UPDATED

CALIFORNIA C-10 ELECTRICAL

PRACTICE TEST

INTRODUCTION

ALL -IN -ONE

Practice Test - Answers & Standard Exam Paper Questions

This Practice test thoroughly covers all chapters relevant to the C-10 electrical exam, featuring over **350 carefully crafted multiple-choice questions** spread across approximately **80 pages**.

Designed to support your certification journey and long-term professional success, this practice test focuses on the essential knowledge and skills required for the exam. It includes comprehensive practice questions with detailed answers to help reinforce key concepts and ensure exam readiness.

With a proven track record of helping candidates achieve high scores, this resource is an invaluable tool for building the confidence and competence needed to excel as a **certified C-10 Electrical .**

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PART 1: C-10 Electrical Practice Test by Chapter

PART 2: Standard Exam Paper Questions

1: ELECTRICAL Critical Topics

1. What is the primary unit of electrical pressure?
   A) Ampere
   B) Volt
   C) Ohm
   D) Watt

2. Which component resists the flow of current?
   A) Conductor
   B) Insulator
   C) Resistor
   D) Capacitor

3. What does Ohm's Law define the relationship between?
   A) Voltage, current, resistance
   B) Power, energy, time
   C) Frequency, wavelength, speed
   D) Capacitance, inductance, impedance

4. In a series circuit, how does total resistance relate to individual resistances?
   A) It is the sum
   B) It is the average
   C) It is the reciprocal
   D) It is the product

5. What is the function of a circuit breaker?
   A) To store energy
   B) To regulate voltage
   C) To protect circuits
   D) To increase current

6. Which type of current flows in one direction only?
   A) Alternating Current (AC)
   B) Direct Current (DC)
   C) Pulsating Current
   D) Oscillating Current

7. What is the standard frequency of AC power in the United States?
   A) 50 Hertz
   B) 60 Hertz
   C) 100 Hertz
   D) 120 Hertz

8. Which material is the best electrical conductor?
   A) Aluminum
   B) Copper
   C) Silver
   D) Gold

9. What is the purpose of a transformer?
   A) To change voltage levels
   B) To convert AC to DC
   C) To store electrical charge
   D) To measure resistance

10. What is the main purpose of grounding in an electrical system?
    A) To increase voltage
    B) To provide a return path
    C) To ensure safety
    D) To regulate frequency

Answer Key (1-10):

1.B,
2.C,
3.A,
4.A,
5.C,
6.B,
7.B,
8.C,
9.A,
10.C

11. A GFCI is designed to protect people from what?
    A) Overvoltage
    B) Power surges
    C) Electric shock
    D) Circuit overloads

12. What does the term "ampacity" refer to?
    A) Current-carrying capacity
    B) Voltage rating
    C) Resistance value
    D) Power consumption

13. Which wiring method is commonly used in residential construction?
    A) Mineral-insulated cable
    B) Nonmetallic-sheathed cable
    C) Armored cable
    D) Rigid metal conduit

14. What is the primary hazard associated with arc flashes?
    A) High voltage
    B) Intense heat and light
    C) Loud noise
    D) Magnetic fields

15. In a parallel circuit, what remains constant across all components?
    A) Current
    B) Resistance
    C) Voltage
    D) Power

16. What is the unit of electrical power?
    A) Joule
    B) Watt
    C) Coulomb
    D) Henry

17. What type of diagram shows the physical layout of components?
    A) Schematic diagram
    B) Wiring diagram
    C) One-line diagram
    D) Block diagram

18. What is the function of an insulator?
    A) To block current flow
    B) To enhance current flow
    C) To store electrical energy
    D) To regulate voltage

19. Which factor does NOT affect a conductor's resistance?
    A) Length
    B) Material
    C) Color
    D) Temperature

20. What is the purpose of a fuse in a circuit?
    A) To regulate voltage
    B) To provide overcurrent protection
    C) To store charge
    D) To amplify signals

Answer Key (11-20):

11.C,
12.A,
13.B,
14.B,
15.C,
16.B,
17.B,
18.A,
19.C,
20.B

21. What is the difference between a neutral and a ground wire?
    A) Their color
    B) Their function
    C) Their material
    D) Their size

22. What does a multimeter measure?
    A) Voltage only
    B) Current only
    C) Resistance only
    D) Multiple electrical values

23. What is the primary purpose of a conduit?
    A) To protect wires
    B) To increase ampacity
    C) To reduce voltage drop
    D) To provide insulation

24. What is the term for the opposition to current flow in an AC circuit?
    A) Resistance
    B) Reactance
    C) Impedance
    D) Admittance

25. What is the function of a capacitor?
    A) To store energy
    B) To resist current
    C) To induce a magnetic field
    D) To step down voltage

26. Which of the following is a key component of a basic electrical circuit?
    A) A switch
    B) A motor
    C) A transformer
    D) A generator

27. What is the primary danger of working on live circuits?
    A) Fire hazard
    B) Electric shock
    C) Equipment damage
    D) Power outage

28. What is the term for a circuit with only one path for current flow?
    A) Parallel circuit
    B) Series circuit
    C) Open circuit
    D) Short circuit

29. What is the purpose of the National Electrical Code (NEC)?
    A) To set material prices
    B) To ensure safe installations
    C) To license electricians
    D) To design electrical systems

30. What is the result of connecting a voltage source to a circuit with no resistance?
    A) An open circuit
    B) A short circuit
    C) A series circuit
    D) A stable circuit

Answer Key (21-30):

21.B,

22.D,

23.A,

24.C,

25.A,

26.A,

27.B,

28.B,

29.B,

30.B

2: Planning and Estimating

31. What is the first step in evaluating an existing electrical system?
    A) Check panel capacity
    B) Inspect for safety
    C) Measure circuit loads
    D) Review old plans

32. What information is found on a panel schedule?
    A) Circuit numbers and loads
    B) Building occupancy type
    C) Wall and ceiling finishes
    D) HVAC system details

33. When interpreting plans, what does a solid line typically represent?
    A) Conduit concealed in walls
    B) Exposed conduit
    C) Underground conduit
    D) Future wiring

34. A lighting plan shows fixture types and what other key information?
    A) Fixture locations
    B) Fixture costs
    C) Fixture manufacturers
    D) Fixture colors

35. What is the purpose of a one-line diagram?
    A) To show power distribution
    B) To detail control wiring
    C) To list all materials
    D) To specify receptacle heights

