

CLOSED BOOK  
EXAM  
#1

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_%

CB#1

JOURNEYMAN CLOSED BOOK EXAM #1

1. \_\_\_\_ can be generated.  
  
I. Electricity      II. Electrical energy  
  
a.) I only    **b.) II only**      c.) Both I & II      d.) either I nor II
2. The phenomenon whereby a circuit stores electrical energy is called \_\_\_\_.  
  
a.) Inductance    **b.) Capacitance**      c.) Resistance    d.) Susceptance
3. A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like used as a part of, or in connection with, an electrical installation is \_\_\_\_.  
  
a.) Premises wiring (system)  
b.) Service equipment  
c.) Utilization equipment  
**d.) Equipment**
4. A switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage, is a \_\_\_\_ switch.  
  
a.) By pass isolation    **b.) General use**      c.) Isolating      d.) Transfer

5. The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed is known as \_\_\_\_.

- a.) Ordinary tap joint   b.) Scarf joint   c.) Britannia joint   d.) Bonding

6. An instrument that is used to measure the diameter of a wire or cable to thousandths of an inch is a \_\_\_\_.

- a.) Galvanometer   b.) Micrometer   c.) Hydrometer   d.) Ruler

7. A \_\_\_\_ squirrel cage motor can be started at full voltage.

- I. Design A   II. Design B   III. Design C   IV. Design D

- a.) I only   b.) I & II only   c.) III & IV only   d.) I,II,III or IV

8. A \_\_\_\_ is a braking system for an electric motor.

- I. Friction braking   II. Plugging   III. Dynamic Braking

- a.) I only   b.) III only   c.) I & III only   d.) I,II, or III

9. Rigid metal conduit permitted for wiring a hazardous location if the conduit is threaded and made up wrench tight at least \_\_\_\_ full threads.

- a.) 4   b.) 5   c.) 7   d.) 9

10. A circuit breaker that has purposely introduced into it a delay in the tripping action and which delay decreases as the magnitude of the current increases is a \_\_\_\_ circuit breaker.

- a.) Inverse time   b.) Adjustable   c.) Control vented   d.) Vented power

11. It is intent of this Code that factory installed internal wiring or the conduction of equipment need not be inspected at the time of installation of the equipment, except to \_\_\_\_.

- I. Detect alterations  
II. Detect damage  
III. Detect insulation type

- a.) I only   b.) II only   c.) I & II only   d.) I,II,III

12. A premises wiring system whose power is derived from a source such as a transformer that has no direct connection to the supply conductors originating in another system is a/an \_\_\_\_ system.

- a.) Integrated   b.) Separately derived   c.) Interactive   d.) Isolated

13. Listed or labeled equipment shall be installed, used, or both, in accordance with any instructions included \_\_\_\_.

- I. By the foreman  
II. In the listing or labeling  
III. With the equipment from the manufacturer

- a.) I only   b.) II only   c.) II & III only   d.) I,II,III

14. Where conductors with an ampacity higher than the ampere rating or setting of the overcurrent device are used, the \_\_\_\_ shall determine the circuit rating.

- a.) Conductor ampacity  
b.) Overcurrent device

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- c.) Combined rating
- d.) Derated ampacity

15. \_\_\_\_ are permitted to protect motor branch circuit conductors from overload.

- I. Thermal relays
- II. Inverse time circuit breakers
- III. Time delay fuses

a.) I only    b.) II only    c.) II & III only    d.) I, II, & III

p. The power factor of an incandescent light bulb would be \_\_\_\_.

a.) Unity    b.) 0.7 leading    c.) 0.7 lagging    d.) zero

17. \_\_\_\_ is a pliable raceway.

- I. EMT    II. ENT    III. PVC

a.) I only    b.) II only    c.) I & II only    d.) I, II, & III

18. Flexible cords and cables shall be protected by \_\_\_\_ where passing through holes in covers, outlet boxes, or similar enclosures.

- a. Fitting    II. Bushings    III. Tie wraps

a.) I only    b.) II only    c.) II & III only    d.) I & II only

19. A transformer would most likely have a \_\_\_\_ efficiency.

a.) 60%    b.) 70%    c.) 80%    d.) 90%

20. When alternating current flows through a conductor, there is an inductive action that causes the current in the conductor to

be forced toward the outer surface. The current is greater at the surface than at the center of the conductor, this \_\_\_\_ will cause the resistance in the conductor to increase due to the increased heating of the conductor.

- a.) Capacitive effect    c.) Conductive effect
- b.) Skin effect    d.) Outer effect

21. A value assigned to a circuit or system for the purpose of conveniently designating its voltage class is \_\_\_\_.

- a.) Nominal Voltage    c.) Voltage (of a circuit)
- b.) Voltage to ground    d.) Voltage<sup>2</sup>

22. A type of AC motor that runs at a constant speed and is used for such purposes as an electric clock motor is a \_\_\_\_ motor.

- a.) AC squirrel cage    c.) Wound rotor induction
- b.) AC induction    d.) Synchronous

23. \_\_\_\_ is the resistance at the point of contact of two conductors or one conductor and another surface.

- a.) Conductor resistance
- b.) Contact resistance
- c.) Resistance per M/ft
- d.) Resistance per K/ft

24. \_\_\_\_ is/are classified as a conduit body.

- I. LB fitting    II. FS box    III. LR fitting

a.) I & II only    b.) II only    c.) II & III only    d.) I & III only

25. \_\_\_\_ Raceways are not suitable to enclose conductors that are subject to physical damage.

- a.) Rigid metal conduit      b.) Intermediate metal conduit
- c.) PVC schedule 40      d.) PVC schedule 80

26. A low power factor in an industrial plant is most likely caused by \_\_\_\_.

- a.) Insufficient resistive loads      b.) Insufficient inductive loads
- c.) Excessive resistive loads      d.) Lack of synchronous condenser

27. Where lighting outlets are installed in interior stairways, there shall be a wall switch at each floor level to control the lighting where the difference between floor levels is \_\_\_\_ steps or more.

- a.) Two    b.) Four    c.) Six    d.) Eight

28. A voltage or current that is reversed at regular intervals is called \_\_\_\_ voltage or current.

- I. Direct      II. Steady State      III. Sinusoidal

- a.) I only    b.) II only    c.) III only    d.) none of the these

29. Of the following \_\_\_\_ is a false statement.

- a.) The term kilowatt indicates the measure of power which is all available for work.
- b.) The term kilovolt-amperes indicate the apparent power made up of an energy component and a wattles or induction component.
- c.) In an industrial plant, low power factor is usually due to underloaded induction motors.
- d.) The lower factor of a motor is much greater at partial loads than at full load.

30. It is generally not good practice to supply lights and motors from the same circuit because \_\_\_\_.

- a.) Lamps for satisfactory service must operate within closer voltage limits than motors.
- b.) Overloads and short circuits are more common on motor circuits.
- c.) When motors are started, the large starting current causes voltage drop on the circuit and the lights will blink or burn dim.
- d.) All of these.

31. In general, motors are designed to operate in a maximum ambient temperature of \_\_\_\_ unless specifically designed for a higher temperature.

- a.) 60%    b.) 50%    c.) 45%    d.) 40%

32. A type of single phase motor that can be operated on either ac or dc is a \_\_\_\_ motor.

- a.) Multispeed      c.) Universal
- b.) Capacitor-start      d.) Repulsion-induction

33. For screw shell devices with attached leads, the conductor attached to the screw shell shall be \_\_\_\_ in color.

- a.) White or Gray    b.) Orange    c.) Green    d.) Black

34. Branch circuit conductors shall have an ampacity not less than \_\_\_\_.

- a.) The load increased 125%
- b.) 100% of the load to be served
- c.) 80% of the load to be served
- d.) 125% of the continuous load plus 80% of the noncontinuous load

35. A switch intended for isolating an electric circuit from the



source of power that has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means is a/an \_\_\_\_.

- a.) Isolating switch                      c.) General use switch
- b.) Bypass isolation switch              d.) transfer switch

36. Raceways or cable trays containing electric conductors shall not contain \_\_\_\_.

I. Pipe for steam    II. Tube for air    III. Pipe for water

- a.) I only    b.) II only    c.) III only    d.) I,II, or III

37. Not readily accessible to persons unless special means for access are used is \_\_\_\_.

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- a.) Elevated    b.) Guarded    c.) Isolated    d.) Listed

38. After cutting a conduit to remove the rough edges on both ends, the conduit ends should be \_\_\_\_.

- a.) Sanded    b.) Shaped    c.) Burnished    d.) ground

39. The instrument used to indicate phase relation between current and voltage is the \_\_\_\_.

- a.) Megger    b.) Power factor meter    c.) Voltmeter    d.) Galvanometer

40. To calculate the  $V_a$ , one needs to know the \_\_\_\_.

- a.) Voltage and current                      b.) Impedance and conductance
- c.) Resistance and impedance    d.) Ohms and resistance

41. You have an adjustable trip coil rated at 5 amps on a 200-amp switch. If you want the switch to trip at 120 amps, the trip coil should be set at \_\_\_\_.

- a.) 2amps    b.) 3amps    c.) 4amps    d.) 5amps

42. When an ammeter is disconnected from an in-service current transformer, the secondary terminals of the current transformer must be \_\_\_\_.

- a.) Shorted    b.) Open    c.) Disconnected    d.) Grounded

43. Reactance will cause the current in a circuit to vary only when \_\_\_\_.

- a.) AC current flows    c.) There is no resistance in the circuit
- b.) DC current flows    d.) There is resistance in the circuit

44. Motors of 1/3, 4/4, and 1/8 hp are connected in parallel. Those motors deliver a total of \_\_\_\_.

- a.) 1hp    b.) 7/8hp    c.) 17/24    d.) .07hp

45. Flexible cords and cables shall not be used.

- a.) For wiring of cranes and hoists
- b.) For prevention of the transmission of noise or vibration
- c.) To run through holes in floors
- d.) Simply to facilitate frequent interchange

46. A fixture that weighs more than \_\_\_\_ shall be supported independently of the outlet box.

- a.) 25pounds    b.) 30pounds    c.) 50pounds    d.) 75pounds

47. The force which moves electrons from atom to atom through a closed conducting path is called \_\_\_\_\_.

- a.) Flux    b.) Resistance    c.) Admittance    d.) EMF

48. An advantage of a 240-volt system compared with a 120-volt system of the same wattage is \_\_\_\_\_.

- a.) Reduced voltage drop                      c.) Large currents  
b.) Reduced power use                      d.) Lower electrical pressure

49. A resistor has an indicated tolerance error of 10 percent. With a value of 1,000 ohms, the minimum resistance the resistor may have is \_\_\_\_\_.

- a.) 1,000ohms    b.) 990ohms    c.) 910ohms    d.) 900ohms

50. A transformer has a primary voltage of 120 volts and a secondary voltage of 480 volts. If there are 40 turns on the primary, the secondary contains \_\_\_\_\_.

- a.) 10turns              b.) 40turns              c.) 120turns              d.) 160turns

CLOSED BOOK  
EXAM  
#2

CB#2

JOURNEYMAN CLOSED BOOK EXAM #2      One Hour Time  
Limit

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_%

1. Frequency is measured in \_\_\_\_\_.  
a.) Hertz      b.) Voltage      c.) RPM      d.) Foot pounds
2. Which of the following would cause the most power to be dissipated in the form of heat?  
a.)  $X_L$       b.)  $X_C$       c.) Resonance      d.) Resistance
3. \_\_\_\_\_ is the combined opposition to current by resistance and reactance.  
a.) Q      b.) Z      c.)  $X_C$       d.)  $I^2R$
4. An electrician in the industry would first check the \_\_\_\_\_ to correct a low power factor.  
a.) Resistance      b.) Hysteresis      c.) Inductive load      d.) Reactance
5. Single conductor cable runs within a building are generally more common than multicable runs because \_\_\_\_\_.  
a.) Of conduit fill      c.) The splicing is easier  
b.) Of the temperature      d.) The weight is evenly distributed
6. \_\_\_\_\_ has the highest electrical breakdown strength and

longest life over all other materials used for insulation.

- a.) Rubber insulation      c.) Impregnated paper
- b.) Woven cloth            d.) Thermoplastic

7. Voltage in a generator is produced by \_\_\_\_\_.

- a.) Resonance   b.) Pressure      c.) Cutting lines of force   d.) Chemical

8. To adjust the voltage generated by a constant speed DC generator, you would change the \_\_\_\_\_.

- a.) Stator            b.) Slip rings   c.) Brushes      d.) Field current

9. The generator which is best suited for electroplating power is a \_\_\_\_\_ generator.

- a.) Slip-phase   b.) Six pole   c.) Separately excited   d.) Compound

10. To change the rotation of a DC motor you would \_\_\_\_\_.

- a.) Reverse capacitor leads                      c.) Reverse commutator
- b.) Reverse A1 and A2                      d.) Reverse F1 and F2

11. Frequency is determined by the \_\_\_\_\_ of an alternator.

- I. Size
- II. Number of poles
- III. Voltage
- IV. Rotation speed of armature

- a.) II only      b.) II and III only      c.) II and IV only      d.) I,II, and IV only

12. An example of a "made" electrode would be \_\_\_\_\_.

- a.) Metallic water pipe                      c.) Concrete-encased
- b.) Metal frame of a building              d.) Ground rod

13. Illumination is measured in \_\_\_\_\_.

- a.) Luminous flux   b.) Lumens      c.) Temperature              d.) Foot candles

14. A motor enclosure designed and constructed to contain sparks or flashes that may ignite surrounding gas or vapor is called \_\_\_\_\_.

