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1. A B	19. A B C D	38. A B C D	57. A B C D
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5. A B	23. A B C D	42. A B C D	61. A B C D
6. A B	24. A B C D	43. A B C D	62. A B C D
7. A B	25. A B C D	44. A B C D	63. A B C D
8. A B C D	26. A B C D	45. A B	64. A B C D
9. A B C D	27. A B C D	46. A B	65. A B C D
10. A B C D	28. A B C D	47. A B	66. A B C D
11. A B C D	29. A B C D	48. A B	67. A B
12. A B C D	30. A B C D	49. A B	68. A B
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17. A B C D	35. A B C D	54. A B	73. A B C D
18. A B C D	36. A B C D	55. A B	74. A B C D
19. A B C D	37. A B C D	56. A B	75. A B C D

76. A B C D
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112. A B
113. A B
114. A B
115. A B
116. A B C D
117. A B C D
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138. A B C D
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The Assignment (Exam) is also available in Word on the Internet for your Convenience, please visit www.ABCTLC.com and download the assignment and e- mail it back to TLC.

You will have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. We prefer if this exam is proctored. No intentional trick questions. If you should need any assistance, please email all concerns and the completed manual to info@tlch2o.com.

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your manual and make copy for yourself. You can e-mail or fax your Answer Key along with the Registration Form to TLC. **(S) Means answer may be plural or singular**. **Multiple Choice Section, One answer per question and please use the answer key.**

Electrical Motors Section

Understanding Motors

1. The classic division of electric motors has been that of Direct Current (DC) types vs. Alternating Current (AC) types.
A. True B. False

2. Many classic DC motors run happily on AC power.
A. True B. False

3. The ongoing trend toward electronic control further muddles the distinction; as modern drivers have moved the commutator out of the motor shell. For this new breed of motor, driver circuits are relied upon to generate sinusoidal AC drive currents, or some approximation of.
A. True B. False

4. The two best motor examples are: the brushless DC motor and the stepping motor, both being polyphase AC motors requiring external electronic control.
A. True B. False

5. There is a clearer distinction between a synchronous motor and asynchronous types. In the synchronous types, the rotor rotates in synchrony with the oscillating field or current (e.g. permanent magnet motors).
A. True B. False

6. A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homopolar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty.
A. True B. False

7. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source -- so they are not purely DC machines in a strict sense.
A. True B. False

Brushed DC Motors

8. Which of the following design generates an oscillating current in a wound rotor with a split ring commutator, and either a wound or permanent magnet stator?

A. Classic DC motor C. Classic commutator DC motor
B. A split ring commutator D. None of the above

9. Which of the following consists of a coil wound around a rotor which is then powered by any type of battery?

A. Brushes C. Rotor
B. A split ring commutator D. None of the above

10. Many of the limitations of the _____ are due to the need for brushes to press against the commutator. This creates friction.

A. Classic DC motor C. Classic commutator DC motor
B. A split ring commutator D. None of the above

11. At higher speeds, _____ have increasing difficulty in maintaining contact.

A. Brushes C. Rotor
B. A split ring commutator D. None of the above

12. Brushes may bounce off the irregularities in the_____, creating sparks. This limits the maximum speed of the machine.

A. Commutator surface C. Rotor
B. A split ring commutator D. None of the above

13. Brushes eventually wear out and require replacement, and the _____itself is subject to wear and maintenance.

A. Brushes C. Rotor
B. Commutator D. None of the above

14. Which of the following on a large machine is a costly element, requiring precision assembly of many parts?

A. Brushes C. Rotor
B. Commutator assembly D. None of the above

Brushless DC Motors

15. Some of the problems of the brushed DC motor are eliminated in the _____ design.

A. Rotor's position C. Brushless
B. Hall Effect D. None of the above

16. In the brushless motor, the mechanical "rotating switch" or commutator/brush gear assembly is replaced by an external electronic switch synchronized to the _____.