36. To calculate the total load for a dwelling, you must first determine the what?
    A) General lighting load
    B) Largest motor load
    C) Air conditioning load
    D) Kitchen appliance load

37. What is the formula for calculating wattage?
    A) Volts times Amps
    B) Volts divided by Amps
    C) Amps divided by Volts
    D) Volts plus Amps

38. Voltage drop is a function of conductor length, size, and what else?
    A) The load current
    B) The ambient temperature
    C) The conduit type
    D) The panel brand

39. The NEC requires branch circuits for kitchen countertops to be what amperage?
    A) 15 amperes
    B) 20 amperes
    C) 25 amperes
    D) 30 amperes

40. What is the minimum number of small-appliance branch circuits required in a kitchen?
    A) One
    B) Two
    C) Three
    D) Four

Answer Key

41. According to the NEC, what is the maximum number of disconnects for a service?
    A) Four
    B) Five
    C) Six
    D) Seven

42. When selecting wire, what does the "THHN" insulation rating indicate?
    A) High heat resistance
    B) Suitable for wet locations
    C) Designed for underground use
    D) Low smoke characteristics

43. For a commercial project, what type of conduit is typically specified for exposed areas?
    A) PVC
    B) EMT
    C) FMC
    D) ENT

44. What factor is most critical when selecting an overcurrent protection device?
    A) The conductor ampacity
    B) The panelboard brand
    C) The circuit voltage
    D) The load type

45. In photovoltaic (PV) system planning, what does "irradiance" measure?
    A) Solar panel efficiency
    B) Sun's power per unit area
    C) Battery storage capacity
    D) Inverter output wattage

46. What is the primary function of an inverter in a PV system?
    A) To convert DC to AC
    B) To store solar energy
    C) To track the sun's position
    D) To clean the solar panels

47. When planning a generator installation, what is a critical consideration?
    A) The generator's color
    B) The fuel type and storage
    C) The engine's horsepower
    D) The brand of the generator

48. A transfer switch is used to switch a building's load between what two sources?
    A) Utility and generator
    B) Solar and wind
    C) Battery and inverter
    D) AC and DC power

49. What is a key factor when sizing a battery bank for an energy storage system?
    A) The battery chemistry
    B) The desired autonomy
    C) The battery's weight
    D) The manufacturer's warranty

50. In a wind energy system, what component converts wind into rotational energy?
    A) The tower
    B) The blades
    C) The gearbox
    D) The nacelle

Answer Key

51. When evaluating an older home, what is a common electrical system issue?
    A) Ungrounded outlets
    B) Excessive voltage
    C) Oversized panels
    D) Too many GFCIs

52. What does an "RFI" stand for in the context of project planning?
    A) Request for Information
    B) Ready for Inspection
    C) Revised Final Invoice
    D) Residential Fault Indicator

53. An electrical legend on a blueprint defines the what?
    A) Symbols used
    B) Project timeline
    C) Payment schedule
    D) List of subcontractors

54. What is the purpose of "as-built" drawings?
    A) To show original design
    B) To document final installation
    C) To estimate project costs
    D) To order materials

55. To calculate the required feeder size, you must know the total calculated what?
    A) Voltage
    B) Load
    C) Resistance
    D) Length

56. What is the standard voltage for a residential lighting and receptacle circuit?
    A) 120 volts
    B) 208 volts
    C) 240 volts
    D) 277 volts

57. The NEC is not a design manual; it is a standard for what?
    A) Maximum efficiency
    B) Minimum safety
    C) Lowest cost
    D) Aesthetic appearance

58. What is the primary reason for derating conductor ampacity?
    A) High ambient temperature
    B) Long circuit length
    C) Type of insulation
    D) Conduit color

59. What type of cable is typically used for underground service entrances?
    A) NM-B
    B) MC
    C) USE-2
    D) SOOW

60. For a project with sensitive electronics, what might be specified?
    A) Surge protective devices
    B) Larger conductors
    C) Aluminum wiring
    D) Higher voltage

Answer Key

61. When planning a PV system, what is the purpose of a "site survey"?
    A) To assess solar access
    B) To determine property lines
    C) To test soil composition
    D) To count existing outlets

62. What is a "grid-tied" PV system?
    A) It operates independently
    B) It connects to the utility
    C) It only powers DC loads
    D) It uses no batteries

63. What is the main safety device for a standby generator?
    A) A transfer switch
    B) A larger fuel tank
    C) A heavy-duty cord
    D) An exhaust fan

64. What is the primary role of a capacitor in a power system?
    A) To correct power factor
    B) To increase voltage
    C) To store long-term energy
    D) To reduce current

65. When reviewing project specifications, what does "or equal" mean?
    A) An identical product
    B) A less expensive product
    C) A similar, approved product
    D) A locally sourced product

66. What is the demand factor for the first 10 kW of household electric ranges?
    A) 70%
    B) 80%
    C) 90%
    D) 100%

67. What is required for all 125-volt, 15- and 20-ampere receptacles in a dwelling unit's garage?
    A) AFCI protection
    B) GFCI protection
    C) Surge protection
    D) Tamper resistance

68. What material is commonly used for enclosing underground conduits in concrete?
    A) Sand
    B) Gravel
    C) Steel
    D) PVC

69. What is a "rapid shutdown" system for PV arrays designed to protect?
    A) The inverter
    B) The utility grid
    C) The solar panels
    D) First responders

70. What is a key consideration when selecting an automatic transfer switch (ATS)?
    A) Its color
    B) Its transition type
    C) Its weight
    D) Its country of origin

Answer Key

71. When evaluating a commercial building, what is a key concern?
    A) Number of windows
    B) Type of flooring
    C) Adequacy of egress lighting
    D) Color of the walls

72. What is a "take-off" in the estimating process?
    A) A final summary
    B) A list of materials
    C) A project schedule
    D) A labor estimate

73. The scale on a blueprint is used to determine what?
    A) Actual dimensions
    B) Material costs
    C) Project duration
    D) Labor rates

74. If a 120V circuit draws 10A, what is its power consumption?
    A) 12 watts
    B) 120 watts
    C) 1200 watts
    D) 12,000 watts

75. The NEC requires at least one 20A circuit for a dwelling unit's what?
    A) Bedroom
    B) Living room
    C) Laundry area
    D) Hallway