- a.) Non-ventilated
- b.) Encapsulated
- c.) Explosion proof
- d.) Water cooled

15. The output of a 3Ø transformer is measured in units called \_\_\_\_\_.

- a.) Watt      b.) Volt-amps   c.) Impedance              d.) Turns-ratio

16. Three horsepower is equivalent to \_\_\_\_\_ watts.

- a.) 764      b.) 2292              c.) 2238                      d.) none of these
- CB#2

17. Sometimes copper conductors are coated (tinned) to help prevent \_\_\_\_\_.

- a.) Higher Resistance      c.) Capacitive Reactance
- b.) Mechanical damage   d.) Chemical reaction

18. A wheatstone bridge is used to measure \_\_\_\_\_ resistance.

- I. Low      II. Medium      III. High

- a.) I only   b.) II and III only   c.) III only   d.) II only

19. To check voltage to ground, you would check from \_\_\_\_\_.

- a.) The breaker to the cabinet
- b.) Hot to neutral
- c.) The breaker to the grounding terminal
- d.) All of these

20. The inductive action that causes current flow on the outside surface of a conductor is known as the \_\_\_\_\_.

- a.) Corona effect
- b.) Skin effect
- c.) Electrolytic action
- d.) DC reactance

21. Electrical continuity is required by the electrical code for metallic conduit.

- a.) To assure equipment grounding
- b.) To reduce static electricity
- c.) To reduce inductive heat
- d.) To trace electrical wiring

22. The Resistance of an open circuit is equal to \_\_\_\_\_.

- a.) Less than one ohm
- b.) Zero
- c.) Infinity
- d.) None of these

23. An electrical timer switch for lighting is normally connected in \_\_\_\_\_ with the lighting circuit being controlled.

- a.) Series
- b.) Parallel
- c.) Sequence
- d.) Tandem

24. The definition of ampacity is \_\_\_\_\_.

- a.) The current-carrying capacity of conductors expressed in volt-amps

- b.) The current-carrying capacity expressed in amperes
- c.) The current-carrying capacity of conductors expressed in wattage
- d.) The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating

25. The grounded conductor would connect to the \_\_\_\_\_ of a lampholder.

- a.) Screw shell
- b.) Filament
- c.) Base contact
- d.) Lead in wire

26. A three-phase, 6-pole AC alternator 34 kva, on a Y-connected system. During one complete mechanical rotation (360°) will have \_\_\_\_\_ electrical rotations.

- a.) 1
- b.) 1 ½
- c.) 3
- d.) 12

27. The voltage per turn of the primary of a transformer is \_\_\_\_\_ the voltage per turn of the secondary.

- a.) More than
- b.) The same as
- c.) Less than
- d.) None of these

28. A single concrete-encased electrode shall be augmented by one additional electrode if it does not have a resistance to ground of \_\_\_\_\_

- a.) 28 ohms
- b.) 30 ohms
- c.) 50 ohms
- d.) Not a Code requirement

29. Which of the following is not true about alternating current?

- a.) Develops eddy current
- b.) It can be transformed
- c.) Is suitable for charging batteries
- d.) interference with communication

lines

30. On a 120V 1Ø circuit, grounding fault protection for personnel operates on the principal of unbalanced current between \_\_\_\_\_.

- a.) The grounded and ungrounded conductor
- b.) The ungrounded conductors
- c.) The grounding conductor and the neutral conductor
- d.) The service disconnect and the branch circuit

CB#2

31. In a 3Ø circuit, how many electrical degrees separate each phase?

- a.) 360      b.) 180      c.) 120      d.) 90

32. \_\_\_\_\_ duty is a type of service where both the load and the time intervals may have wide variations.

- a.) Continuous      b.) Periodic      c.) Intermittent      d.) Varying

33. The definition of ambient temperature is \_\_\_\_\_.

- a.) The temperature of the conductor
- b.) The insulation rating of the conductor
- c.) The temperature of the area surrounding the conductor
- d.) The maximum heat the insulation can be used within

34. As the power factor of a circuit is increased \_\_\_\_\_.

- a.) Reactive power is decreased      c.) Reactive power is increased
- b.) Active power is decreased      d.) Both active and reactive power are increased

35. Tinning rubber insulated twisted cable is done to \_\_\_\_\_.

- a.) Make the strands stronger
- b.) Prevent chemical reactions between the copper and the rubber
- c.) Increase the resistance
- d.) Meet NEMA requirements

36. A negatively charged body has \_\_\_\_\_.

- a.) Excess of the electrons      c.) Deficit of electrons
- b.) Excess of neutrons      d.) Deficit of neutrons

37. A fluorescent light blinks "on" and "off" repeatedly many times in time \_\_\_\_\_.

- a.) Cause the fuse to blow      c.) Cause the wire to melt
- b.) Cause the switch to wear out      d.) Result in damage to the ballast

38. Electrical appliances are connected in parallel because it \_\_\_\_\_.

- a.) Makes the operation of appliances independent of each other
- b.) Results in reduced power loss
- c.) Is a simple circuit
- d.) Draws less current

39. What relationship determines the efficiency of electrical equipment?

- a.) The power input divided by the output
- b.) The volt-amps x the wattage
- c.) The va divided by the pf

d.) The power output divided by the input

40. What is the formula to find watt hour?

- a.)  $E \times T \times 1000$    b.)  $I \times E \times T$    c.)  $I \times E \times T/1000$    d.)  $E \times T \times \emptyset/1000$

41. Of the six ways of producing emf, which method used the least?

- a.) Pressure   b.) Solar   c.) Chemical action   d.) Friction

42. The voltage produced by electromagnetic induction is controlled by \_\_\_\_\_.

- a.) The number of lines of flux cut per second  
b.) Eddy currents  
c.) The size of the magnet  
d.) The number of turns

43. As the power factor of a circuit is increased \_\_\_\_\_.

- a.) Reactive power is decreased  
b.) Active power is decreased  
c.) Reactive power is increased  
d.) Both active and reactive power are increased

44. The breakdown voltage of insulation depends upon \_\_\_\_\_ value of AC voltage.

- a.) R.M.S.   b.) Effective   c.) Peak   d.) 1.732 of peak

45. The AC system is preferred to the DC system because \_\_\_\_\_.

- a.) DC voltage cannot be used for domestic appliances  
b.) DC motors do not have speed control  
c.) AC voltages can be easily changed in magnitude  
d.) High-voltage AC transmission is less efficient

46. DC series motors are used in applications where \_\_\_\_\_ is required.

- a.) Constant speed   b.) High starting torque  
c.) low no-load speed   d.) None of these

47. Basically all electric motors operate on the principle of repulsion or \_\_\_\_\_.

- a.) Magnetism   b.) Induction   c.) Resistance   d.) Capacitance

48. A capacitor opposes \_\_\_\_\_.

- a.) Both a change in voltage and current  
b.) Change in current   c.) Change in voltage  
d.) none of these

49. The armature current drawn by any DC motor is proportional to the \_\_\_\_\_.

- a.) Motor Speed   c.) flux required  
b.) Voltage Applied   d.) Torque applied

50. The greatest voltage drop in a circuit will occur when the \_\_\_\_\_ the current flow through that part of the circuit.

- a.) Greater   b.) Slower   c.) Faster   d.) Lower

CB#2

CLOSED BOOK  
EXAM  
#3

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_%

CB#3

JOURNEYMAN CLOSED BOOK EXAM #3    One Hour Time Limit

1. The electromotive force required to cause a current to flow may be obtained \_\_\_\_.  
I. Thermally    II. Mechanically    III. Chemically  
a.) I only    b.) I & III only    c.) II & III only    d.) I, II, & III
2. Which of the following is not true?  
a.) A fluorescent fixture is more efficient than an incandescent fixture.  
b.) Room temperature has an affect on the operation of a fluorescent lamp.  
c.) Fluorescent fixtures have a good power factor with the current leading the voltage.  
d.) The life of a fluorescent bulb is affected by starting and stopping.
3. Resistance opposes the flow of current at a circuit and is measured in \_\_\_\_\_.  
a.) Farads    b.) Joules    c.) Ohms    d.) Henrys



4. Which of the following is true?

- a.) Wooden plugs may be used for mounting electrical equipment in concrete.
- b.) The high-leg conductor of a 4-wire delta is identified blue in color.
- c.) The minimum size service permitted by the Code for a residence is 100 amps.
- d.) The ungrounded conductor is connected to the screw shell of a lampholder.

5. Multiple start buttons in a motor control circuit are connected in \_\_\_\_\_.

- a.) Series   b.) Parallel   c.) Series-parallel   d.) none of these

6. Which of the following if not true?

- a.) Feeder demand factors are applicable to household electric ranges.
- b.) A green colored conductor can be used as an underground circuit conductor.
- c.) Insulated conductors #6 or smaller shall be white or gray, no marking tape permitted.
- d.) All joints or splices must be electrically and mechanically secure before soldering.

7. Special permission is \_\_\_\_\_.

- a.) Granted by the electrical foreman on the job.
- b.) Verbal permission by the inspector.
- c.) Given only once on one blueprint change request.
- d.) The written consent of the authority having jurisdiction.

8. One million volts can also be expressed as \_\_\_\_\_.

- a.) 1 millivolt      b.) 1kilovolt      c.) 1megavolt      d.) 1microvolt

9. Resistance in a circuit may be \_\_\_\_\_.

- I. Resistance of the conductors      II. Resistance due to imperfect contact

- a.) I only   b.) II only      c.) Both I & II      d.) Neither I nor II

10. Which of the following is not true?

- a.) All receptacles on 15 and 20 amp branch circuits must be of the grounding type.
- b.) Splices and joints shall be covered with an insulation equivalent to the conductor insulation.
- c.) The size of the conductor determines the rating of the circuit.
- d.) All 15 and 20 amp receptacles installed in a dwelling bathroom shall have GFCI protection.

11. A magnetic field around a conductor.

- a.) Whenever current flows in the wire, provided the wire is made of magnetic material

CB#3

- b.) Only when the wire carries a large current
- c.) Whenever current flows in the conductor
- d.) Only if the conductor is formed into a loop

12. A universal motor has brushes that ride on the \_\_\_\_\_.

- a.) Commutator   b.) Stator      c.) Inter-pole      d.) Field

13. How many kw hours are consumed by 25-60 watt light bulbs burning 5 hours in a 120 v circuit?

- a.) 1.5      b.) 180      c.) 7.5      d.) 75

14. A dynamo is \_\_\_\_\_.

- a.) A pole line insulator
- b.) A tool used to test dielectric strength
- c.) A meter used for checking the R.P.M. of a motor
- d.) A machine for converting mechanical energy

15. Which of the following is/are generally used for field magnets?

I. Copper II. Steel III. Wrought iron

- a.) I and II only   b.) I and III only   c.) II and III only   d.) I, II, and III

16. The difference between a neutral and a grounded circuit conductor is \_\_\_\_\_.

- a.) Only a neutral will have equal potential to the ungrounded conductor
- b.) Only a neutrals outer covering is white or natural gray
- c.) Only a neutral carries unbalanced current
- d.) There is no difference

17. The normal rotation motor is \_\_\_\_\_ facing the front of the motor. (The front of a motor is the end opposite the shaft).

- a.) Clockwise   b.) Counter clockwise

18. A function of a relay is to \_\_\_\_\_.

- a.) Turn on another circuit
- b.) Produce thermal electricity
- c.) Limit the flow of circuits
- d.) Create a resistance in the winding

19. Which of the following is not true?

- a.) It is an electrical impossibility to have a circuit with only inductive reactance because the metallic wire has a resistance.
- b.) The voltage of a circuit is the greatest effective difference of potential that exists between any two conductors of a circuit.
- c.) The current is said to lag the voltage in a circuit that has only capacitive reactance.
- d.) Power factor is the phase displacement of current and voltage in an AC circuit.

20. Unity power factor, which means that the current is in phase with the voltage, would be \_\_\_\_\_.

- a.) .50   b.) .80   c.) 0.10   d.) 1.0

21. Rheostat and potentiometers are types of \_\_\_\_\_ resistors.

- a.) Film   b.) Variable   c.) Fixed   d.) Wirewound

22. A laminated pole is \_\_\_\_\_.

- a.) One built up layers or iron sheets, stamped from sheet metal and insulated
- b.) Used in transmission lines over 100kv
- c.) A pole soaked in creosote
- d.) Found in the western part of the U.S.A.