A. Rotor's position C. Motors
B. Hall Effect sensors D. None of the above

17. Brushless motors are typically _____% efficient, whereas DC motors with brush gear are typically 75-80% efficient.

A. 85-90 C. 95-99
B. 75-84 D. None of the above

18. Midway between ordinary DC motors and stepper motors lies the realm of the brushless DC motor. Built in a fashion very similar to_____, these often use a permanent magnet external rotor, three phases of driving coils, one or more Hall Effect sensors to sense the position of the rotor, and the associated drive electronics.
A. Hall effect sensors C. Coils
B. Stepper motors D. None of the above

19. Which of the following are activated one phase after the other by the drive electronics, as cued by the signals from the Hall effect sensors? In effect, they act as three-phase synchronous motors containing their own variable-frequency drive electronics.
A. Hall effect sensors C. Coils
B. Stepper motors D. None of the above

Universal Motors

20. A variant of the wound field DC motor is the universal motor. The name derives from the fact that it may use AC or DC supply current, although in practice they are nearly always used with _____ supplies.
A. AC C. AC or DC supply current
B. DC D. None of the above

21. The principle is that in a wound field _____ the current in both the field and the armature (and hence the resultant magnetic fields) will alternate (reverse polarity) at the same time, and hence the mechanical force generated is always in the same direction.
A. AC motor C. AC or DC motors
B. DC motor D. None of the above

22. In practice, the motor must be specially designed to cope with the _____ current (impedance must be taken into account, as must the pulsating force), and the resultant motor is generally less efficient than an equivalent pure DC motor.
A. AC C. AC or DC supply current
B. DC D. None of the above

23. The advantage of the universal motor is that AC supplies may be used on motors that have the typical characteristics of _____ motors, specifically high starting torque and very compact design if high running speeds are used.
A. AC C. AC or DC supply current
B. DC D. None of the above

24. The negative aspect is the maintenance and short life problems caused by the commutator. As a result, such motors are usually used in _____ devices such as food mixers and power tools which are used only intermittently.
A. AC C. AC or DC supply current
B. DC D. None of the above

25. Continuous speed control of a universal motor running on _____ is very easily accomplished using a thyristor circuit, while stepped speed control can be accomplished using multiple taps on the field coil.
A. AC C. AC or DC supply current
B. DC D. None of the above

AC Motor Sub-Section

26. In 1882, Nicola Tesla identified the rotating magnetic field principle, and pioneered the use of a rotary field of force to operate machines. He exploited the principle to design a _____in 1883. In 1885, Galileo Ferraris independently researched the concept.

A. Rotary field of force
B. Unique two-phase induction motor
C. Rotating magnetic field principle
D. None of the above

27. Before the invention of the _____, motors operated by continually passing a conductor through a stationary magnetic field (as in homopolar motors).

A. Rotary field of force
B. Stationary magnetic field
C. Rotating magnetic field
D. None of the above

28. Tesla had suggested that the commutators from a machine could be removed and the device could operate on _____.

A. A rotary field of force
B. A stationary magnetic field
C. A rotating magnetic field principle
D. None of the above

Components

A typical AC motor consists of two parts:

29. An outside stationary stator having coils supplied with AC current to produce a _____.

A. Rotating magnetic field
B. Torque to the load
C. Torque by the rotating field
D. None of the above

30. An inside rotor attached to the output shaft that is given a _____.

A. Rotating magnetic field
B. Torque to the load
C. Torque by the rotating field
D. None of the above

Torque motors

31. A torque motor is a specialized form of induction motor that is capable of operating indefinitely at stall (with the rotor blocked from turning) without damage. In this mode, the motor will apply a steady stall _____.

A. Rotating magnetic field
B. Torque to the load
C. Torque by the rotating field
D. None of the above

Slip Ring

32. The slip ring or wound rotor motor is an induction machine where the rotor comprises a set of coils that are terminated in slip rings to which _____ can be connected.

A. Speed/current and speed/torque
B. External impedances
C. Energized and de-energized
D. None of the above

33. The stator is the same as is used with a standard squirrel cage motor. By changing the impedance connected to the rotor circuit, the _____can be altered.