76. What is the maximum voltage drop recommended for a branch circuit?
    A) 1%
    B) 3%
    C) 5%
    D) 7%

77. Which type of wire has the highest temperature rating?
    A) TW
    B) THW
    C) THWN
    D) THHN

78. What is the primary benefit of using aluminum conductors?
    A) They are lighter
    B) They are more conductive
    C) They are more flexible
    D) They are stronger

79. When planning a solar installation, what does the "azimuth angle" refer to?
    A) The panel's tilt
    B) The panel's orientation
    C) The sun's height
    D) The roof's pitch

80. A "microinverter" in a PV system is typically connected to what?
    A) The entire array
    B) The battery bank
    C) A single solar panel
    D) The utility meter

Answer Key

81. What is the purpose of an "uninterruptible power supply" (UPS)?
    A) To provide backup power
    B) To regulate voltage
    C) To improve power factor
    D) To lower energy costs

82. In a large commercial building, power is often distributed at what voltage?
    A) 120/240V
    B) 120/208V
    C) 277/480V
    D) 347/600V

83. What is a key step in creating a project estimate?
    A) Guessing labor hours
    B) Calculating overhead and profit
    C) Ignoring material costs
    D) Doubling the initial quote

84. What document legally binds a contractor to a project's price?
    A) The estimate
    B) The proposal
    C) The contract
    D) The invoice

85. A 2% voltage drop on a 240V circuit is how many volts?
    A) 1.2 volts
    B) 2.4 volts
    C) 4.8 volts
    D) 6.0 volts

86. The NEC requires that outdoor receptacles be what?
    A) Weather-resistant
    B) Tamper-resistant
    C) GFCI protected
    D) All of the above

87. What does the term "AWG" refer to?
    A) A wire's material
    B) A wire's size
    C) A wire's insulation
    D) A wire's manufacturer

88. What is the primary purpose of a cutting agent in a lubricant for pulling wire?
    A) To reduce friction
    B) To clean the conduit
    C) To cool the wires
    D) To add color

89. A "peak sun hour" is a unit of what?
    A) Time
    B) Solar irradiance
    C) Temperature
    D) Panel efficiency

90. In a generator's specifications, "kVA" stands for what?
    A) Kilovolt-amperes
    B) Kilowatt-amperes
    C) Kilovolt-average
    D) Kilowatt-average

Answer Key

91. What is the primary function of a battery management system (BMS)?
    A) To monitor and protect cells
    B) To increase battery capacity
    C) To convert DC to AC
    D) To charge the batteries faster

92. What is a "change order" in a construction project?
    A) A request for payment
    B) A modification to the contract
    C) A notice of completion
    D) A daily work log

93. A panelboard is rated for 200A. What is the maximum continuous load it can carry?
    A) 160A
    B) 180A
    C) 200A
    D) 225A

94. What is the minimum burial depth for direct-buried UF cable under a residential driveway?
    A) 12 inches
    B) 18 inches
    C) 24 inches
    D) 30 inches

95. In selecting materials, what is the advantage of using MC cable over EMT?
    A) It is less expensive
    B) It is more flexible
    C) It has a higher ampacity
    D) It is lighter

96. What is the primary role of a charge controller in a PV system?
    A) To regulate battery charging
    B) To convert DC to AC
    C) To increase voltage
    D) To track the sun

97. When planning for a backup generator, "load shedding" refers to what?
    A) Adding more circuits
    B) Turning off non-essential loads
    C) Increasing generator size
    D) Running the generator at full power

98. A specification calls for "10 AWG copper wire." What does the "10" represent?
    A) The insulation thickness
    B) The number of strands
    C) The conductor size
    D) The voltage rating

99. Before submitting a bid, it is crucial to review all what?
    A) Addenda
    B) Invoices
    C) Pay stubs
    D) Old permits

100. What is the NEC article that covers grounding and bonding?
    A) Article 240
    B) Article 250
    C) Article 300
    D) Article 430

Answer Key

101. What is the standard load calculation for a show-window in a store?
A) 180 VA per outlet
B) 200 VA per linear foot
C) 3 VA per square foot
D) 1500 VA per circuit

102. When selecting a panelboard, what does "interrupting rating" refer to?
A) The continuous current rating
B) The maximum fault current
C) The number of circuits
D) The physical dimensions

103. In a PV system, what does "MPPT" stand for?
A) Maximum Power Point Tracking
B) Minimum Power Production Threshold
C) Main Panel Power Tie-in
D) Multi-Phase Power Transfer

104. What is the purpose of a "drip loop" in an overhead service entrance?
A) To prevent water entry
B) To reduce wire tension
C) To meet clearance requirements
D) To simplify connections

105. When estimating labor, what is a crucial factor to consider?
A) The weather forecast
B) The project's complexity
C) The color of the wires
D) The brand of tools used

106. What is the primary purpose of a punch list?
A) To list completed tasks
B) To identify items needing correction
C) To order final materials
D) To calculate final payment

107. According to the NEC, receptacles in a dwelling bathroom must be on a what circuit?
A) 15-amp lighting circuit
B) 20-amp dedicated circuit
C) 20-amp small appliance circuit
D) 20-amp general purpose circuit

108. What is the primary advantage of a three-phase power system?
A) It is more efficient
B) It is simpler to install
C) It uses less copper
D) It is safer

109. When planning a job, what is the critical path method used for?
A) Estimating costs
B) Scheduling tasks
C) Selecting materials
D) Designing the system

110. In an energy storage system, what does "depth of discharge" (DoD) refer to?
A) How much a battery is used
B) How fast a battery charges
C) The battery's total capacity
D) The battery's internal temperature

Answer Key

111. What is the minimum size copper grounding electrode conductor for a 200A service?
A) #8 AWG
B) #6 AWG
C) #4 AWG
D) #2 AWG

112. In California, what agency is responsible for electrical contractor licensing?
A) The CPUC
B) The CSLB
C) Cal/OSHA
D) The CEC

113. What is the first step in creating a detailed cost estimate?
A) Calculating profit
B) Performing a material takeoff
C) Guessing labor hours
D) Calling the client

114. What does the term "rough-in" refer to in the construction process?
A) The final inspection
B) The installation of wiring and boxes
C) The installation of fixtures
D) The project planning phase