23. Which of the following is true?

- a.) Conductors of different systems may not occupy the same enclosure.
- b.) Knife switches should be mounted in a horizontal position.
- c.) 75 amps is a standard size fuse.
- d.) Circuits are grounded to limit excess voltage to ground, which might occur from lighting or exposure to other higher voltage

sources.

CB#3

24. Electrical power is a measure of \_\_\_\_\_.

- a.) Work wasted
- b.) Voltage
- c.) Rated which work is performed
- d.) Total worker performed

25. What percentage of the maximum (peak) voltage is the effective (R.M.S.) voltage?

- a.) 100%
- b.) 70.7%
- c.) 63.7%
- d.) 57.7%

26. A low factor is commonly caused by \_\_\_\_\_.

I. Induction motors II. Synchronous motors III. Fluorescent lights

- a.) III only
- b.) II and III only
- c.) I and III only
- d.) I, II, and III

27. Which of the following is not true?

- a.) Conduit painted with enamel cannot be used outdoors.
- b.) All AC phase wires neutral and equipment grounding conductors if used must be installed in the same raceway.
- c.) PVC shall have a minimum burial depth of 24".
- d.) EMT raceway can be installed in an air conditioning-space heating duct.

28. Which of the following is not true?

- a.) Equal currents flow in the branches of parallel circuits.
- b.) The total resistance of a parallel circuit is less than the smallest resistor in the circuit.
- c.) The total current in a parallel circuit is the sum of the branch currents.

d.) In a parallel circuit, there is more than one path for the current flow.

29. Hysteresis is \_\_\_\_\_.

- a.) The tool used to read the specific gravity of a battery
- b.) The lagging of magnetism, in a magnetic metal, behind the magnetizing flux which produces it.
- c.) The opposite of impedance.
- d.) None of these

30. The electric pressure of a circuit would be the \_\_\_\_\_.

- a.) Voltage
- b.) Amperage
- c.) Resistance
- d.) Wattage

31. Permeability is \_\_\_\_\_.

- a.) The opposite of conductance.
- b.) A measure of the ease with which magnetism passes through any substance
- c.) The total resistance to current flow
- d.) The liquid substance in a battery

32. The Wheathstone bridge method is used for accurate measurements of \_\_\_\_\_.

- a.) Voltage
- b.) Amperage
- c.) Resistance
- d.) Wattage

33. When a circuit breaker is in the OPEN position

- I. You have a short in the ungrounded conductor
- II. You have a short in the grounded conductor

- a.) I only
- b.) II only
- c.) Either I or II
- d.) Both I and II

34. In solving series parallel circuits, generally you would \_\_\_\_\_.

- a.) Treat it as a series circuit
- c.) Assume that all leads are

equal

b.) Reduce it to its simplest formd.) Treat it as a parallel circuit

35. A commutator is \_\_\_\_\_.

- a.) A ditching machine
- b.) The inter-poles of a generator
- c.) A device for causing the alternating currents generated in the armature to flow in the same direction in the external circuit
- d.) A transformer with a common conductor

36. Which of the following is true?

a.) EMT may be threaded

CB#3

- b.) The "white" colored conductor connected to the silver colored post on a duplex receptacle on a 120V two-wire branch circuit is called the "neutral" conductor.
- c.) Plastic water pipe is approved to be used for electrical conduit.
- d.) The screw shell of a lamp holder may support a fixture weighing 6 pounds.

37. To fasten a box to a terra cotta wall you should use which of the following?

a.) Wooden plug b.) Lag bolt c.) Expansion bolt d.) Toggle bolt

38. If a 240 volt heater is used on 120 volts, the amount of heat produced will be \_\_\_\_\_.

- a.) Twice as great
- b.) Four times as great

c.)  $\frac{1}{4}$  as much

d.) The same

39. Which of the following about a strap wrench is/are true?

- I. You can turn pipe using one hand
- II. Use in a tight corner
- III. Use on different sizes of pipe

a.) I only b.) II only c.) III only d.) I, II, and III

40. When soldering a joint, the flux is used to \_\_\_\_\_.

- a.) Keep the wire cool c.) Lubricate the joint
- b.) Keep the surface clean d.) maintain a tight connection

41. The transferring of electrons from one material to another would be \_\_\_\_\_.

- a.) Electrochemistry
- b.) Static electricity
- c.) Solar electricity
- d.) Piezoelectricity

42. A minimum thickness of \_\_\_\_\_ inch/inches of concrete over conduits and raceways should be used to prevent cracking.

a.) 1 b.) 2 c.) 3 d.) 4

43. Wire connectors are generally classified as \_\_\_\_\_ type (s).

- I. Thermal II. Pressure

a.) I only b.) II only c.) Both I and II d.) Neither I nor II

44. One of the disadvantages of indenter or crimp connectors is \_\_\_\_\_.

- a.) They must be re-criped at each annual maintenance inspection
- b.) That special tools are required to make the joint
- c.) Eventually they will loosen
- d.) They can only be used copper conductors

45. The usual service conditions under which a transformer should be able tp carry its rated load are \_\_\_\_\_.

- I. At rated secondary voltage or not in excess of 105% of the rated value
- II. At rated frequency
- III. Temperature of the surrounding cooling air at no time exceeding 40°C (104°F) and average temperature of the surrounding cooling air during any 24-hour period not exceeding 30°C (86°F)

- a.) I only    b.) II only    c.) III only    d.) I, II, and III

46. Which of the following is not true?

- a.) An autotransformer may be used as part of the ballast for lighting circuits.
- b.) A branch circuit can never be supplied through an autotransformer.
- c.) The losses of the autotransformer are less than those of a two-coil transformer.
- d.) Autotransformers may be used as starting compensators for AC motors.

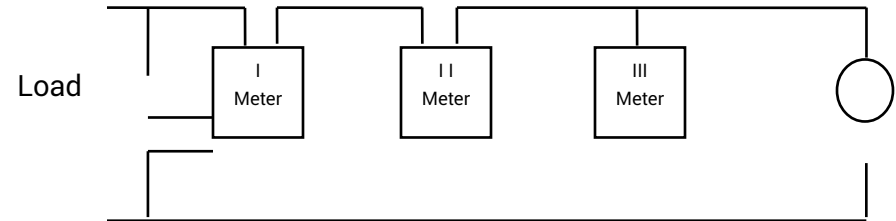
47. Conductors supplying two or more motors shall have an ampacity equal to the sum of the full-load current rating of all the motors plus \_\_\_\_\_% of the highest rated motor in the group.

- a.) 25    b.) 80    c.) 100    d.) 125

48. The symbol for a wye connection is \_\_\_\_\_.

- a.)  $\Sigma$     b.)  $\Delta$     c.)  $\emptyset$     d.) Y

49. Which of the following meters is a wattmeter?



- a.) I only    b.) II only    c.) III only    d.) I, II, and III

50. The voltage of a circuit is best defined as \_\_\_\_\_.

- a.) The potential between two conductors.
- b.) The greatest difference of potential between two conductors.
- c.) The effective difference of potential between two conductors.
- d.) The average RMS difference of potential between any two conductors.

50 QUESTIONS  
TIME LIMIT – 1 HOUR

SCORE\_\_\_\_%

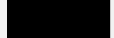
JOURNEYMAN CLOSED BOOK EXAM #4    One Hour Time Limit

-

- a.) Wattmeter    b.) Ammeter    c.) Ohmmeter    d.) Voltmeter

5. Concrete, brick or tile walls are considered as being \_\_\_\_\_.

- a.) Isolated locations    b.) Insulator    c.) Grounded    d.) Dry

6.  Is the symbol for a \_\_\_\_\_ panel?

- a.) Power    b.) Wall-mounted    c.) Lighting    d.) Surface-mounted

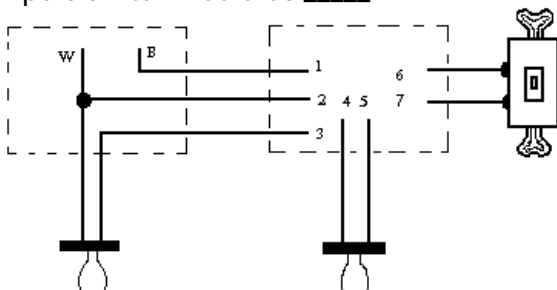
7. A corroded electrical connection \_\_\_\_\_.

- a.) Decreases the voltage drop  
b.) Decreases the resistance of the connection  
c.) Increases the resistance at the connection  
d.) Increases the ampacity at the connection

8. An AC ammeter or voltmeter is calibrated to read RMS values; this means the meter is reading the \_\_\_\_\_ value.

- a.) Maximum    b.) Peak    c.) Average    d.) Effective

9. The correct connection for the two 120 volt lights to the single pole switch would be \_\_\_\_\_.



- a.) 1-4 2-6 3-5-7    b.) 1-6 2-5 3-4-7    c.) 1-7 2-5-6 3-4    d.) 1-5 2-6-7 3-4

10. The location of a wall receptacle outlet in the bathroom of a dwelling shall be installed \_\_\_\_\_.

- a.) The Code does not specify the location  
b.) Adjacent to the toilet  
c.) With 36" of outside edge of basin  
d.) Across from the shower

11. On a delta three-phase four-wire secondary, how much hot wires may use the common neutral?

- a.) 1    b.) 2    c.) 3    d.) 4

12. It shall be permissible to apply a demand factor of \_\_\_\_\_ to the nameplate-rating load of four or more appliances fastened in place served by the same feeder in a dwelling.

CB#4

- a.) 70%    b.) 75%    c.) 60%    d.) 80%

13. Insulated nonmetallic boxes are made of \_\_\_\_\_.

- I. Polyvinyl chloride    II. Bakelite    III. Bower-Barff lacquer  
a.) I only    b.) II only    c.) I and II only    d.) I, II, and III

14. Tungsten-filament lamps can be used on \_\_\_ circuits.

- a.) AC      b.) DC      c.) AC and DC      d.) none of these

15. An overcurrent protective device with a circuit fusible part that is heated and severed by the passage of overcurrent through it is called a \_\_\_\_\_.

- a.) Current-limiter    c.) Circuit Breaker  
b.) Fuse                d.) Thermal overload

16. The service conductors between the terminal of the service equipment and a point usually outside the building, clear of the building walls, where joined by tap or splice to the service drop is called the \_\_\_\_\_.

- a.) Service drop                                      c.) Service equipment  
b.) Service-entrance conductors          d.) none of these

17. If you need to know the provisions for the installation of storage batteries, you would refer to Article \_\_\_\_ of the Code.

- a.) 225      b.) 445                      c.) 460                      d.) 480

18. A chain wrench can be used \_\_\_\_\_.

- I. With one hand after the chain is around the conduit.
- II. In confined places and close to walls.
- III. For all sizes of conduit.

- a.) I and II only   b.) I and III only   c.) II and III only   d.) I, II, and III

19. To cut rigid conduit you should \_\_\_\_\_.

- a.) Use 3 wheel pipe cutter  
ream the end
- c.) Use hack saw and

b.) Use a cold chisel and ream the ends d.) order it cut to size

20. A fixture that weighs more than \_\_\_\_ pounds shall be supported independently of the outlet box.

- a.) 25      b.) 30      c.) 35      d.) 50

21. Is it permissible to install direct current and alternating current conductors in the same outlet outbox?

- a.) Yes, if insulated for the maximum voltage of any conductor

- b.) No, Never  
c.) Yes, if the ampacity is the same for both conductors

- d.) Yes, In dry places

22. Electrical equipment shall be installed \_\_\_\_\_.

- a.) Better than minimum Code allows
- b.) According to the local Code when more stringent than the N.E.C.
- c.) According to the N.E.C. regardless to the local Code.
- d.) According to the local Code when less stringent than the N.E.C.

23. Voltage drop in a wire is \_\_\_\_.

- a.) The wire resistance times the voltage insulation  
b.) A percentage of the applied voltage  
c.) A function of insulation  
d.) Part of the load voltage

24. Conductors shall not installed in locations where the operating temperature will exceed that specified for the type of \_\_\_\_\_ used.