A. Slip ring starter
B. Stepper motors
C. Speed/current and speed/torque curves
D. None of the above

34. Which of the following is used primarily to start a high inertia load or a load that requires a very high starting torque across the full speed range?

A. Slip ring motor
B. Stepper motor
C. Standard squirrel cage motor
D. None of the above

35. By correctly selecting the resistors used in the secondary resistance or _____, the motor is able to produce maximum torque at a relatively low current from zero speed to full speed.
A. Slip ring starter C. Standard squirrel cage
B. Stepper D. None of the above

36. A secondary use of the _____is to provide a means of speed control.
A. Slip ring motor C. Standard squirrel cage motor
B. Stepper motors D. None of the above

37. Because the torque curve of the motor is effectively modified by the resistance connected to the rotor circuit, the speed of the motor can be altered. Increasing the value of resistance on the _____will move the speed of maximum torque down.
A. Rotor circuit C. Secondary resistors
B. Resistance D. None of the above

38. If the resistance connected to the rotor is increased beyond the point where the maximum torque occurs at zero speed, the torque will be further reduced. When used with a load that has a torque curve that increases with speed, the motor will operate at the speed where the torque developed by the motor is equal to the_____.
A. Motor torque C. Load torque
B. Resistance D. None of the above

39. Reducing the load will cause the motor to speed up, and increasing the load will cause the motor to slow down until the _____and motor torque are equal.
A. Load C. Secondary resistors
B. Resistance D. None of the above

40. Operated in this manner, the slip losses are dissipated in the secondary resistors and can be very significant. The _____is also very poor.
A. Motor torque C. Speed regulation
B. Resistance D. None of the above

Stepper Motors
41. Closely related in design to three-phase AC synchronous motors are _____, where an internal rotor containing permanent magnets or a large iron core with salient poles is controlled by a set of external magnets that are switched electronically.
A. Slip ring starters C. Standard squirrel cage motor
B. Stepper motors D. None of the above

42. Which of the following may also be thought of as a cross between a DC electric motor and a solenoid? As each coil is energized in turn, the rotor aligns itself with the magnetic field produced by the energized field winding.
A. Slip ring starter C. Standard squirrel cage motor
B. Stepper motor D. None of the above

43. Unlike a synchronous motor, in its application, the motor may not rotate continuously; instead, it "steps" from one position to the next as field windings are _____ in sequence. Depending on the sequence, the rotor may turn forwards or backwards.
A. Rotate extremely smoothly C. Energized and de-energized
B. Forwards or backwards D. None of the above

44. Simple stepper motor drivers entirely energize or entirely de-energize the field windings, leading the rotor to "cog" to a limited number of positions; more sophisticated drivers can proportionally control the power to the field windings, allowing the rotors to position between the cog points and thereby rotate _____.
A. Extremely smoothly C. Energized and de-energized
B. Forwards or backwards D. None of the above

Electric Motor Maintenance Sub-Section
General
45. Make a habit of checking that the motor is securely bolted to its platform. Mounting bolts can vibrate loose. Check to see that rotating parts aren't rubbing on stationary parts of the motor, causing damage to the motor.
A. True B. False

46. Even if windings are protected from moisture, minerals in the pumped water can attach to the windings and cause early failure. Motors that operate at 3600-rpm experience twice as much wear as motors operating at 1800 rpm. Regular maintenance is especially critical for 3600-rpm motors and pumps.
A. True B. False

Motor Electrical System
47. Wide temperature fluctuations during the year can cause electrical connections (especially in aluminum wire) to expand and contract, loosening connectors. Loose electrical connections cause heat buildup and arcing at electrical terminals.
A. True B. False

48. The voltage drop across loose connections will cause the motor to operate at less than its rated voltage, increasing internal motor temperature. Increased heat will break down motor winding insulation, resulting in electrical shorts and motor failures. A loose or broken connection can also unbalance the phases of three-phase power and damage the motor windings.
A. True B. False

