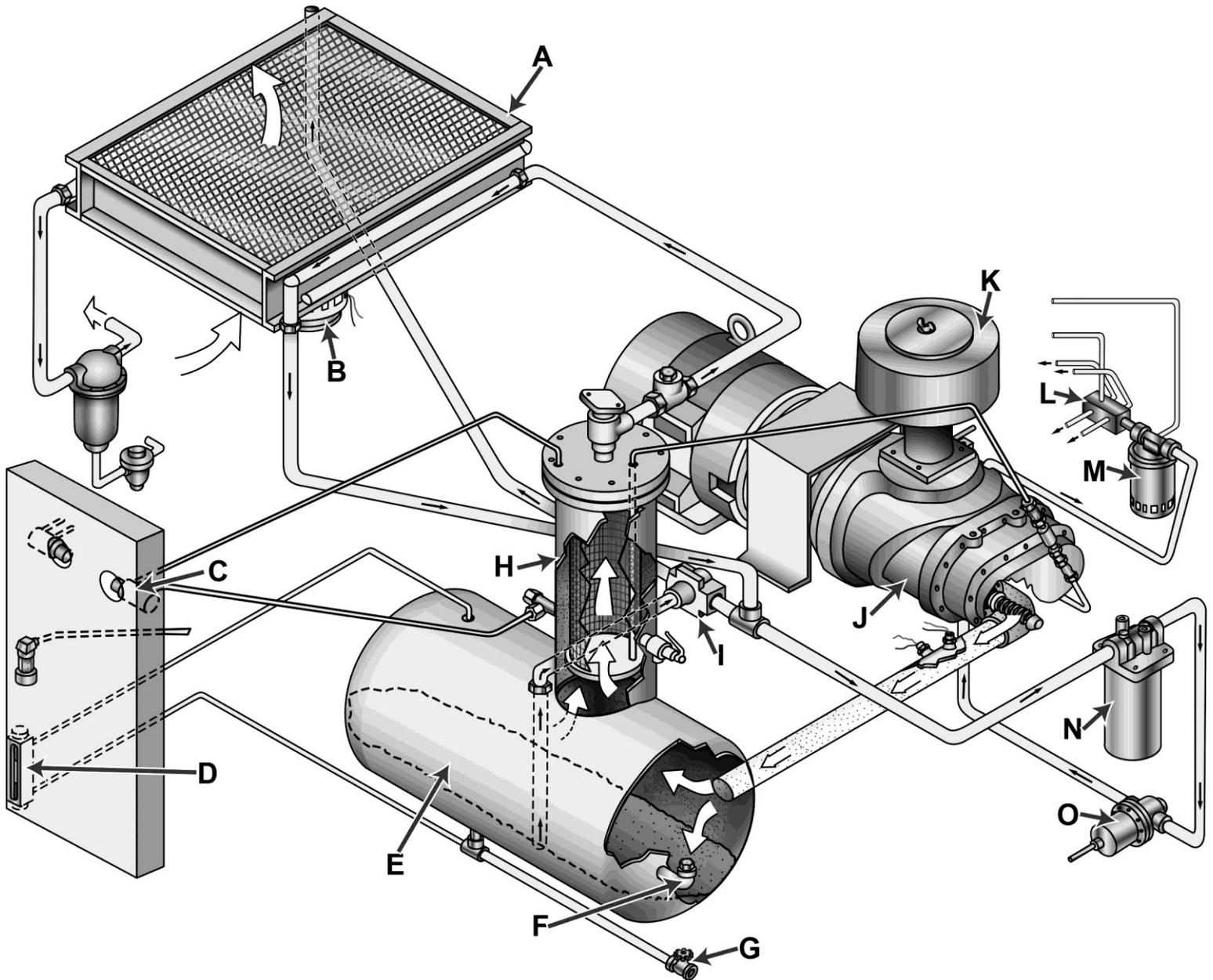
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