- a.) Connectors    b.) Protection    c.) Insulation    d.) Wiring

25. Galvanized conduit has a finish exterior and interior of \_\_\_\_.

- a.) Lead                      b.) Copper      c.) Nickel      d.) Zinc

26. Which of the following is the best type of saw to cut a 3" diameter hole through ½" plywood?

- a.) Circular saw    b.) Saber saw    c.) Hack saw    d.) Cross-cut saw

CB#4

27. Which of the following machine screws has the smallest diameter?

- a.) 6-32 x 1"      b.) 10-32 x ¾"      c.) 8-32 x ½"      d.) 10-24 x 3/8"

28. Which of the following is the most important factor contributing to an electrician's safety on the job?

- a.) Work at a slow pace                      c.) Be alert at all times  
b.) Always wear leather gloves    d.) Never be late for break

29. A cone-quarter bend in a raceway is equivalent to an angle of \_\_\_\_ degrees.

- a.) 90      b.) 45                      c.) 25                      d.) 180

30. A 3Ω, a 6Ω, a 9Ω and a 12Ω resistor are connected in parallel, which resistor will consume the most power?

- a.) 3Ω      b.) 6Ω                      c.) 9Ω                      d.) 12Ω

31. Listed ceiling (paddle) fans that do not exceed \_\_\_\_ pounds in weight, with or without accessories, shall be permitted to be supported by outlet boxes identified for such use.

- a.) 35      b.) 45                      c.) 50                      d.) 60

32. The best way to lay out a 40 foot long straight line on a floor is to \_\_\_\_.

- a.) Use a steel measuring tape with dark crayon  
b.) Use a plumb bob with long string  
c.) Use a long 2 x 4 and a lead pencil  
d.) Use a chalk line

33. Silver is used on electrical contacts to \_\_\_\_.

- a.) Avoid corrosion                                      c.) Improve continuity  
b.) Improve efficiency                      d.) Improve appearance

34. Electricians should be familiar with the rules and regulations of their job mainly to \_\_\_\_.

- a.) Eliminate overtime                      c.) Perform their duties properly  
b.) Increase wages                      d.) Save time

35. To determine if the raceway is truly vertical an electrician would use a \_\_\_\_.

- a.) Plumb bob      b.) Transit level                      c.) Square      d.) Level

36. In order to prevent a safety hazard an electrician should never \_\_\_\_.

- a.) Strike a hardened steel surface with a hardened steel hammer  
b.) Use a soft brass hammer to strike a soft brass surface  
c.) Strike a soft iron surface with a hardened steel hammer  
d.) Use a soft iron hammer to strike a hardened steel surface

37. Service drop conductors not in excess of 600 volts shall have

a minimum clearance of \_\_\_\_ feet over residential property and driveways, and those commercial areas not subject to truck traffic.

- a.) 10      b.) 12      c.) 15      d.) 18

38. When conduit or tubing nipples having a maximum length not to exceed 24" are installed between boxes they shall be permitted to filled \_\_\_\_ percent of its total cross-sectional area.

- a.) 31      b.) 40      c.) 53      d.) 60

39. Before using rubber gloves when working on high voltage equipment the gloves should be \_\_\_\_.

- a.) Cleaned inside and out      c.) Oiled inside and out  
b.) Tested to withstand the high voltage d.) Brand new

40. Stranded wire should be \_\_\_\_ before being placed under a screw head.

- a.) Tinned  
b.) Twisted together tightly  
c.) Coated with an inhibitor  
d.) Sanded

CB#4

41. A  $3\Omega$ ,  $6\Omega$ ,  $9\Omega$  and a  $12\Omega$  resistor are connected in series. The resistor that will consume the most power is the \_\_\_\_ ohm.

- a.)  $3\Omega$       b.)  $6\Omega$       c.)  $9\Omega$       d.)  $12\Omega$

42. What Article of the NEC refers to grounding?


- a.) 230      b.) 240      c.) 250      d.) 300

43. The total of the following numbers  $8\frac{5}{8}"$ ,  $6\frac{1}{4}"$ ,  $7\frac{3}{16}"$ ,  $5\frac{1}{4}"$  is \_\_\_\_.

- a.)  $27\frac{5}{16}"$       b.)  $26\frac{1}{8}"$       c.)  $28\frac{7}{8}"$       d.) none of these

44. A fusestat is different than the ordinary plug fuse because a fusestat \_\_\_\_.

- a.) Doesn't have threads      c.) Has different size threads  
b.) Has left-hand threads      d.) Has an aluminum screwshell

45. The symbol  usually indicates a (an) \_\_\_\_.

- a.) Switch      b.) Receptacle      c.) Ceiling outlet d.) Exhaust fan

46. A fuse on a 20 amp branch circuit has blown. The fuse is replaced with a 20 amp fuse and the fuse blows when the switch is turned on. The electrician should \_\_\_\_.

- a.) Check the ground rod connection first  
b.) Change to a circuit breaker  
c.) Install a 30 amp fuse  
d.) Check the circuit for a problem

47. To sharpen an electrician's knife, you would use a \_\_\_\_ stone.

- a.) Rubber      b.) Carborundum      c.) Rosin      d.) Bakelite

48. The decimal equivalent of  $\frac{3}{16}"$  is \_\_\_\_.

- a.) 0.125      b.) 0.1875      c.) 5.33      d.) none of these

49. When drilling into a steel I-beam, the most likely cause for breaking a drill bit would be \_\_\_\_.

- a.) The drill bit is too dull
- b.) Too slow a drill speed
- c.) Too much pressure on the bit
- d.) Too much cutting oil on bit

50. Which of the fuses is blown?

- a.) L1 fuse is blown
- b.) L2 fuse is blown
- c.) Both fuses are blown
- d.) Neither fuse is blown

CLOSED BOOK  
EXAM  
#5

CB#5

JOURNEYMAN CLOSED BOOK EXAM #5    One Hour Time Limit

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_ %

1. Locknuts are sometimes used in making electrical connections on studs. In these cases the purpose of the locknuts is to \_\_\_\_.
  - a.) Be able to connect several wires to one stud
  - b.) Make it difficult to tamper with the connection
  - c.) Make a tighter connection
  - d.) Prevent the connection from loosening under vibration
2. To cut rigid conduit you should \_\_\_\_.
  - a.) Use a 3-wheel pipe cutter
  - b.) Use a cold chisel and ream the ends
  - c.) Use a hacksaw and ream the ends
  - d.) Order it cut to size
3. In the course of normal operation the instrument which will be

least effective in indicating that a generator may overheat because it is overloaded, is \_\_\_\_.

- a.) A wattmeter
- b.) A voltmeter
- c.) An Ammeter
- d.) A stator thermocouple

4. Two switches in one box under one face-plate is called a \_\_\_\_.

- a.) Double-pole switch    c.) 2-way switch
- b.) Two-gang switch      d.) Mistake

5. A conduit body is \_\_\_\_.

- a.) A cast fitting such as an FD or FS box
- b.) A standard 10 foot length of conduit
- c.) A sealtight enclosure
- d.) A "LB" or "T", or similar fitting

6. A dwelling unit is \_\_\_\_.

- a.) One unit of an apartment
- b.) One or more rooms used by one or more persons
- c.) One or more rooms with space for eating, living, and sleeping
- d.) One or more rooms used as a housekeeping unit and having permanent cooking and sanitation provisions.

7. Enclosed means, surrounded by a \_\_\_\_ which will prevent persons from accidentally contacting energized parts.

- I. Wall                  II. Fence              III. Housing or case

- a.) I only    b.) II only      c.) III only      d.) I,II, or III

8. Where the conductor materials are not specified in the Code, the conductors are assumed to be \_\_\_\_.

- a.) Bus bars    b.) Aluminum    c.) Copper-clad aluminum    d.) Copper

9. The voltage lost across a portion of a circuit is called the \_\_\_\_.

- a.) Power loss    b.) Power factor      c.) Voltage drop    d.) Apparent va

10. In a series circuit \_\_\_\_ is common.

- a.) Resistance    b.) Current      c.) Voltage      d.) Wattage

11. Batteries supply \_\_\_\_ current.

- a.) Positive                  b.) Negative                  c.) Direct      d.) Alternating

12. Electron flow produced by means of applying pressure to a material is called \_\_\_\_.

- a.) Photo conduction
- b.) Electrochemistry
- c.) Piezoelectricity
- d.) Thermoelectricity

13. Raceways shall be provided with \_\_\_\_ to compensate for thermal expansion and contraction.

- a.) Accordion joints
- b.) Thermal fittings
- c.) Expansion joints
- d.) Control-expansion

14. An alternation is \_\_\_\_\_.

- a.) One-half cycle
- b.) One hertz
- c.) One alternator
- d.) Two cycles

15. What is the function of a neon glow tester?

- I. Determines if circuit is alive
- II. Determines polarity of DC circuits
- III. Determines if circuit is AC or DC

- a.) I only    b.) II only    c.) III only    d.) I,II and III

16. What chapter in the Code is Mobile Homes referred to?

- a.) Chapter 3    b.) Chapter 5    c.) Chapter 6    d.) Chapter 8

17. Never approach a victim of an electrical injury until you \_\_\_\_\_.

- a.) Find a witness
- b.) Are sure the power is turned off
- c.) Have a first aid kit
- d.) Contact the supervisor

18. A wattmeter indicates \_\_\_\_\_.

- I. Real power
- II. Apparent power if PF is not in unity
- III. Power factor

- a.) I only    b.) II only    c.) III only    d.) I,II, and III

19. The connection of a ground clamp to a grounding electrode shall be \_\_\_\_\_.

- a.) Accessible    b.) Visible    c.) Readily Accessible    d.) In sight

20. The current will lead the voltage when \_\_\_\_\_.

- a.) Inductive reactance exceeds the capacitive reactance in the circuit
- b.) Reactance exceeds the resistance in the circuit
- c.) Resistance exceeds the reactance in the circuit
- d.) Capacitive reactance exceeds the inductive reactance in the circuit

21. Mandatory rules of the Code are identified by the use of the word \_\_\_\_\_.

- a.) Should    b.) Shall    c.) Must    d.) Could

22. Which of the following is not one of the considerations that must be evaluated in judging equipment?

- a.) Wire-bending and connection space
- b.) Arcing effects
- c.) Longevity
- d.) Electrical insulation

23. To increase the range of an AC ammeter which one of the following is most commonly used?

- a.) A current transformer
- b.) Condenser
- c.) An inductance
- d.) A straight shunt (not U-shape)

24. If a test lamp lights when placed in series with a condenser and a suitable source of DC, it is a good indication that the condenser is \_\_\_\_\_.

- a.) Full charged
- b.) Short circuited

- c.) Open-circuited
- d.) Fully discharged

25. To transmit power economically over considerable distances, it is necessary that the voltages be high. High voltages are readily obtainable with \_\_\_\_ currents.

- a.) Rectified      b.) AC      c.) DC      d.) Carrier

26. Two 500 watt lamps connected in series across a 110 volt line draws 2 amperes. The total power consumed is \_\_\_\_ watts.

- a.) 50      b.) 150      c.) 220      d.) 1000

CB#5

27. The resistance of a copper wire to the flow of electricity \_\_\_\_.

- a.) Decreases as the length of the wire increases
- b.) Decreases as the diameter of the wire decreases
- c.) Increases as the diameter of the wire increases
- d.) Increases as the length of the wire increases

28. Enclosed knife switches that require the switch to be open before the housing door can be opened are called \_\_\_\_ switches.

- a.) Release Service      b.) Air-break      c.) Safety      d.)

29. A type of cable protected by a spiral metal cover called \_\_\_\_ in the field.

- a.) BX      b.) Greenfield      c.) Sealtight      d.) Romex

30. The resistance of a circuit may vary due to \_\_\_\_.

- a.) A loose connection

- b.) Change in voltage
- c.) Change in current
- d.) Induction

31. Grounding conductors running with circuit conductors may be \_\_\_\_.

- I. Uninsulated
- II. A continuous green, if covered
- III. Continuous green with yellow stripe, if covered

- a.) I only      b.) II only      c.) III only      d.) I,II, and III

32. For voltage and current to be in phase, \_\_\_\_.

- I. The circuit impedance has only resistance
- II. The voltage and current appear at their zero and peak values at the same time

- a.) I only      b.) II only      c.) Both I and II      d.) Neither I or II

33. The definition of ampacity is \_\_\_\_.

- a.) The current carrying capacity of conductors expressed in volt-amps
- b.) The current carrying capacity expressed in amperes
- c.) The current carrying capacity of conductors expressed in wattage
- d.) The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating

34. Continuous duty is \_\_\_\_.

- a.) A load where the maximum current is expected to continue for the three hours or more
- b.) A load where the maximum current is expected to continue for one hour or more

- c.) Intermittent operation in which the load conditions are regularly recurrent
- d.) Operation at a substantially constant load for an indefinitely long time

35. A location classified as dry may be temporarily subject to \_\_\_\_.

I. Wetness      II. Dampness

- a.) I only    b.) II only    c.) Both I and II    d.) Neither I nor II

36. A \_\_\_\_ is an enclosure designed either for surface or flush mounting and provided with a frame, mat, or trim in which a swinging door or doors are or may be hung.