Motor Bearings
49. Lubricate the motor according to the manufacturer's instructions. Intervals between lubrication will vary with motor speed, power draw, load, ambient temperatures, exposure to moisture, and seasonal or continuous operation.
A. True B. False

50. Electric motors should not be greased daily. Bearings can be ruined by either over- or under-greasing.
A. True B. False

51. Even a current of 15 milliamps (one milliamp is one one-thousandth of an amp) can cause serious injury or death. Always play it safe!
A. True B. False

Electrical Understanding Sub-Section

Understanding Voltage

52. Voltage, electrical potential difference, electric tension or electric pressure and measured in units of electric potential.
A. True B. False

53. Volts, or joules per coulomb is the electric potential difference between two points, or the difference in electric potential energy of a unit charge transported between two points.
A. True B. False

54. Voltage is electric potential energy per unit charge, measured in amps per coulomb.
A. True B. False

55. Electric potential is mathematically expressed as the line integral of the electric field and the time rate of change of voltage.
A. True B. False

56. The electric potential of a material is not even a well-defined quantity, since it varies on the subatomic scale.
A. True B. False

57. A voltmeter can be used to measure the _____ between two points in a system?
A. Energy C. Voltage
B. Electric potential D. None of the above

58. Voltage can be caused by _____ or, by electric current through a magnetic field, by time-varying magnetic fields, or some combination of these three.
A. Static electric fields C. Electric potential difference
B. Electromotive force D. None of the above

59. Which of the following is defined so that negatively charged objects are pulled towards higher voltages?
A. Voltage C. Electric potential difference
B. Electromotive force D. None of the above

60. Which of the following must be distinguished from electric potential energy by noting that the "potential" is a "per-unit-charge" quantity?
A. Pressure C. Charge
B. Electric potential D. None of the above

61. Which of the following is equal to the work done per unit charge against a static electric field to move the charge between two points?
A. Energy C. Voltage
B. Electric potential D. None of the above

62. Which of the following along with the dynamic electromagnetic field must be included in determining the voltage between two points?
A. Electric current C. A static (unchanging) electric field
B. Electromotive force D. None of the above

63. Which of the following is now obsolete but tension is still used?
A. Pressure C. Charge
B. Electric potential D. None of the above

64. Which of the following may represent either a source of energy or lost, used, or stored energy?
A. Voltage C. Electric potential difference
B. Electromotive force D. None of the above

65. Which of the following can flow from lower voltage to higher voltage, but only when a source of energy is present to "push" it?
A. Pressure C. Charge
B. Current D. None of the above

66. Which of the following is not the only issue determining charge flow?
A. Electric field C. Resistance
B. Electromotive force D. None of the above

Understanding Three-Phase Power

67. The three-phase system was introduced and patented by George Westinghouse.
A. True B. False

68. A hot wire allows the three-phase system to use a higher voltage while still supporting lower-voltage single-phase appliances.
A. True B. False

69. Which of the following represents electric power is a common method of alternating-current electric power generation, transmission, and distribution?
A. Three phase(s) C. Balanced load
B. Di-phase distribution D. None of the above

70. Which of the following are more inexpensive than others because it uses less conductor material to transmit electric power than equivalent single-phase or two-phase systems at the same voltage?
A. Three-phase system C. Supply conductor
B. Single phase D. None of the above

71. Which of the following terms has the effect of giving constant power transfer over each cycle of the current and makes it possible to produce a rotating magnetic field in an electric motor?
A. This delay between phases C. Linear balanced load
B. The lowest phase order D. None of the above

72. Three-phase systems may have a?
A. Neutral wire C. Non-linear balanced load
B. One phase system D. None of the above

73. In a three-phase system, _____carry three alternating currents (which reach their instantaneous peak values at different times.
A. A balanced load C. Instantaneous peak values
B. Three circuit conductors D. None of the above

74. Taking one conductor as the reference, the other two currents are delayed in time by one-third and two-thirds of one cycle of the?
A. Electric current C. Lowest phase order
B. Phase system D. None of the above