Answer Key

3: Rough Wiring

115. What is the first step in laying out a new wiring system?
A) Pulling the wire
B) Installing the panel
C) Marking box locations
D) Drilling holes in studs

116. Outlet boxes for wall-mounted light fixtures are typically installed at what height?
A) 18 inches
B) 48 inches
C) 66 inches
D) 80 inches

117. What is the standard height for receptacles in a residential dwelling?
A) 12 inches
B) 16 inches
C) 18 inches
D) 24 inches

118. What is the minimum clearance in front of an electrical panel?
A) 24 inches
B) 30 inches
C) 36 inches
D) 42 inches

119. What is the required headroom clearance for service equipment?
A) 6 feet
B) 6 feet, 6 inches
C) 7 feet
D) 7 feet, 6 inches

120. When running conduit, what is the maximum number of quarter bends allowed between pull points?
A) Two
B) Three
C) Four
D) Five

121. What is the purpose of a nail plate when wiring through wood studs?
A) To protect the wires
B) To secure the wires
C) To identify the circuit
D) To ground the stud

122. How should nonmetallic-sheathed cable be supported?
A) With staples or straps
B) With tape or glue
C) With nails or screws
D) With wire or string

123. What is the minimum depth for a receptacle box in a combustible wall?
A) 1/2 inch
B) 3/4 inch
C) 1 inch
D) 1-1/4 inches

124. How many #12 AWG conductors are allowed in a 4" x 1-1/2" square box?
A) 7
B) 8
C) 9
D) 10

Answer Key

125. The main bonding jumper connects the neutral bus to what?
A) The grounding bus
B) The service disconnect
C) The meter base
D) The grounding electrode

126. What is the purpose of bonding all metal parts of a swimming pool?
A) To create equal potential
B) To heat the water
C) To power the lights
D) To filter the water

127. What is the minimum size copper bonding conductor for a swimming pool?
A) #12 AWG
B) #10 AWG
C) #8 AWG
D) #6 AWG

128. In a PV system, what is the purpose of the equipment grounding conductor?
A) To ground the modules
B) To carry fault current
C) To connect the inverter
D) To charge the batteries

129. When installing a generator, the transfer switch must be located where?
A) Next to the generator
B) Before the service panel
C) After the service panel
D) Inside the service panel

130. What type of box is typically used for an outdoor receptacle?
A) A metal handy box
B) A plastic gem box
C) A weatherproof box
D) A 4-square box

131. In a commercial building, how are conduits often supported?
A) With ceiling grid wires
B) With strut and clamps
C) With wood furring strips
D) With adhesive tape

132. When pulling wire through conduit, what is used to reduce friction?
A) Water
B) Oil
C) Wire-pulling lubricant
D) Sand

133. What is the maximum spacing for staples on NM cable run horizontally?
A) 24 inches
B) 36 inches
C) 4.5 feet
D) 6 feet

134. A neutral wire must be identified by what color?
A) Green
B) White or gray
C) Black or red
D) Blue or yellow

Answer Key

135. What is the function of a grounding electrode conductor?
A) To connect to the earth
B) To bond metal piping
C) To ground equipment
D) To carry neutral current

136. In a subpanel, how should the neutral and ground buses be configured?
A) Bonded together
B) Isolated from each other
C) Connected by a jumper
D) Removed entirely

137. For a PV array on a rooftop, what is a key requirement for the racking?
A) It must be weatherproof
B) It must be properly bonded
C) It must be painted black
D) It must be made of wood

138. When roughing in wiring for a ceiling fan, what type of box should be used?
A) A standard plastic box
B) A fan-rated box
C) A shallow pancake box
D) A metal handy box

139. How far must a cable be from the edge of a framing member?
A) 1 inch
B) 1-1/4 inches
C) 1-1/2 inches
D) 2 inches

140. What is the purpose of an anti-short bushing for armored cable?
A) To protect wire insulation
B) To secure the cable
C) To ground the armor
D) To identify the voltage

141. A grounding clip is used to bond a grounding wire to what?
A) A metal box
B) A plastic box
C) A wood stud
D) A neutral bus

142. The "hot" or ungrounded conductor in a 120V circuit is typically what color?
A) White
B) Green
C) Black
D) Gray

143. What is the maximum number of wires allowed under a single screw terminal?
A) One
B) Two
C) Three
D) Four

144. What is the primary purpose of a pull box in a long conduit run?
A) To make pulling easier
B) To house a splice
C) To change conduit size
D) To install a device

Answer Key

145. What is the minimum burial depth for rigid metal conduit under a building?
A) 0 inches
B) 6 inches
C) 12 inches
D) 18 inches

146. How are individual solar modules in an array typically connected?
A) With wire nuts
B) With solder
C) With quick-connect plugs
D) With terminal screws

147. A "home run" in electrical wiring refers to the cable running from the first outlet to where?
A) The last outlet
B) The service panel
C) The subpanel
D) The meter

148. What is the standard size for a single-gang switch box?
A) 12 cubic inches
B) 14 cubic inches
C) 16 cubic inches
D) 18 cubic inches

149. EMT conduit is joined together using what type of fitting?
A) A threaded coupling
B) A compression coupling
C) A set-screw coupling
D) B or C

150. What is the primary reason for installing a vapor barrier behind an outdoor panel?
A) To prevent corrosion
B) To provide insulation
C) To meet code
D) To add support

151. An isolated ground receptacle has its grounding terminal connected directly to what?
A) The metal box
B) The neutral bus
C) The service ground
D) The conduit system

152. In a PV system, the DC disconnect should be located near the what?
A) Inverter
B) Solar panel
C) Battery bank
D) Utility meter

153. What is the maximum length of flexible metal conduit allowed for a lighting fixture whip?
A) 3 feet
B) 4 feet
C) 5 feet
D) 6 feet

154. Before backfilling a trench with underground conduit, what is often required?
A) An inspection
B) A pressure test
C) A continuity test
D) A coat of paint

Answer Key

155. What does the term "knockout" refer to on an electrical box?
A) A pre-punched opening
B) A type of fastener
C) A wiring device
D) A testing tool

156. How is PVC conduit typically bent?
A) With a mechanical bender
B) With a hydraulic bender
C) With a heat gun or blanket
D) By hand pressure

157. What is the purpose of a ground rod?
A) To bond the water pipes
B) To create a grounding electrode
C) To protect against lightning
D) To secure the service mast