- a.) Cabinet board      b.) Panel board    c.) Cutout box    d.) Switch board

37. A 15 ohm resistance carrying 20 amperes of current uses \_\_\_\_ watts of power.

- a.) 300      b.) 3000      c.) 6000      d.) None of these

38. When using # 14-2 with ground Romex, the ground \_\_\_\_ carry current under normal operation.

- a.) Will    b.) Will not    c.) Will sometimes    d.) None of these

CB#5

39. As compared with solid wire, stranded wire of the same gauge size is \_\_\_\_.

- a.) Better for higher voltages      c.) Easier to skin
- b.) Given a higher ampacity      d.) Larger in total diameter

40. The type of AC system commonly used to supply both commercial light and power is the \_\_\_\_.

- a.) 3-phase, 3wire
- b.) 3-phase, 4wire
- c.) 2-phase, 3wire
- d.) Single phase, 2-wire

41. To make a good soldered connection between two stranded wires, it is least important to \_\_\_\_.

- a.) Use enough heat to make the solder flow freely
- b.) Clean the wires carefully
- c.) Twist the wires together before soldering
- d.) Apply solder to each strand before twisting the two wires together

42. The most important reason for using a conduit-type fitting in preference to making a bend in a one inch conduit is to \_\_\_\_.

- a.) Avoid the possible flattening of the conduit when making the bend
- b.) Cut down the amount of conduit needed
- c.) Make a neater job
- d.) Make wire pulling easier

43. When skinning a small wire, the insulation should be "penciled down" rather than cut square to \_\_\_\_.

- a.) Allow more room for the splice
- b.) Save time in making the splice
- c.) Decrease the danger of nicking the wire
- d.) Prevent the braid from fraying



44. Rubber insulation on an electrical conductor would quickly be damaged by continuous contact with \_\_\_\_.

- a.) Water      b.) Acid      c.) Oil      d.) Alkali

45. A tester using an ordinary light bulb is commonly used to test \_\_\_\_.

- a.) Whether a circuit is AC or DC   c.) An overloaded circuit  
b.) For polarity of a DC circuit   d.) For grounds on 120 volts circuits

46. Pigtails are used on brushes to \_\_\_\_.

- a.) Compensate for wear  
b.) Supply the proper brush tension  
c.) Make a good electrical connection  
d.) Hold the brush in the holder

47. With respect to fluorescent lamps it is correct to state \_\_\_\_.

- a.) The filaments seldom burn out  
b.) The starters and tubes must be replaced at the same time  
c.) They are easier to install than incandescent light bulbs  
d.) Their efficiency is less than the efficiency of incandescent light bulbs

48. A \_\_\_\_ stores energy in much the same manner as a spring stores mechanical energy.

- a.) Resistor      b.) Coil      c.) Condenser   d.) None of these

49. An overcurrent trip unit of a circuit shall be connected in series with each \_\_\_\_.

- a.) Transformer  
b.) Grounded conductor  
c.) Overcurrent device  
d.) Underground conductor

50. \_\_\_\_ Lighting is a string of outdoor lights suspended between two points.

- a.) Pole    b.) Festoon    c.) Equipment   d.) Outline

CB#5

SCORE\_\_\_\_%

CLOSED BOOK  
EXAM  
#6

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

CB#6

JOURNEYMAN CLOSED BOOK EXAM #6    One Hour Time Limit

1. Something that would affect the ampacity of a conductor would be \_\_\_\_\_.  
  
I. Voltage      II. Amperage    III. Length      IV. Temperature  
  
a.) I only      b.) II only      c.) III only      d.) IV only
2. Alternating currents may be increased or decreased by means of a \_\_\_\_\_.

- a.) Motor                      b.) Transformer                      c.) Dynamo                      d.)  
Megger

3. Fixtures supported by the framing members of ceiling systems shall be securely fastened to the ceiling framing member by mechanical means such as \_\_\_\_.

- I. Bolts or screws                      II. Rivets                      III. Clips identified for this use

- a.) I only                      b.) II only                      c.) III only                      d.) I,II or III

4. Which has the highest electrical resistance?

- a.) Brass                      b.) Iron                      c.) Water                      d.)  
Paper

5. Conductor sizes are expressed \_\_\_\_.

- a.) Only in circular mils                      c.) In diameter or area  
b.) In AWG or in circular mils                      d.) In AWG or millimeters

6. Of the following, which one is not a type of file?

- a.) Half round                      b.) Bastard                      c.) Tubular                      d.) Mill

7. Oil is used in many large transformers to \_\_\_\_.

- a.) Prevent breakdown due to friction                      c.) Cool and Insulate the transformer  
b.) Lubricate the core                      d.) Lubricate the coils

8. Fractional horsepower universal motors have brushes usually made of \_\_\_\_.

- a.) Copper strands                      b.) Mica                      c.) Carbon                      d.) Thin  
wire rings

9. When administering first aid to a worker suffering from fright as a result of falling from a ladder the most important thing to do is \_\_\_\_.

- a.) Position the person to a sitting position  
b.) Cover the person and keep the person warm  
c.) Apply artificial respiration immediately  
d.) Check the rungs of the ladder

10. Which of the following would be used as a stop button?

11. If a co-worker is burned by acid from a storage battery, the proper first aid treatment is to wash with \_\_\_\_.

- a.) Iodine and leave it open to the air  
b.) Vinegar and apply a wet dressing  
c.) Water and apply vaseline  
d.) Lye and apply a dry bandage

12. A type of motor that will not operate on DC is the \_\_\_\_.

- a.) Series  
b.) Short shunt  
c.) Long shunt compound  
d.) Squirrel cage

13. Receptacles installed on \_\_\_\_ ampere branch circuits shall be of the grounding type.

- a.) 15 and 20                      b.) 25                      c.) 30                      d.) 40

14. Where conductors carrying alternating current are installed in metal enclosures or metal raceways, they shall be so arranged as to avoid heating the surrounding metal by induction to accomplish this \_\_\_\_ shall be grouped together.

- I. All phase conductors
- II. Where used, the neutral
- III. All equipment grounding conductors

- a.) I only   b.) I and II only   c.) I and III only   d.) I,II, and III

15. A (an) \_\_\_\_ changes AC to DC.

- a.) Battery   b.) Capacitor   c.) Alternator   d.) Rectifier

16. A steel measuring tape is undesirable for use around electrical equipment. The least important reason is the \_\_\_\_.

- a.) Danger of entanglement in rotating machines   c.) Short circuit hazard  
b.) Shock hazard   d.) Magnetic effect

17. \_\_\_\_ is the ability of a material to permit the flow of electrons.

- a.) Voltage   b.) Current   c.) Resistance   d.) Conductance

18. Automatic is self-acting, operating by its own mechanism when actuated by some impersonal influence, such as a change in \_\_\_\_.

- I. Temperature   II. Pressure   III. Current strength

- a.) I only   b.) I and II only   c.) II only   d.) I,II and III

19. A fitting is \_\_\_\_.

- a.) Part of a wiring system that is intended primarily to perform

an electrical function

- b.) Pulling cable into a confined area  
c.) To be suitable or proper for  
d.) Part of a wiring system that is intended primarily to perform a mechanical function

20. The neutral conductor \_\_\_\_.

- a.) Is always the "white" grounded conductor  
b.) Has 70% applied for a household clothes dryer for a branch circuit  
c.) Never apply ampacity corrections  
d.) Carries the unbalanced current

21. An appliance that is not easily moved from one place to another in normal use in a \_\_\_\_ appliance.

- a.) Fastened in place   b.) Dwelling-unit   c.) Fixed   d.) Stationary

22. All wiring must be installed so that when completed \_\_\_\_.

- a.) It meets the current-carrying requirements of the load  
b.) It is free of shorts and unintentional grounds  
c.) It is acceptable to Code compliance authorities  
d.) It will withstand a hy-pot test

23. Rosin is preferable to acid as a flux for soldering wire because rosin is \_\_\_\_.

- a.) A dry powder  
b.) A better conductor  
c.) A non conductor  
d.) Noncorrosive

24. Utilization equipment is equipment which utilizes \_\_\_\_ energy for mechanical, chemical, heating, lighting or similar

purposes.

I. Chemical      II. Electric      III. Heat

a.) I only      b.) II only      c.) III only      d.) I,II and III

25. The main purpose of using a cutting fluid when threading conduit is to \_\_\_\_\_.

- a.) Prevent the formation of rust
- b.) Wash away the metal chips
- c.) Improve the finish of the thread
- d.) Prevent the formation of electrolytic pockets

26. Of the following, the best indication of the condition of the charge of a lead acid battery is the \_\_\_\_\_.

- a.) Temperature of the electrolyte      c.) Open circuit cell voltage
- b.) Level of the electrolyte gravity      d.) Specific gravity

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27. In general, the most important point to watch in the operation of transformer is the \_\_\_\_\_.

- a.) Core loss
- b.) Exciting current
- c.) Temperature
- d.) Primary voltage

28. When mounting electrical equipment, wooden plugs driven into holes in \_\_\_\_ shall not be used.

I. Masonry      II. Concrete      III. Plaster

a.) I only      b.) II only      c.) III only      d.) I,II, or III

29. Mica is commonly used in electrical construction for \_\_\_\_\_.

- a.) Commutator bar separators      c.) Strain insulators
- b.) Heater cord insulation panels      d.) Switchboard panels

30. If a fuse becomes hot under normal load, a probable cause is \_\_\_\_\_.

- a.) Excessive tension in the fuse clip
- b.) Rating of the fuse is too low
- c.) insufficient pressure at the fuse clips
- d.) Rating of the fuse is too high

31. For maximum safety the magnetic contactors used for reversing the direction of rotation of a motor should be \_\_\_\_\_.

- a.) Operated from independent sources
- b.) Electrically interlocked
- c.) Mechanically interlocked
- d.) Electrically and Mechanically interlocked

32. Large squirrel cage induction motors are usually started at a voltage considerably lower than the line voltage to \_\_\_\_\_.

- a.) Allow the rotor current to build up gradually
- b.) Permit starting under full load
- c.) Avoid excessive starting current
- d.) obtain a low starting speed

33. Which of the following is a motor starter?

34. If the voltage on a light bulb is increased 10%, the bulbs will \_\_\_\_\_.

- a.) Fail by insulation breakdown
- b.) Have a longer life
- c.) Burn more brightly
- d.) Consume less power

35. All edges that are invisible should be represented in a drawing by lines that are \_\_\_\_.

- a.) Dotted
- b.) Curved
- c.) Solid
- d.) Broken

36. A light bulb usually contains \_\_\_\_.

- a.) Air
- b.) Neon
- c.) H<sub>2</sub>O
- d.) Either a vacuum or gas

37. The service disconnecting means shall be installed \_\_\_\_.

- I. Outside a building
- II. Inside a building
- III. At the meter

- a.) I only
- b.) II only
- c.) III only
- d.) Either I or II

38. Critical burns are potentially \_\_\_\_.

- a.) Life-threatening
- b.) Disfiguring
- c.) Disabling
- d.) All of these

39. A set of lights switched from three different places can be controlled by \_\_\_\_ switch (es).

- a.) Two 3-way and one 4-way
- b.) Two 3way and one 2way
- c.) 2 single-pole
- d.) Four pole

40. A fellow electrician is not breathing after receiving an electrical shock, but is no longer in contact with the electricity, the most important thing for you to do is \_\_\_\_.

- a.) Start artificial respiration immediately
- b.) Cover the person and keep warm

- c.) Move the person to a window
- d.) Remove the persons shoes

CB#6

41. A wrench you would not use to connect rigid metal conduit is a \_\_\_\_ wrench.

- a.) Box end
- b.) Chain
- c.) Strap
- d.) Stillson

42. The instrument that would prove least useful in testing for opens, grounds, and shorts after the wiring has been completed is the \_\_\_\_.

- a.) Voltmeter
- b.) Ammeter
- c.) Ohmmeter
- d.) Megger

43. A stranded wire is given the same size designation as a solid wire if it has the same \_\_\_\_.

- a.) Weight per foot
- b.) Overall diameter
- c.) Strength
- d.) Cross-sectional area

44. A lighting fixture is to be controlled independently from two different locations. The type of switch required in each of the two locations is a \_\_\_\_.

- a.) Double-pole, double-throw
- b.) Double-pole, single-throw
- c.) Single-pole, double-throw
- d.) Single-pole, single-throw

45. The rating "1000 ohms, 10 watts" would generally apply to a \_\_\_\_.

- a.) Transformer
- b.) Relay
- c.) Resistor
- d.) Heater

46. The open circuit test on a transformer is a test for measuring its \_\_\_\_.

- a.) Insulation resistance
- b.) Copper losses
- c.) Iron losses
- d.) Equivalent resistance of the transformer

47. The proper way to open a knife switch carrying a heavy load is to \_\_\_\_.

- a.) Open it with care, to avoid damage to the auxiliary blade by the arc
- b.) Open it slowly so that there will not be a flash over at the contacts
- c.) Tie a 5 foot rope on the switch handle and stand clear of the switch
- d.) Open it with a jerk so as to quickly break any arc

48. When thermal overload relays are used for the protection of polyphase induction motors, their primary purpose is to protect the motors in case of \_\_\_\_.