75. Which of the following is common not to have a neutral wire as the loads can simply be connected between phases?
A. High-voltage distribution situations C. Linear balanced load
B. Two-phase system D. None of the above

Three-phase has properties that make it very desirable in electric power systems:
76. Power transfer into a _____ is constant, which helps to reduce generator and motor vibrations.
A. High-voltage distribution situations C. Linear balanced load
B. Two-phase system D. None of the above

77. Which of the following can produce a magnetic field that rotates in a specified direction, which simplifies the design of electric motors?
A. A balanced load C. Instantaneous peak values
B. Three-phase systems D. None of the above

78. Three is _____order to exhibit all of these properties.
A. The highest phase order C. The lowest phase order
B. Number D. None of the above

79. Most household loads are?
A. Single-phase C. Dual phases
B. Three-phase systems D. None of the above

80. The phase currents tend to assist out one another, summing to zero in the case of a linear balanced load.
A. True B. False

3 Or 4 Wire
81. The '3-wire' and '4-wire' designations count the ground wire used on many transmission lines.
A. True B. False

82. A three-phase induction motor has a simple design, inherently low starting torque.
A. True B. False

83. A three-phase motor is more compact and less costly than a single-phase motor of the same voltage class and rating and single-phase DC motor.
A. True B. False

84. Large types of loads do not require the revolving magnetic field characteristic of three-phase motors but take advantage of the higher voltage and power level usually associated with three-phase distribution.
A. True B. False

85. Which of the following occur in two varieties: three-wire and four-wire?
A. Three-phase circuits C. Instantaneous phase order
B. Two-phase system D. None of the above

86. The three-wire system is used when the loads on the 3 live wires will be balanced, for example in motors or heating elements with?
A. A balanced load C. Instantaneous peak values
B. 3 identical coils D. None of the above

Sine waves are measured and compared by certain features.
87. In each cycle, there are one reversal and three maximums.
A. True B. False

88. The amplitude of the sine wave tells you the maximum value of current or?
A. Sine wave C. Voltage
B. Magnetic field D. None of the above

89. A cycle is one complete repetition of the wave form; it is produced by one complete revolution- 360^{O} -of the conductor through the?
A. Sine wave C. Voltage
B. Magnetic field D. None of the above

90. Which of the following terms peaks in the positive direction at 90^{O}, crosses the zero axis at 180^{O}, peaks in the negative direction at 270^{O}, then reaches zero again at 360^{O}?
A. Sine wave C. Voltage
B. Magnetic field D. None of the above

91. Which of the following is generated at 60 cycles or 50 cycles per second?
A. Each cycle C. Voltage or current
B. Most AC D. None of the above

92. Two waves can have the same amplitude and frequency, the same amplitude but different frequency, and different amplitude and different?
A. Amplitude C. Frequency
B. Horizontal line D. None of the above

93. The Peak to Peak voltage is the voltage calculated between the maximum positive and maximum negative points on the sine wave, it is twice the?
A. Amplitude C. AC
B. A horizontal line D. None of the above

94. RMS voltage or current is a standard means of measuring?
A. Magnetic field C. Positive current and voltage
B. Alternating current D. None of the above

95. Negative current and voltage do the same amount of work as positive voltage and current.
A. True B. False

Transformers

96. Makes AC power transmission and distribution possible and transform values of voltage and current.
A. True B. False

97. Transformers work because electric current generates a magnetic field around an electrical conductor to the earth.
A. True B. False

98. If each turn in the Secondary coil has 8 volts across it, each turn in the primary will also have 4 volts across it.
A. True B. False

99. Transformers operate on the principle of?
A. Tesla's principles C. Electromagnetic induction
B. One voltage from another D. None of the above

100. Transformers usually transfer _____ from one circuit to another.
A. AC voltages C. Expanding magnetic field
B. Energy D. None of the above

101. Which of the following are designed either to step voltage up or to step it down?
A. Most transformers C. Frequencies
B. Step down convertor D. None of the above

102. The magnetic field is constant, if the current flow is steady, as with?
A. AC voltages C. Expanding magnetic field frequencies
B. DC D. None of the above