158. In a battery storage system, what is a key requirement for the battery enclosure?
A) It must be airtight
B) It must be well-ventilated
C) It must be made of metal
D) It must be heated

159. When installing a subpanel, what must be installed if it's in a separate building?
A) A main breaker
B) A grounding electrode system
C) A surge protector
D) A separate meter

160. What is the purpose of expansion fittings in long runs of PVC conduit?
A) To allow for thermal expansion
B) To make pulling wire easier
C) To facilitate future splices
D) To provide extra support

161. A "pigtail" is a short piece of wire used for what purpose?
A) To make connections in a box
B) To test circuit voltage
C) To pull other wires
D) To extend a circuit

162. What is the minimum size of a service entrance for a new single-family home?
A) 60 amps
B) 100 amps
C) 150 amps
D) 200 amps

163. The metal frame of a generator must be what?
A) Painted
B) Insulated
C) Grounded
D) Isolated

164. What is a key consideration when installing recessed lighting fixtures?
A) The bulb wattage
B) The fixture's color
C) The insulation contact rating
D) The brand of the fixture

Answer Key

165. What is the NEC requirement for supporting conduit within 3 feet of a box?
A) One support
B) Two supports
C) Three supports
D) No supports

166. A "service head" or "weatherhead" is used in what type of installation?
A) An underground service
B) An overhead service
C) A solar panel array
D) A backup generator

167. What is the purpose of sealing a conduit entering a building from outside?
A) To prevent moisture entry
B) To keep out insects
C) To stop gas migration
D) All of the above

168. How many service-entrance conductors are required for a 120/240V single-phase service?
A) Two
B) Three
C) Four
D) Five

169. What is the purpose of a fire caulk or sealant around conduit passing through a firewall?
A) To maintain the fire rating
B) To provide structural support
C) To prevent water leaks
D) To reduce noise transmission

170. When installing a panel in a wet location, what is required?
A) A NEMA 1 enclosure
B) A NEMA 3R enclosure
C) A NEMA 4X enclosure
D) A NEMA 12 enclosure

171. In a PV system, what is the purpose of a combiner box?
A) To parallel string outputs
B) To convert DC to AC
C) To store excess energy
D) To shut down the system

172. A bored hole in a wood joist for cable must be how far from the edge?
A) 1 inch
B) 1-1/2 inches
C) 2 inches
D) 2-1/2 inches

173. What is the maximum distance between supports for 1/2" EMT?
A) 5 feet
B) 8 feet
C) 10 feet
D) 12 feet

174. A grounding bushing is used on a conduit for what purpose?
A) To provide a bonding jumper
B) To protect wire insulation
C) To seal the conduit
D) To transition to another conduit

Answer Key

175. What is the primary concern when routing generator exhaust?
A) Noise reduction
B) Carbon monoxide safety
C) Heat dissipation
D) Aesthetic appearance

176. What is the minimum number of ground rods required if one does not have a resistance of 25 ohms or less?
A) One
B) Two
C) Three
D) Four

177. When laying out circuits, it is good practice to balance what?
A) The loads between phases
B) The number of outlets
C) The length of the circuits
D) The colors of the wires

178. What does a three-way switch control?
A) Three separate lights
B) A light from two locations
C) A light from three locations
D) A three-speed fan

179. In a commercial kitchen, what type of wiring is often required?
A) Wiring in conduit
B) Nonmetallic-sheathed cable
C) Underground feeder cable
D) Armored cable

180. A main service panel must be located where?
A) In a bathroom
B) In a clothes closet
C) In a readily accessible location
D) In the attic

181. What is the minimum size wire allowed for a 20-amp branch circuit?
A) #14 AWG
B) #12 AWG
C) #10 AWG
D) #8 AWG

182. A grounding electrode system must be connected to what?
A) The water piping system
B) The gas piping system
C) The structural steel
D) All of the above if available

183. When installing a panelboard, the top of the highest breaker cannot be more than how high?
A) 5' 6"
B) 6' 0"
C) 6' 7"
D) 7' 0"

184. What is a "derrick" used for in electrical work?
A) To dig trenches
B) To set utility poles
C) To bend large conduit
D) To test insulation

185. What is the purpose of an "arc-fault circuit interrupter" (AFCI)?
A) To protect against shock
B) To prevent electrical fires
C) To guard against overloads
D) To prevent surges

Answer Key

4: Finish Wiring and Trim

186. What is the final step before installing a device in a box?
A) Connecting the wires
B) Pushing wires into the box
C) Folding wires neatly
D) Attaching the cover plate

187. How is a standard receptacle wired?
A) Hot to silver screw
B) Hot to brass screw
C) Neutral to brass screw
D) Ground to silver screw

188. What is the purpose of "making up" a box before installing devices?
A) To prepare connections
B) To clean the box
C) To paint the box
D) To test the box

189. A GFCI receptacle should be installed with the LINE and LOAD terminals connected how?
A) Line to downstream receptacles
B) Load to downstream receptacles
C) Line and Load together
D) Load to the panel

190. When installing a motor, what is critical to check?
A) The motor's color
B) The rotation direction
C) The motor's weight
D) The manufacturer's logo

191. The nameplate on a motor provides what important information?
A) The installation date
B) The wiring diagram
C) The contractor's name
D) The purchase price

192. What is the purpose of a disconnect switch for an appliance?
A) To provide a means of service
B) To act as a circuit breaker
C) To regulate the voltage
D) To improve efficiency

193. How should circuits in a panelboard be labeled?
A) With a clear, legible directory
B) With handwritten notes
C) With color-coded tape
D) They do not need labels

194. Why is it important to label wires in a junction box?
A) To aid in future troubleshooting
B) To meet aesthetic standards
C) To increase conductivity
D) To prevent overheating

195. What is used to seal the opening between an outdoor box and the wall surface?
A) Silicone caulk
B) Duct tape
C) Plaster
D) Mortar

Answer Key

196. What is the purpose of a weatherproof "in-use" cover for an outdoor receptacle?
A) To keep the outlet dry
B) To protect the cord when plugged in
C) To prevent theft of the outlet
D) To add decoration

197. In a PV system, what is the final connection to be made?
A) The DC disconnect
B) The inverter to the panel
C) The ground wire
D) The battery terminals

198. When finishing the wiring for a generator, the transfer switch must be what?
A) Clearly labeled
B) Painted red
C) Hidden from view
D) Locked in the off position