- a.) Short circuit between phases
- b.) Low line voltage
- c.) Reversal of phases in the supply
- d.) Sustained overload

49. The National Electrical Code is sponsored by the \_\_\_\_.

- a.) Underwriters Lab
- b.) National Safety Council
- c.) National Electrical Manufacturers Association
- d.) National Fire Protection Association

50. Which of the following is an LB conduit body?

TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE\_\_\_\_%

CLOSED BOOK  
EXAM  
#7

CB#7

JOURNEYMAN CLOSED BOOK EXAM #7    One Hour Time Limit

50 QUESTIONS

1. An advantage that rubber insulation has is that it \_\_\_\_\_.



- a.) Is not damaged by oil                      c.) Does not absorb much moisture
- b.) Is good for extreme temperatures   d.) Will not deteriorate with age
2. The advantage of using a storage battery rather than a dry cell is the storage battery \_\_\_\_.
- a.) Is portable  
b.) Is less expensive  
c.) Can be recharged  
d.) Is easier to use
3. The least desirable device for measuring an electrical cabinet containing live equipment is a \_\_\_\_.
- a.) 6' wooden ruler  
b.) Plastic ruler  
c.) Wooden yard stick  
d.) 12' steel tape
4. The relationship of a transformer primary winding to the secondary winding is expressed in \_\_\_\_.
- a.) Wattage              b.) Turns-ratio              c.) Current              d.) Voltage
5. When the size # 12 of a stranded wire is referred to, this number specifies the:
- a.) Strength of wire                      c.) Square inch area of the insulation  
b.) Cross-sectional area of the wire              d.) The pounds per square inch

6. The purpose of a clip clamp is to \_\_\_\_.
- I. Ensure good contact between the fuse terminals of cartridge fuses and the fuse clips  
II. Make it possible to use cartridge fuses of a smaller size than that for which the fuse clips are intended  
III. Prevent the accidental removal of the fuse due to vibration
- a.) I, II and III              b.) I only              c.) II only              d.) I and II only
7. To increase the life of an incandescent light bulb you could \_\_\_\_.
- a.) Use at a higher than rated voltage              c.) Turn off when not in use  
b.) Use at a lower than rated voltage              d.) Use at a higher wattage
8. Which of the following statements about mounting single-throw knife switches in a vertical position is (are) correct?
- I. The switch shall be mounted so that the blade hinge is at the bottom  
II. The supply side of the circuit shall be connected to the bottom of the switch
- a.) I only              b.) II only              c.) Both I and II              d.) Neither I nor II
9. When re-routing conduit, it may be necessary to increase the wire size, if the distance is greater, in order to \_\_\_\_.
- a.) Account for current drop  
b.) Allow for possible resistance drop  
c.) Compensate for voltage drop

d.) Account for ampacity drop

10. One megaohm is the equivalent of \_\_\_\_\_

- a.) 100 ohms   b.) 100 ohms   c.) 100,000 ohms   d.) 1,000,000 ohms

11. On smaller gauges of wire, they are pencil-stripped to prevent \_\_\_\_\_.

- a.) Over stripping  
b.) Loosening of the wire-nut  
c.) Nicks in the wire  
d.) Other

CB#7

12. Galvanized conduit is made of \_\_\_\_\_

- a.) Iron                      b.) Zinc                      c.) Nickle                      d.) Lead

13. The frame of a motor is usually positively grounded to \_\_\_\_\_.

- a.) Protect against shock   b.) Remove the static currents  
c.) Provide 115 volts       d.) Protect from lightning

14. When wrapping a splice with both rubber and friction tape, the main purpose of the friction tape is to \_\_\_\_\_.

- a.) Provide extra insulation  
b.) Build up the insulation to the minimum thickness required  
c.) Protect the rubber tape  
d.) Provide a waterproof seal

15. An electrician should not wear shoes that have sponge rubber soles while working mainly because they \_\_\_\_\_.

- a.) Wear out too quickly  
b.) Are not waterproof  
c.) Are not insulated  
d.) Are easily punctured when stepping on a nail

16. The transformer output is measured by \_\_\_\_\_.

- c.) Volts   b.) Amps       c.) Volt-amps                      d.) Watts

17. Which of the following hacksaw blades should be used for the best results in cutting EMT?

- 12 teeth per inch  
b.) 18 teeth per inch  
c.) 24 teeth per inch  
d.) 32 teeth per inch

18. So constructed or protected that exposure to the weather will not interface with successful operation is \_\_\_\_\_.

- a. Weather proof                                      II. Raintight    III. Watertight

- a.) I only   b.) I and II only   c.) II only   d.) I,II and III

19. The rating of the largest size regular plug fuse is \_\_\_\_\_ amperes.

- a.) 15       b.) 20                      c.) 30                      d.) 60

20. A hacksaw with fine teeth used to cut raceways is commonly called a \_\_\_\_\_.

- a.) Tube saw   b.) Keyhole saw   c.) Sabre saw   d.) Crosscut saw

21. You shouldn't use a file without lamp is rated in \_\_\_\_\_.

- a.) The file is hard to hold injured  
will cut too deep    b.) The user may be injured  
c.) The file will cut too deep    d.) Improper filing stroke

22. The brightness of an incandescent lamp is rated in \_\_\_\_\_.

- a.) Watts    b.) Footcandles    c.) Volt-amps    d.) Lumens

23. If the primary winding of a 10 to 1 step down transformer has 20,000 turns, the secondary winding should have \_\_\_\_\_ turns.

- a.) 200,000    b.) 2000    c.) 200    d.) 20

24. An electron is \_\_\_\_\_.

- a.) A neutron    b.) An orbiting particle  
c.) A proton    d.) The smallest part of an atom with a negative charge

25. The signals of electrical injury may include \_\_\_\_\_.

- I. Unconsciousness  
II. Weak, Irregular, or absent pulse  
III. Dazed, Confused behavior

- a.) I only    b.) II only    c.) III only    d.) I, II, or III

26. This CODE is intended to be suitable for mandatory application by governmental bodies exercising legal jurisdiction over \_\_\_\_\_.

- I. Electrical installation    II. And for use by insurance inspectors  
CB#7

- a.) Both I and II    b.) Neither I nor II    c.) I only    d.) II only

27. The name of the tool commonly used for bending small size conduit is a \_\_\_\_\_.

- a.) Growler    b.) Mandrel    c.) Hickey    d.) Henry

28. When cutting holes in masonry which of the following tools is most commonly used?

- a.) Auger bit    b.) Router bit    c.) Star drill    d.) Reamer

29. Electrician's diagonal lineman pliers should not be used to cut \_\_\_\_\_.

- a.) Aluminum wire    c.) Steel wire  
b.) Copper wire    d.) Copper-clad wire

30. One of the following is the first thing to do when a person gets an electric shock and is still in contact with the supply:

- a.) Remove the victim from contact by using a dry stick or dry rope  
b.) Treat for burns  
c.) Start artificial respiration immediately  
d.) Shut off power within 10 minutes

31. A "mil" measures \_\_\_\_\_.

- a.) 1/8"    b.) .000001"    c.) .001"    d.) .00010"

32. The term "hertz" means \_\_\_\_\_.

- a.) Car rental company    b.) Frequency    c.) Degrees    d.) Phase angle

33. The difference of electrical potential between two conductors of a circuit is the:

a.) Resistance    b.) Amperage    c.) Voltage    d.) Wattage

a.) 1 and 3

34. The letters DPDT are used to identify a type of \_\_\_\_.

b.) 2 and 3

c.) 1 and 2

a.) Insulation    b.) Fuse    c.) Motor    d.) Switch

d.) 1 and 4

35. The term "ampere-hours" is associated with \_\_\_\_.

a.) Motors    b.) Transformers    c.) Electromagnets    d.) Storage Batteries

36. Which of the following would improve the resistance to earth?

I. Use multiple ground rods

II. Treat the soil

III. Lengthen the ground rod

CB#7

a.) I only    b.) II and III only    c.) I and III only    d.) I, II, and III

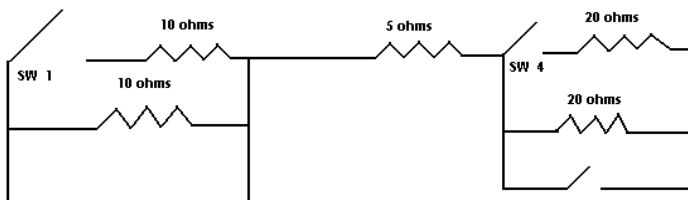
37. A tap tool is a tool used to \_\_\_\_.

a.) Cut external threads    c.) Ream raceways  
b.) Remove broken bolts    d.) Cut internal threads

38. When cutting a metal conduit with a hacksaw, the pressure applied to the hacksaw should be on \_\_\_\_.

a.) The return stroke only  
b.) The forward stroke only  
c.) Both the forward and return stroke equally  
d.) None of these

39. The switches to be closed in order to obtain a combined resistance of 5 ohms are \_\_\_\_.



40. When the term "10-32" in connection with machine screws commonly used in lighting work, the number 32 refers to \_\_\_\_.

a.) Screw length  
b.) Screw thickness  
c.) Diameter of holes  
d.) Threads per inch

41. To fasten a box to a terra cotta wall you would use \_\_\_\_.

a.) Lag bolts    b.) Expansion bolts    c.) Wooden plugs    d.) Rawl Plugs

42. The output winding of a transformer is called the \_\_\_\_.

a.) Primary    b.) Output    c.) Secondary    d.) Both a & b

43. The flux commonly used for the soldering of electrical conductors is \_\_\_\_.

- a.) Zinc Chloride   b.) Rosin   c.) Borax   d.) None of these

44. A shunt is sometimes used to increase the range of an electrical measuring instrument. The shunt is normally used when measuring \_\_\_\_.

- a.) AC voltage   b.) DC voltage   c.) DC amperes   d.) AC amperes

45. A battery operates on the principle of \_\_\_\_.

- a.) Photo emission   c.) Electro chemistry  
b.) Turboelectric effect   d.) Voltaic Conductivity

46. When an electric current is forced through a wire that has considerable resistance, the \_\_\_\_.

- I. Ampacity will decrease   II. Voltage will drop   III. Wire will heat up

- a.) III only   b.) I and II only   c.) II and III only   d.) I and III only

47. The continuity of an electrical circuit can be determined in the field by the means of \_\_\_\_.

- a.) An ammeter  
b.) Wheatstone  
c.) Bell & battery set  
d.) Wattmeter

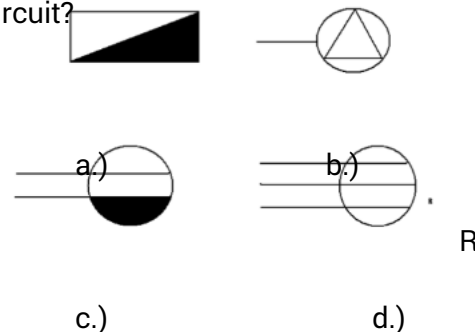
48. A wattmeter is connected in \_\_\_\_ in the circuit.

- a.) Series   b.) Parallel   c.) Series-Parallel   d.) None of these

49. A shunt is used to measure \_\_\_\_.

- a.) Resistance   b.) Capacitance   c.) Current   d.) Wattage

50. Which of the following is the symbol for a duplex outlet, split circuit?



CLOSED BOOK  
EXAM  
#8

50 QUESTIONS  
TIME LIMIT – 1 HOUR

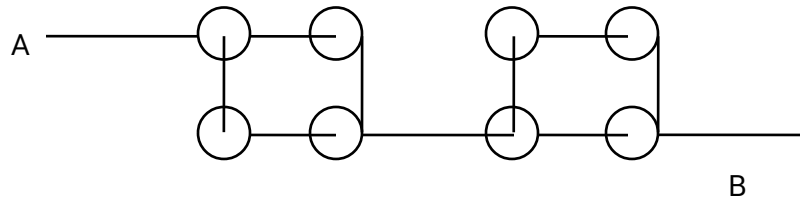
TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_%

CB#8

JOURNEYMAN CLOSED BOOK EXAM #8 One Hour Time Limit

1. Using 1.5 volt dry cells, the voltage between A and B would be \_\_\_\_\_.



- a.) 1.5                      b.) 4                      c.) 6                      d.) 12

2. A rigid conduit connecting to an outlet should have a \_\_\_\_\_.

- a.) Bushing and locknut on the outside  
b.) Bushing on the outside and locknut on the inside  
c.) Locknut and bushing on the inside  
d.) Locknut on the outside and a bushing on the inside

3. Identified, as used in the Code in reference to a conductor or its terminals, means that such a conductor or terminal is to be recognized as \_\_\_\_\_.