103. Which of the following consist of a primary winding or coil connected to the source circuit and a secondary winding connected to the load circuit?
A. Transformers C. Electromagnetic induction
B. Primary windings D. None of the above

104. Which of the following flows through the primary, the collapsing and expanding magnetic field induces a voltage and current in the secondary as the lines of force keep cutting through the secondary coil windings?
A. AC C. Expanding magnetic fields
B. DC D. None of the above

105. With each turn of wire in the, primary coil has an equal share at the primary voltage across it and the same _____is induced in each turn of the secondary coil.
A. Voltage C. Frequency
B. Primary winding D. None of the above

SCADA Section

106. Industrial organizations and companies in the public and private sectors to maintain and control efficiency, distribute data for smarter decisions, and communicate system issues to help mitigate downtime utilize SCADA systems.
A. True B. False

107. SCADA systems are critical for industrial organizations (like water and wastewater facilities) since they help to maintain efficiency, process data for smarter decisions, and communicate system issues to help mitigate downtime.
A. True B. False

108. The SCADA software will process, distribute, and display important data, helping operators and other employees understand the data and make important decisions.
A. True B. False

109. The acronym SCADA refers to the centralized computer systems that control and monitor the entire sites, or they are the complex systems spread out over large areas. Nearly all the control actions are automatically performed by the remote terminal units (RTUs) or by the programmable logic controllers (PLCs).
A. True B. False

110. Data acquisition starts at the HMI level, which includes the equipment status reports, and meter readings. Data is then formatted in such way that the operator of the control room can make the supervisory decisions to override or adjust normal HMI controls, by using the PLC.
A. True B. False

111. SCADA systems implement the distributed databases known as Excel databases, containing data elements called rows or columns.
A. True B. False

112. The key attribute of a SCADA system is its capability to perform a supervisory operation over a variety of other proprietary devices.
A. True B. False

113. The internet is linked to the SCADA system's databases, to provide the diagnostic data, management information and trending information such as logistic information, detailed schematics for a certain machine or sensor, maintenance procedures and troubleshooting guides.
A. True B. False

114. The HMI, or Human Machine Interface, is a device apparatus that gives the processed data to the human operator. A human operator uses HMI to control processes.
A. True B. False

115. The information provided by the HMI to the operating personnel is graphical, in the form of mimic diagrams. This means the schematic representation of the plant that is being controlled is obtainable to the operator.
A. True B. False

116. Which of the following terms can convert electrical signals coming from the equipment into digital values like the status- open/closed – from a valve or switch, or the measurements like flow, pressure, current or voltage?
A. RTU C. PLC
B. HMI D. None of the above

117. By converting and sending the electrical signals to the equipment, _____ may control the equipment, like closing or opening a valve or a switch, or setting the speed of the pump.
A. RTU C. SCADA system
B. HMI D. None of the above

118. A 'supervisory Station' refers to the software and servers responsible for communication with the field equipment (PLCs, RTUs etc.), and after that, to _____ software running on the workstations in the control room, or somewhere else.
A. RTU C. SCADA system
B. HMI D. None of the above

119. Which of the following terms can have multiple servers, disaster recovery sites and distributed software applications in larger SCADA systems?
A. Master station C. SCADA system(s)
B. SCADA implementation(s) D. None of the above

120. For increasing the system integrity, _____are occasionally configured in hot standby or dual-redundant formation, providing monitoring and continuous control during server failures.
A. Multiple servers C. Multiple stations
B. Independent systems D. None of the above

121. Which of the following originally used modem connections or combinations of direct and radio serial to meet communication requirements, even though IP and Ethernet over SONET/SDH can also be used at larger sites like power stations and railways?
A. SCADA systems C. SCADA
B. SCADA implementation(s) D. None of the above

122. The monitoring function or remote management of the _____ is referred to as telemetry.
A. SCADA operator C. SCADA system(s)
B. SCADA implementation(s) D. None of the above