199. What is the final step after installing a light fixture?
A) Installing the bulb
B) Testing the switch
C) Attaching the trim or globe
D) All of the above

200. On a three-way switch, what is the dark-colored screw terminal for?
A) The common wire
B) The traveler wire
C) The neutral wire
D) The ground wire

201. Before installing a heavy ceiling fan, what must be confirmed?
A) The ceiling height
B) The box is fan-rated
C) The room's square footage
D) The wall switch amperage

202. What is the purpose of torquing terminal screws on a panelboard?
A) To ensure a tight connection
B) To prevent wire damage
C) To meet warranty requirements
D) All of the above

203. The identifying sticker on a smoke detector indicates what?
A) The installation date
B) The replacement date
C) The decibel rating
D) The manufacturer's address

204. When installing recessed lights in an insulated ceiling, they must be rated as what?
A) IC-rated
B) Non-IC rated
C) Airtight
D) A and C

205. What is used to protect the edge of a metal stud from sharp edges?
A) A plastic bushing
B) Electrical tape
C) A metal grommet
D) Silicone sealant

Answer Key

206. After installing an inverter for a solar system, what must be done?
A) It must be commissioned
B) It must be painted
C) It must be covered
D) It must be grounded

207. What should be done with unused openings in a panelboard?
A) They should be left open
B) They should be filled
C) They should be taped over
D) They should be labeled "spare"

208. When connecting a large motor, what type of termination is often used?
A) Wire nuts
B) Crimp lugs
C) Terminal screws
D) Solder

209. What is a key step in finishing a generator installation?
A) Filling it with fuel
B) Testing the transfer switch
C) Polishing the enclosure
D) Registering the warranty

210. What is the purpose of a trim plate on a recessed fixture?
A) To cover the opening
B) To hold the bulb
C) To dissipate heat
D) To direct the light

211. Before placing a cover plate on a box, what should be checked?
A) The wires are pushed back
B) The box is flush
C) The devices are straight
D) All of the above

212. What is the purpose of strain relief on a cord-connected appliance?
A) To prevent pullout
B) To provide grounding
C) To improve appearance
D) To reduce vibration

213. How are the individual cells of a large battery bank typically connected?
A) With bus bars
B) With small wires
C) With alligator clips
D) With solder

214. What must be done after installing a fire alarm system?
A) It must be certified
B) It must be painted
C) It must be silenced
D) It must be disabled

215. What is the purpose of a drip shield on top of an outdoor panel?
A) To deflect rain
B) To provide shade
C) To add structural support
D) To hold the directory card

Answer Key

216. When installing a dimmer switch, what is a key consideration?
A) The load type compatibility
B) The color of the switch
C) The size of the knob
D) The manufacturer's brand

217. How should data cables (e.g., Cat 6) be terminated?
A) With wire nuts
B) With a punch-down tool
C) By twisting them together
D) With electrical tape

218. What is the final step in the electrical inspection process?
A) The rough-in inspection
B) The temporary power inspection
C) The final inspection
D) The plan check

Answer Key

5: Startup, Troubleshooting, and Maintenance

219. Before energizing a new system, what is the most important check?
A) Test for short circuits
B) Verify voltage at the source
C) Check for proper grounding
D) All of the above

220. What tool is used to check for proper circuit rotation in a three-phase system?
A) A voltmeter
B) An ammeter
C) A phase rotation meter
D) An ohmmeter

221. A "megger" or megohmmeter is used to test what?
A) Conductor insulation
B) Circuit amperage
C) Supply voltage
D) Ground resistance

222. If a circuit breaker trips immediately upon being reset, what is the likely cause?
A) An overload
B) A short circuit
C) A loose connection
D) A bad breaker

223. Flickering lights can be a sign of what electrical problem?
A) A loose connection
B) High voltage
C) A grounded neutral
D) An oversized breaker

224. If a receptacle shows 120V from hot to neutral, but 0V from hot to ground, what is the issue?
A) A bad receptacle
B) A missing ground
C) A reversed polarity
D) A faulty breaker

225. What is the first step in troubleshooting a dead circuit?
A) Replace all outlets
B) Check the circuit breaker
C) Rewire the circuit
D) Call the power company

226. What tool is used to measure current without breaking the circuit?
A) A voltmeter
B) An ohmmeter
C) A clamp-on ammeter
D) A continuity tester

227. In a PV system, what does a lower than expected voltage from a string indicate?
A) A faulty module
B) A bad inverter
C) Too much sun
D) High temperatures

228. How is the performance of a generator typically tested under load?
A) With a resistive load bank
B) By plugging in a few lights
C) By checking the fuel level
D) By measuring the exhaust temp

Answer Key

229. What is the purpose of an infrared or thermal scan of electrical equipment?
A) To detect loose connections
B) To measure voltage
C) To check for grounding
D) To identify the manufacturer

230. A continuity test is used to check for what?
A) A complete circuit path
B) The correct voltage
C) The amount of current
D) The insulation resistance

231. When a GFCI trips, what does it indicate?
A) A ground fault
B) An overload
C) A short circuit
D) A power surge

232. If a motor is humming but not starting, what could be the problem?
A) A faulty start capacitor
B) Incorrect voltage
C) A bad connection
D) All of the above

233. What is the best way to locate an underground cable?
A) With a shovel
B) With a cable locator
C) By dowsing rods
D) By guessing

234. In an energy storage system, what is a common maintenance task?
A) Checking battery terminals
B) Painting the enclosure
C) Replacing the inverter
D) Cleaning the fan

235. Before working on any electrical component, what is the first and most critical step?
A) Put on gloves
B) Verify it is de-energized
C) Get a new part
D) Tell a coworker

236. What does a "no-load" test on a transformer check?
A) The secondary voltage
B) The primary current
C) The winding resistance
D) The core losses

237. If an AFCI breaker trips, what type of fault does it indicate?
A) An arc fault
B) A ground fault
C) An overload
D) A phase loss

238. What is a common cause of high energy bills related to the electrical system?
A) Inefficient lighting
B) A faulty meter
C) An unbalanced load
D) Loose connections

Answer Key

239. How do you test a smoke detector to ensure it is working?
A) Use the test button
B) Blow smoke at it
C) Light a match under it
D) Unplug and replug it

240. In a solar installation, what is a key part of the commissioning process?
A) Verifying system output
B) Washing the panels
C) Taking pictures for marketing
D) Registering the warranty