- a.) Grounded      b.) Bonded      c.) Colored      d.) Marked

4. A toaster will produce less heat on low voltage because \_\_\_\_\_.

- a.) Its total watt output decrease  
c.) The resistance has not changed  
b.) The current will decrease      d.) All of these

5. If the current flow through a conductor is increased, the magnetic field around the conductor \_\_\_\_\_.

- a.) Is unchanged  
b.) Becomes stronger  
c.) Collapses  
d.) Becomes weaker

6. Comparing a #6 conductor to a #10 conductor of equal lengths, the #6 will have lower \_\_\_\_.

- a.) Cost      b.) Weight      c.) Resistance      d.) Strength

7. The definition of ambient temperature is \_\_\_\_\_.

- a.) The temperature of the conductor  
b.) The insulation rating of the conductor  
c.) The temperature of the area surrounding the conductor  
d.) The differential temperature

8. The primary reason for using a hacksaw blade with fine teeth rather than coarse teeth when cutting large stranded conductors is \_\_\_\_\_.

- a.) A coarse blade would overheat the conductor  
b.) A coarse blade breaks too easily

- c.) To avoid snagging or pulling strands
  - d.) A fine blade will bend easier
9. The standard residential service is a 3-wire, 240 volt single-phase system. The maximum voltage to ground in this system would be \_\_\_\_\_ volts.
- a.) 115      b.) 120                      c.) 199                      d.) 208
10. When working on a motor, the electrician should \_\_\_\_\_ to prevent accidental starting of the motor.
- a.) Remove the fuses                      c.) Shut off the switch
- b.) Ground the motor                      d.) Remove the belts
11. It is the responsibility of the electrician to make sure his tools are in good condition because \_\_\_\_\_.
- a.) Defective tools can cause accidents
- b.) The boss may want use them
- c.) The company will pay only for only one set of tools
- d.) A good job requires perfect tools

CB#8

12. Continually overloading a conductor is a poor practice because it causes \_\_\_\_\_.
- a.) The conductor to melt                      c.) The conductor to shrink
- b.) The installation to deteriorated.) Damage to the raceway
13. For better illumination you would \_\_\_\_\_.
- a.) Random spacing of lights
- b.) Even spacing, numerous lights
- c.) Evenly spaced, higher ceilings
- d.) Cluster lights

14. A junction box above a lay-in ceiling is considered \_\_\_\_\_.
- a.) Concealed    b.) Accessible    c.) Readily accessible    d.) Recessed
15. Which of the following metals is most commonly used in the filament of the bulb?
- a.) Aluminum      b.) Mercury    c.) Tungsten    d.) Platinum
16. Electrical equipment can be defined as \_\_\_\_\_.
- I. Fittings                      II. Appliances                      III. Devices    IV. Fixtures
- a.) I only    b.) I and IV only    c.) I, III and IV    d.) All of these
17. If two equal resistance conductors are connected in parallel, the resistance of the two conductors is equal to \_\_\_\_\_.
- a.) The resistance of one conductor
- b.) Twice the resistance of one conductor
- c.) One-half the resistance of one conductor
- d.) The resistance of both conductors
18. Wire connection should encircle binding posts in the \_\_\_\_\_ the nut turns to tungsten.
- a.) Opposite      b.) Same      c.) Reverse    d.) Different
19. Which of the following is a limit switch?
20. The primary and secondary windings of a transformer always have \_\_\_\_\_.
- a.) A common magnetic circuit



26. When soldering conductors, flux is used \_\_\_\_\_.

- a.) Galvanometer
- b.) Wattmeter
- c.) Dynamometer
- d.) watt-hour meter

32. In electrical wiring, "wire nuts are used to \_\_\_\_\_.

- a.) Connect wires to terminals
- b.) Join wires and insulate the joint
- c.) Connect the electrode
- d.) Tighten the panel studs

33. Which of the following would be the best metal for the magnet?

- a.) Steel
- b.) Aluminum
- c.) Lead
- d.) Tin

34. An electrician may use a megger \_\_\_\_\_.

- a.) To determine the RPM of a motor
- b.) To determine the output of a motor
- c.) To check wattage
- d.) To test a lighting circuit for a ground

35. The least important thing in soldering two conductors together is to \_\_\_\_\_.

- a.) Use plenty of solder
- b.) Use sufficient heat
- c.) Clean the conductors
- d.) Use the proper flux

36. The property of a circuit tending to prevent the flow of current and at the same time causing energy to be converted into heat is referred to as \_\_\_\_\_.

- a.) The inductance
- b.) The resistance
- c.) The capacitance
- d.) The reluctance

37. Rigid conduit is generally secured to outlet boxes by \_\_\_\_\_.

- a.) Beam clamps
- b.) Locknuts and bushings
- c.) Set screws
- d.) Offsets

38. Which one of the following is not a safe practice when lifting heavy items?

- a.) Use the arm and leg muscles
- b.) Keep your back as upright as possible
- c.) Keep lifting a heavy object until you get help
- d.) Keep your feet spread apart

39. A thermocouple will transform \_\_\_\_\_ into electricity.

- a.) Current
- b.) Heat
- c.) Work
- d.) Watts

40. In a residence the wall switch controlling the ceiling light is usually \_\_\_\_\_.

CB#8

- a.) Connected across both lines
- b.) A double pole switch
- c.) Connected in one line only
- d.) A 4-way switch

41. A switch which opens automatically when the current exceeds a predetermined limit would be called a \_\_\_\_\_.

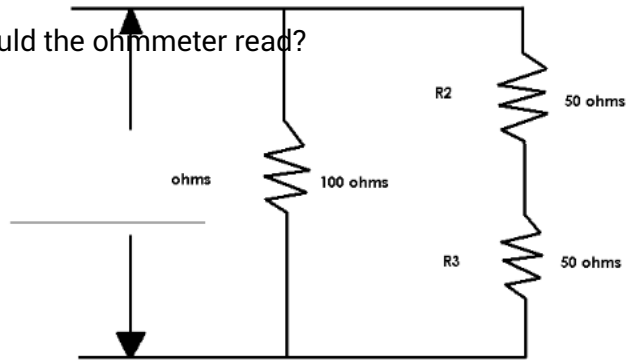
- a.) Limit Switch
- b.) Circuit breaker
- c.) DT disconnects
- d.) Contactor

42. A wattmeter is a combination of which two of the following meters?

- I. Ammeter
- II. Ohmmeter
- III. Phase meter
- IV. Voltmeter
- V. Power factor meter

- a.) II and III  
V
- b.) I and V    c.) I and IV    d.) II and V

43. What would the ohmmeter read?



- a.) 100  $\Omega$     b.) 200  $\Omega$     c.) 125  $\Omega$     d.) 50  $\Omega$

44. Acid is not considered a good flux when soldering conductors because it \_\_\_\_.

- a.) Smells bad  
b.) Is corrosive  
c.) Is non-conductive  
d.) Costs too much

45. If the spring tension on a cartridge fuse clip is weak, the result most likely would be \_\_\_\_.

- a.) The fuse would blow immediately  
b.) The fuse clips would become warm  
c.) The voltage to the load would increase  
d.) The supply voltage would increase

46. The branch-circuit loads specified by the Code for lighting and receptacles are considered \_\_\_\_.

- a.) Minimum loads  
b.) Maximum loads  
c.) Loads to be served  
d.) Peak loads

47. The conductor with the highest insulation temperature rating is \_\_\_\_.

- a.) RH    b.) TW    c.) THWN    d.) THHN

48. After cutting a conduit, to remove the rough edges on both ends, the conduit ends should be \_\_\_\_.

- a.) Reamed    b.) Filed    c.) Sanded    d.) Ground

49. To fasten a raceway to a solid concrete ceiling, you would be \_\_\_\_.

- a.) Toggle bolts  
b.) Expansion bolts  
c.) Wooden plugs  
d.) Rawl plugs

50. A commutator of a generator should be cleaned with which of the following?

- a.) Emery cloth  
b.) Graphite  
c.) A smooth file  
d.) Fine sand paper

CLOSED BOOK  
EXAM  
#9

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE\_\_\_\_%

CB#9

JOURNEYMAN CLOSED BOOK EXAM #9 One Hour Time Limit

1. To control a ceiling light from five different locations it requires which of the following?
  - a.) Four 3-way switches and one 4-way switch
  - b.) Three 4-way switches and two 3-way switch
  - c.) Three 3-way switches and two 4-way switch
  - d.) Four 4-way switches and one 3-way switch
2. The advantage of AC over DC includes which of the following?
  - a.) Better speed control
  - b.) Lower resistance at higher current
  - c.) Ease of voltage variation
  - d.) Impedance is greater
3. Which of the following is considered the best electrical conductor?
  - a.) Iron wire
  - b.) Copper wire
  - c.) Aluminum wire
  - d.) Tin wire
4. The liquid in a battery is called the \_\_\_\_\_.
  - a.) Askarel
  - b.) Festoon
  - c.) Hermetic
  - d.) Electrolyte
5. A color code is used in multiple-conductor cables. For a

3-conductor cable the colors would be \_\_\_\_\_.

- a.) One black, one red and one white
  - b.) Two black, and one red
  - c.) One white, one black and one white
  - d.) Two red and one black
6. Explanatory material in the Code is characterized by \_\_\_\_\_.
  - a.) The word "shall"
  - b.) FPN
  - c.) The word "may"
  - d.) the word "could"
7. The identified grounded conductor of a lighting circuit is always connected to the screw of a light socket to \_\_\_\_\_.
  - a.) Reduce the possibility of accidental shock
  - b.) Ground the light fixture
  - c.) Improve the efficiency of the lamp
  - d.) Provide the easiest place to contact the wire
8. A \_\_\_\_\_ box may be weatherproof.
  - a.) Watertight
  - b.) Rainproof
  - c.) Raintight
  - d.) All of these
9. The Code requires that all AC phase conductors where used, the neutral and all equipment grounding conductors be grouped together when using metal enclosures or raceways. The principal reason for this is \_\_\_\_\_.
  - a.) Currents would circulate through individual raceways
  - b.) Less expensive to install a single raceway
  - c.) Less labor hours for pulling wires in a single raceway
  - d.) Conductors are easier to pull in a single raceway
10. Installing more than three current carrying conductors in the same conduit requires \_\_\_\_\_.

- a.) A larger conduit
- b.) High heat rated conductors
- c.) Derating of ampacity
- d.) Continuous loading

11. A \_\_\_\_\_ helps prevent arcing in movable contacts.

- a.) Spring
- b.) Condenser
- c.) Resistor
- d.) Hydrometer

12. The \_\_\_\_\_ circuit is that portion of a wiring system prior to the final overcurrent protective device protecting the circuit.

- a.) Service Branch
- b.) Feeder
- c.) Power
- d.)

13. When tightening a screw on a terminal, the end of the conductor should wrap around the screw in the same direction that you are turning the screw so that \_\_\_\_\_.

- a.) When you pull on the conductor it will tighten
- b.) The screw will not become loose
- c.) The conductor will act as a locking nut
- d.) The conductor will not turn off

CB#9

14. Determining a positive wire on a single-phase circuit is \_\_\_\_\_.

- a.) Possible with a wattmeter
- b.) Possible with a voltmeter
- c.) Possible with an ammeter
- d.) An impossibility

15. A \_\_\_\_\_ is used for the testing specific gravity.

- a.) Thermocouple
- b.) Megger
- c.) Hydrometer
- d.) Galvanometer

16. An autotransformer differs from other types of transformers in the \_\_\_\_\_.

- a.) Its primary winding is always larger than its secondary winding
- b.) It can be used only in automobiles
- c.) Its primary and secondary windings are common to each other
- d.) It must be wound with heavier wire

17. Where the \_\_\_\_\_ is likely to be high, asbestos insulation on the conductor would be a good choice.

- a.) Temperature
- b.) Humidity
- c.) Voltage
- d.) Amperage

18. If the end of a cartridge fuse becomes warmer than normal, you should \_\_\_\_\_.

- a.) Tighten the fuse clips
- b.) Lower the voltage on the circuit
- c.) Notify the utility company
- d.) Change the fuse

19. Which of the following is the poorest conductor of electricity?

- a.) Mercury
- b.) Aluminum
- c.) Carbon
- d.) Silver

20. The primary winding of a loaded step-down transformer has \_\_\_\_\_ compared to secondary winding.

- a.) Lower voltage and current
- b.) Higher voltage and current
- c.) Higher voltage and lower current
- d.) Lower voltage and higher current

21. Copper is used for the tip of a soldering iron because \_\_\_\_\_.

- a.) Copper will not melt
- b.) Copper is a very good conductor of heat
- c.) Solder will not stick to the other alloys

d.) Copper is less expensive

22. The sum of the voltage drop around a circuit is equal to the source voltage is \_\_\_\_.

- a.) Kirchhoff's Law
- b.) Ohm's Law
- c.) Nevins's Theory
- d.) Faraday's Law

23. Piezoelectric is caused by crystals or binding \_\_\_\_.

- a.) Chemical
- b.) Battery
- c.) Pressure
- d.) Heat

24. Heavy-duty lampholders include \_\_\_\_.

- a.) Admedium lampholders rated at 660 watts
- b.) Lampholders used on circuits larger than 20 amperes
- c.) Lampholders rated at not less than 750 watts
- d.) All of the above