123. An important part of most SCADA implementations is _____. The system monitors whether certain alarm conditions are satisfied, to determine when an alarm event has occurred.
A. Policies and procedures C. Alarm handling
B. The cyber security team D. None of the above

124. Once an alarm event has been detected, one or more actions are taken (such as the activation of one or more alarm indicators, and perhaps the generation of email or text messages so that management or _____are informed).
A. SCADA operator C. Remote SCADA operators
B. SCADA implementation(s) D. None of the above

125. In many cases, a _____ may have to recognize the alarm event; this may deactivate some alarm indicators, whereas other indicators remain active until the alarm conditions are cleared.
A. SCADA operator C. SCADA
B. SCADA implementation(s) D. None of the above

126. Which of the following terms might automatically monitor whether the value in an analogue point lies outside high and low- limit values associated with that point?
A. SCADA operator C. SCADA system(s)
B. SCADA implementation(s) D. None of the above

127. Which of the following terms translates the electrical signals from the equipment to digital values such as the open/closed status from a switch or a valve, or measurements such as pressure, flow, voltage or current? By translating and sending these electrical signals out to equipment the RTU can control equipment, such as opening or closing a switch or a valve, or setting the speed of a pump.
A. RTU C. PLCs
B. HMI D. None of the above

128. In the first production, mainframe systems were used for computing. At the time SCADA was established, networks did not exist. Therefore, the _____ did not have any connectivity to other systems, meaning they were independent systems.
A. SCADA systems C. Multiple stations
B. Independent systems D. None of the above

129. The information between multiple stations was shared in real time through _____ and the processing was distributed between various multiple stations. The cost and size of the stations were reduced in comparison to the ones used in the first generation.
A. RTU C. LAN
B. HMI D. None of the above

130. The interaction between the system and the master station is done through the WAN protocols like the_____.
A. Internet Protocols (IP) C. Remote or distant operation
B. Common IT practices D. None of the above

131. Since the standard protocols used and the _____ can be accessed through the internet, the vulnerability of the system is enlarged.
A. Networked SCADA systems C. SCADA system(s)
B. SCADA implementation(s) D. None of the above

132. SCADA systems are now in line with the standard networking technologies. The old proprietary standards are being replaced by the_____.
A. ICS network C. TCP/IP and Ethernet protocols
B. LAN to a WAN D. None of the above

133. Due to certain characteristics of frame-based network communication technology, Ethernet networks have been recognized by the majority of markets for HMI SCADA.
A. True B. False

134. There are many threat vectors to a modern SCADA system. One is the threat of unauthorized access to the control software, whether it is human access or changes induced intentionally or accidentally by _____residing on the control host machine.
A. Policies and procedures C. Virus infections and other software threats
B. DoS attacks and malware D. None of the above

135. In many cases, SCADA users have assumed that having a VPN offered sufficient protection, unaware that security can be _____to SCADA-associated network jacks and switches.
A. Different risks and priorities C. Trivially bypassed with physical access
B. Significantly less isolation D. None of the above

136. Industrial control vendors propose approaching SCADA security like _____ with a defense in depth strategy that leverages common IT practices.
A. Remote control tasks C. Remote or distant operation
B. Information Security D. None of the above

137. A SCADA (or supervisory control and data acquisition) system means a system consisting of a number of remote terminal units (or RTUs) collecting field data connected back to a master station via a_____.
A. Communications system C. PLCs, RTUs etc.
B. HMI D. None of the above

138. The master station displays the _____and also allows the operator to implement remote control tasks.
A. Acquired data C. Remote or distant operation
B. Common IT practices D. None of the above

139. The accurate and timely data (normally real-time) allows for optimization of the operation of the plant and process. A further benefit is more efficient, reliable and most importantly, safer operations. This all results in a lower cost of operation compared to earlier _____.
A. Remote control tasks C. Remote or distant operation
B. Non-automated systems D. None of the above

140. There is a fair degree of misunderstanding between the definition of SCADA systems and process control system. SCADA has the_____.
A. Remote control tasks C. Connotation of remote or distant operation
B. Non-automated systems D. None of the above