241. What is the proper procedure for replacing a faulty circuit breaker?
A) Turn off main breaker first
B) Use a bigger breaker
C) Use a different brand
D) Do it with the power on

242. A voltage tester that reads 240V between two hot wires and 120V from each hot to neutral indicates what type of system?
A) 120/240V single-phase
B) 120/208V three-phase
C) 277/480V three-phase
D) 240V delta

243. When troubleshooting a lighting contactor, what is the first thing to check?
A) The coil voltage
B) The bulb wattage
C) The color of the contactor
D) The size of the enclosure

244. What is the most common reason for a motor to overheat?
A) Overloading
B) Incorrect voltage
C) Poor ventilation
D) All of the above

245. How would you find a break in an electric fence wire?
A) With a voltmeter
B) With a fence fault finder
C) By touching it carefully
D) By visual inspection

246. What is a key maintenance task for a standby generator?
A) Changing the oil
B) Painting the housing
C) Replacing the battery
D) A and C

247. When starting up a new motor, it is important to check the what?
A) The full-load amperage
B) The color of the motor
C) The noise level
D) The manufacturer's website

248. A "hot spot" on a thermal image of a panel indicates what?
A) A potential problem
B) Normal operation
C) A grounded conductor
D) A spare breaker

Answer Key

249. If you measure continuity between the hot and ground wires of a circuit, what does it mean?
A) The circuit is good
B) There is a short circuit
C) The circuit is open
D) The ground is missing

250. How often should a GFCI device be tested?
A) Daily
B) Weekly
C) Monthly
D) Annually

251. When troubleshooting a PV system, what is an IV curve tracer used for?
A) To test panel performance
B) To find the inverter
C) To measure wire length
D) To clean the modules

252. If a battery in a storage system is swollen, what should be done?
A) It should be charged
B) It should be replaced
C) It should be cooled down
D) It should be ignored

253. What is the primary purpose of a maintenance log for electrical equipment?
A) To track work performed
B) To record energy usage
C) To list replacement parts
D) To satisfy the client

254. When a fluorescent light is slow to start, what is a likely culprit?
A) The ballast
B) The bulb
C) The switch
D) The wiring

255. How do you check if a fuse is blown without removing it from the circuit?
A) Measure voltage across it
B) Shake it to hear a rattle
C) Look for discoloration
D) Measure its temperature

256. In a three-phase system, a "single-phasing" condition can damage what?
A) The lighting
B) The receptacles
C) The motors
D) The panelboard

257. What is the first step in replacing a wall switch?
A) Turn off the power
B) Remove the cover plate
C) Buy a new switch
D) Loosen the terminal screws

258. A ground fault is a connection between a hot wire and what?
A) The neutral wire
B) Another hot wire
C) A grounded surface
D) An ungrounded surface

Answer Key

259. What is a common problem with aluminum wiring terminations?
A) They can become loose
B) They are too tight
C) They corrode easily
D) A and C

260. If a generator fails to start, what is the first and simplest thing to check?
A) The fuel level
B) The spark plug
C) The battery
D) The oil level

261. What does the term " commissioning" refer to in a large electrical installation?
A) The final cleanup
B) The system verification process
C) The payment schedule
D) The project kickoff meeting

262. A "wobbling" ceiling fan is often caused by what?
A) Unbalanced blades
B) A loose mounting box
C) Incorrect wiring
D) A faulty switch

263. When troubleshooting, what does the term "divide and conquer" mean?
A) Splitting the circuit
B) Calling for help
C) Replacing all parts
D) Ignoring the problem

264. What is a key maintenance task for a large transformer?
A) Checking oil level and temperature
B) Painting the cooling fins
C) Tightening the mounting bolts
D) Polishing the nameplate

265. What is the primary cause of electrical noise or "hum" from a panel?
A) Loose laminations
B) A vibrating breaker
C) An overloaded circuit
D) All of the above

266. A "floating neutral" can cause what problem in a system?
A) Over- and under-voltages
B) Breakers to trip
C) Lights to dim
D) No power at all

Answer Key

6: Safety

267. What is the primary purpose of a lockout/tagout (LOTO) procedure?
A) To prevent accidental startup
B) To identify equipment
C) To schedule maintenance
D) To track tool inventory

268. Who is authorized to remove a lockout/tagout device?
A) Any qualified electrician
B) The person who applied it
C) The job site supervisor
D) The building owner

269. What piece of personal protective equipment (PPE) is essential for eye safety?
A) Hard hat
B) Safety glasses
C) Steel-toed boots
D) Hearing protection

270. When working near potential arc flash hazards, what type of clothing should be worn?
A) Cotton or wool
B) Arc-rated (AR) clothing
C) Synthetic fabrics
D) Polyester blends

271. What is the "two-person rule" in electrical safety?
A) Two people to lift heavy items
B) Two people present for hazardous work
C) Two people to sign a permit
D) Two people to inspect the work

272. Before using a portable power tool, what should you inspect?
A) The cord and plug
B) The housing for cracks
C) The safety guards
D) All of the above

273. When using a ladder, it should be placed at a stable angle, approximately what ratio?
A) 1:1
B) 2:1
C) 3:1
D) 4:1

274. What is a primary hazard when working in a confined space?
A) Poor lighting
B) Hazardous atmosphere
C) Loud noises
D) Uncomfortable temperature

275. What information is found on a Safety Data Sheet (SDS)?
A) Product pricing
B) Chemical hazard information
C) Installation instructions
D) Manufacturer's warranty

276. What is the proper way to treat an electrical burn?
A) Apply ice immediately
B) Cover with a clean, dry dressing
C) Apply ointment or cream
D) Break any blisters

Answer Key

277. A "tagout" device provides what level of protection?
A) A physical restraint
B) A warning message
C) An audible alarm
D) An electrical shock

278. What is the minimum level of PPE required for testing live circuits below 50V?
A) Full arc flash suit
B) Insulated gloves
C) Safety glasses
D) Usually no PPE required

279. How should a fire involving live electrical equipment be extinguished?
A) With water
B) With a Class A extinguisher
C) With a Class C extinguisher
D) With a fire blanket

280. What is a key safety practice when working on a roof?
A) Using fall protection
B) Working during the day
C) Wearing dark clothing
D) Keeping tools in a bucket

281. What is the main danger of asbestos exposure?
A) Skin irritation
B) Lung disease
C) Electric shock
D) Eye damage

282. What does a GFCI do that a standard circuit breaker does not?
A) Detects small current leaks
B) Protects against overloads
C) Handles higher voltages
D) Resets automatically

283. What is the purpose of an "energized electrical work permit"?
A) To authorize live work
B) To order new parts
C) To schedule an outage
D) To pay the utility bill

284. What is a key component of a personal fall arrest system?
A) A hard hat
B) A full-body harness
C) A reflective vest
D) A pair of gloves

285. A tool with a three-prong plug has what safety feature?
A) An equipment ground
B) A double-insulated design
C) A built-in fuse
D) A variable speed motor

286. What is the safest way to cross a trench on a job site?
A) Jump across it
B) Use a designated bridge
C) Walk through it quickly
D) Go around the long way

Answer Key

287. Before digging, what is the first step an excavator must take?
A) Call 811 to locate utilities
B) Sharpen their shovel
C) Get a soil sample
D) Check the weather

288. What is the purpose of "guarding" live parts?
A) To prevent accidental contact
B) To keep them clean
C) To make them look better
D) To reduce energy loss

289. If a coworker receives an electric shock, what is the first thing you should do?
A) Grab them to pull them away
B) Shut off the power source
C) Start CPR immediately
D) Call their emergency contact

290. What is a "qualified person" according to OSHA?
A) Someone with a license
B) Someone with skills and knowledge
C) Someone with many years of experience
D) Someone who owns the company

291. What is the approach boundary for qualified persons to exposed live parts at 480V?
A) 1 foot
B) 3 feet 6 inches
C) 5 feet
D) 10 feet

292. When working with batteries, what is a primary hazard?
A) Acid spills
B) Hydrogen gas
C) Electric shock
D) All of the above

293. A "tailgate" or "toolbox" safety meeting is held for what purpose?
A) To discuss daily job hazards
B) To plan the week's schedule
C) To hand out paychecks
D) To celebrate a project's completion

294. What is the proper way to lift a heavy object?
A) Lift with your back
B) Bend at the waist
C) Lift with your legs
D) Twist as you lift

295. Why should metallic jewelry be removed before working on electrical circuits?
A) It can conduct electricity
B) It can get caught in machinery
C) It can get dirty
D) A and B

296. What is the purpose of de-energizing a circuit before working on it?
A) To prevent shock and arc flash
B) To save electricity
C) To let the components cool down
D) To avoid tripping the breaker

Answer Key

297. What is the function of a hard hat?
A) To protect from impacts
B) To shield from the sun
C) To keep hair neat
D) To look professional

298. When inspecting insulated gloves, what are you looking for?
A) The brand name
B) The color
C) Holes or punctures
D) The expiration date

299. What is the primary risk of working with solvents and cleaning agents?
A) They are flammable
B) They can be toxic
C) They can damage equipment
D) A and B

300. The "buddy system" is a good practice when working where?
A) In a confined space
B) At great heights
C) On energized circuits
D) All of the above

301. What is the danger of using a power tool with a frayed cord?
A) It may not work properly
B) It presents a shock hazard
C) It can damage the outlet
D) It voids the warranty

302. What is the "flash protection boundary" in an arc flash analysis?
A) The closest approach distance
B) The point of a curable burn
C) The area of loudest noise
D) The zone of highest voltage

303. What is the purpose of barricade tape on a job site?
A) To mark a hazard area
B) To show property lines
C) To provide decoration
D) To support wiring

304. What is the primary safety concern when working with capacitors?
A) They can hold a charge
B) They are heavy
C) They are fragile
D) They are expensive

305. A safety plan for a job site should identify potential what?
A) Hazards and mitigation
B) Coffee and lunch spots
C) Shortcuts and easy tasks
D) Employee birthdays

306. What is the most important reason for good housekeeping on a job site?
A) To prevent slips, trips, and falls
B) To impress the client
C) To make finding tools easier
D) To keep dust down

Answer Key

307. When must an employer provide PPE to an employee?
A) When hazards are present
B) Only if the employee asks
C) After an accident occurs
D) Never, it's the employee's duty

308. What is the purpose of a fire extinguisher "PASS" acronym?
A) To remember how to use it
B) To describe the extinguisher type
C) To indicate its inspection date
D) To rate its effectiveness

309. Before climbing a pole, what is a critical safety check?
A) Inspect the pole for rot or damage
B) Check the wind speed
C) Ensure your boots are clean
D) Ask for permission

310. What is a potential hazard of lead-acid batteries?
A) They can explode
B) They can leak acid
C) They can produce hydrogen
D) All of the above

311. What is the best practice after completing a lockout/tagout procedure?
A) Attempt to start the equipment
B) Immediately start working
C) Remove the lock for a second
D) Ask a coworker to check it

312. What is the primary function of a fall protection lanyard?
A) To arrest a fall
B) To carry tools
C) To secure a ladder
D) To mark a safe zone

313. What is the safest way to handle a damaged extension cord?
A) Repair it with tape
B) Discard and replace it
C) Continue using it carefully
D) Use it only for low-power tools

314. What is a "hot stick" used for?
A) To test high-voltage lines
B) To start a fire
C) To heat PVC conduit
D) To stir chemicals

315. What is the minimum safe distance from overhead power lines when operating equipment?
A) 5 feet
B) 10 feet
C) 15 feet
D) 20 feet

316. What is the purpose of a "job hazard analysis" (JHA)?
A) To identify and control risks
B) To assign blame after an accident
C) To calculate insurance premiums
D) To estimate project costs

Answer Key

317. Why is it important to have proper ventilation when charging batteries?
A) To dissipate flammable gases
B) To keep the batteries cool
C) To prevent dust accumulation
D) To reduce charging time

318. What is the purpose of wearing rubber-soled boots on a job site?
A) To provide electrical insulation
B) To improve traction
C) To protect from falling objects
D) A and B

319. What is a critical safety rule when working in wet conditions?
A) Use only GFCI-protected circuits
B) Work faster to finish quickly
C) Wear cotton clothing for comfort
D) Avoid drinking water

320. A tag on a LOTO device must clearly identify what?
A) The person who applied it
B) The date it was applied
C) The reason for the lockout
D) All of the above

Answer Key

PART 2: Standard Exam Paper Questions