25. The reason for installing electrical conductors in a conduit is \_\_\_\_.

- a.) To provide a ground
- b.) To increase the ampacity of the conductors
- c.) To protect the conductors from damage
- d.) To avoid derating for continuous loading of conductors

26. Discoloring of one end of a fuse normally indicates \_\_\_\_.

- a.) Increased current
- b.) Excessive voltage
- c.) Low resistance
- d.) Poor contact

27. Wing nuts are useful on equipment where \_\_\_\_.

CB#9

- a.) Cotter pins are used
- b.) The nuts must be removed frequently
- c.) A wrench cannot be used
- d.) Screws cannot be used

28. When resistors are connected in series, the total resistance is \_\_\_\_.

- a.) The sum of the individual resistance values
- b.) The equivalent of the smallest resistance value
- c.) The equivalent of the largest resistance value
- d.) Less than the value of the smallest resistance

29. If a 120 volt incandescent light bulb is operating at a voltage of 125 volts, the result will be \_\_\_\_.

- a.) It may be enough to blow a fuse
- b.) The bulb won't be as bright
- c.) Shorter life of the bulb
- d.) The wattage will be less than rated

30. Laminations are used in transformers to prevent \_\_\_\_.

- a.) Copper loss
- b.) Weight
- c.) Eddy current loss
- d.) Counter EMF

31. The Code requires which of the following colors for the equipment grounding conductor?

- a.) White or gray
- b.) Green or green with yellow stripes
- c.) Yellow
- d.) Blue with yellow stripes

32. Sometimes mercury toggle switches are used in place of a regular toggle switch because they \_\_\_\_.

- a.) Are easier to connect
- b.) Do not wear out as quickly
- c.) Are less expensive
- d.) They glow in the dark

33. The assigned color for the high-leg conductor of a three-phase, 4-wire delta secondary is \_\_\_\_.

- a.) Red
- b.) Black
- c.) Blue
- d.) Orange

34. The Code rule for maximum 90 degree bends in a conduit between two boxes is four, the most likely reason for the total 360 degree limitation is \_\_\_\_.

- a.) It is unsafe
- b.) It makes pulling the conductors through the conduit too difficult
- c.) You can damage the galvanized coating on the conduit
- d.) Too many bends require extra wire to be pulled

35. The correct word to define wiring which is not concealed is \_\_\_\_.

- a.) Open
- b.) Uncovered
- c.) Exposed
- d.) Bare

36. A solenoid is \_\_\_\_.

- a.) Relay
- b.) Permanent magnet
- c.) Dynamo
- d.) Electromagnet

37. An electrician should always consider the circuit to be "hot" unless he definitely knows otherwise. The main reason is to avoid \_\_\_\_.

- a.) Personal injury
- b.) Having to find the panel
- c.) Saving time
- d.) Shutting off the wrong circuit

38. The best thing to cut PVC conduit within a tight area is \_\_\_\_.

- a.) A short hacksaw
- b.) A nylon string
- c.) A knife
- d.) A pipe cutter

39. If a live conductor is contacted accidentally, the severity of the electrical shock is determined primarily by \_\_\_\_.

- a.) The size of the conductor
- b.) Whether the current is DC or AC
- c.) The current in the conductor
- d.) The contact resistance

40. Ohm's law is \_\_\_\_.

- a.) An equation for determining power
- b.) The relationship between voltage, current and power
- c.) The relation between, current and resistance
- d.) A measurement of wattage losses

41. What is the normal taper on a standard conduit thread cutting die?

- a.) 1/2" per foot
- b.) 1/4" per foot
- c.) 3/8" per foot
- d.) 3/4" per foot

42. In an AC circuit the ratio of the power in watts to the total volt-amps is called the \_\_\_\_.

- a.) Demand factor
- b.) Power factor
- c.) Turns' ratio
- d.) Diversity factor



43. The total load on any overcurrent device located in a panel board shall not exceed \_\_\_\_ of its rating where in normal operation the load will continue for the 3 hours or more.

- a.) 80%                      b.) 125%                      c.) 70%                      d.) 50%

44. Four heaters, each having a resistance of 30 ohms, are connected in series across a 600-volt train circuit. The current is \_\_\_\_ amperes.

- a.) 5                      b.) 17                      c.) 20                      d.) 80

45. A ladder which is painted is a safety hazard mainly because the paint \_\_\_\_.

- a.) May conceal weak spots in the rails or rungs  
b.) Is slippery after drying  
c.) Causes the wood to crack more quickly  
d.) Peels and the sharp edges of the paint may cut the hands

46. The chemical used as the agent in the fire extinguishers to fight electrical fires is \_\_\_\_.

- a.) CO<sub>2</sub>      b.) KOH                      c.) H<sub>2</sub>O                      d.) L<sub>6</sub>

47. A location classified as \_\_\_\_ may be temporarily subject to dampness and wetness.

- a.) Dry                      b.) Damp                      c.) Moist                      d.) Wet

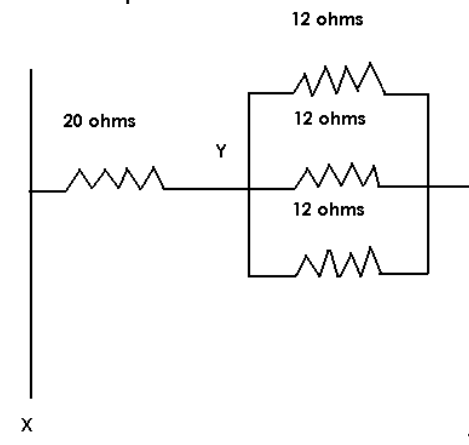
48. The average dry cell battery gives an approximate voltage of \_\_\_\_.

- a.) 1.5                      b.) 1.2                      c.) 1.7                      d.) 2.0

49. The \_\_\_\_ circuit is that portion of a wiring system beyond the final overcurrent protection

- a.) Lighting                      b.) Feeder                      c.) Signal                      d.) Branch

50. What is the voltage between points Y and Z?



EACH OF THE 12 OHM LOADS IS 2 AMPERES

- a.) 72 volts                      b.) 120 volts      c.) 24 volts      d.) 144 volts

CB#9

CLOSED BOOK  
EXAM  
#10

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE\_\_\_\_%

CB#10

JOURNEYMAN CLOSED BOOK EXAM #10 One Hour Time Limit

1. The neutral conductor shall not be \_\_\_\_.

- a.) Stranded      b.) Solid      c.) Insulated      d.) Fused

2. The voltage drop in a line can be decreased by \_\_\_\_.

- I. Increasing the wire size  
II. Increasing the current  
III. Decreasing the load

- a.) I only      b.) I and II only      c.) I, II, and III      d.) I and III only

3. In a residence, no point along the floor line in any wall space may be more than \_\_\_\_ feet from an outlet.

- a.) 6      b.)  $\frac{1}{2}$       c.) 12      d.) 10

4. Insulating safety grips on tools \_\_\_\_.

- a.) Are enough  
b.) Are not meant for that purpose  
c.) Should be used with other insulating equipment  
d.) Are not enough

5. The rating of any one portable appliance shall not exceed \_\_\_\_ percent of the branch circuit rating.

- a.) 40      b.) 50      c.) 70      d.) 80

6. A generic term for a group of non-flammable synthetic chlorinated hydrocarbons used as electrical insulating media:

- a.) Askarel      b.) Acid      c.) Chloragorm  
d.) Solder

7. The part of an electrical system that performs a mechanical function rather than an electrical function is called a (n) \_\_\_\_.

- a.) Receptacle      b.) Device      c.) Fitting      d.) Outlet

8. An electrical condenser is the best defined as \_\_\_\_.

- a.) A coil of wire  
b.) A wrapping of layers of metal foil  
c.) A coil of wire with layers of metal foil  
d.) A wrapping of many layers of metal foil set apart by waxed paper

9. Solid wire is preferred instead of stranded wire in panel wiring because \_\_\_\_

- a.) Costs less than stranded      c.) Can be "shaped" better  
b.) Solid will carry more current      d.) No derating required for solid

10. Which one of the following is not an insulator?

- a.) Bakelite water      b.) Oil      c.) Air      d.) Salt

11. The definition of accessible (wire):

- a.) Admitting close approach  
b.) Not guarded by locked doors, elevation, etc.  
c.) Not permanently closed in by the building or structure  
d.) All of these

12. The Code is designed for safety regardless of \_\_\_\_.

- I. Cost  
Time  
Maintenance  
III. Efficiency  
IV. Future Expansion

- a.) I and II    b.) III and IV    c.) I through IV    d.) I through V

13. When voltage and current appear at their zero and peak values at the same time, they are in \_\_\_\_.

- a.) Motion      b.) Group      c.) Phase      d.) Balanced

14. What is meant by "traveler wire"?

- a.) Wiring to a split receptacles      c.) Wiring to a door bell  
b.) Two-wire between 3-way switches      d.) Out of state electrician

15. On a #4 drill bit, the #4 is determined by \_\_\_\_.

- a.) Hardness      b.) Size      c.) Strength      d.) Length

16. Wiring systems in wet locations should be \_\_\_\_.

- a.) Placed so a permanent air space separates them from the supporting surface  
b.) Separated by insulated bushings  
c.) Separated by non-combustible tubing  
d.) Protected by group strip

17. The best type of fire extinguisher for an electrical fire is a \_\_\_\_.

- a.) Dry chemical extinguisher      c.) Foam extinguisher  
b.) Soda-acid extinguisher      d.) Carbon monoxide extinguisher

18. "Thermally protected" appearing on the nameplate of a motor indicates that the motor is provided with a \_\_\_\_.

- a.) Fuse    b.) Switch    c.) Breaker    d.) Heat sensing element

19. A capacitor is a device that \_\_\_\_ energy.

- a.) Produces      b.) Stores      c.) Opposes      d.) Increases

20. When working near acid storage batteries, extreme care should be taken to guard against sparks, essentially to avoid \_\_\_\_.

- a.) Overheating the electrolyte      c.) A short circuit  
b.) An electric shock      d.) An explosion

21. Which of the following statements is incorrect?

- a.) Current flowing through a conductor causes heat  
b.) The conduit of an electrical system should be grounded  
c.) Voltmeters are connected in parallel in a circuit

CB#10

d.) Rectifiers change DC to AC

22. When installing raceway systems, it is essential that they be \_\_\_\_.

- a.) Rigidly supported as required
- b.) Exposed
- c.) Concealed in walls
- d.) Readily Accessible

23. Which of the following is a "handy" box?

24. The reason for grounding the frame of a portable electric hand tool is to \_\_\_\_.

- a.) Prevent the frame of the tool from becoming alive to ground
- b.) Prevent overheating of the tool
- c.) Prevent shorts
- d.) Reduce shorts
- e.) Reduce the voltage drop

25. Two metals of different materials shall not be joined together in order to avoid the \_\_\_\_ action.

- a.) Rusting
- b.) Galvanic
- c.) Reverse
- d.) Corrosion

26. A \_\_\_\_ is a device which serves to govern in some predetermined manner the electric power delivered to the apparatus to which it's connected.

- a.) Switch
- b.) Feeder
- c.) Service
- d.) Controller

27. The ungrounded conductor can be identified by the color \_\_\_\_.

- a.) White or gray
- b.) Green or bare
- c.) Pink flamingo
- d.) None of these

28. What is the maximum number of overcurrent devices allowed in the lighting and appliance panel board?

- a.) 24
- b.) 30
- c.) 36
- d.) 42

29. A \_\_\_\_ is a certain type of cartridge fuse that can be readily replaced.

- a.) Time-lag fuse
- b.) Permanent fuse
- c.) One-time fuse
- d.) Renewable fuse

CB#10

30. The purpose of a Western Union splice is \_\_\_\_.

- a.) For the use of utility companies only
- b.) For the purpose of strengthening a splice
- c.) For use on the west coast only
- d.) None of these

31. Electricity may be produced by means of \_\_\_\_ forces.

- a.) Mechanical
- b.) Thermal
- c.) Chemical
- d.) All of these

32. Copper-clad aluminum conductors have an ampacity \_\_\_\_.

- a.) Lower than copper but higher than aluminum
- b.) Equal to copper
- c.) Rating of their own
- d.) Equal to aluminum

33. The heating element in a toaster has a \_\_\_\_.

- a.) Low resistance
- b.) High resistance
- c.) High conductivity
- d.) None of these

34. The total resistance of four 10 ohm resistors in parallel is

\_\_\_\_\_.

- a.) 10 ohms      b.) 2.5 ohms      c.) 5 ohms      d.) 4 ohms

35. To mark a point on the floor directly beneath a point on the ceiling, it is best to use a \_\_\_\_\_.

- a.) Transit rod      b.) Plum bob      c.) Square      d.) 12' tape

36. Openings around electrical penetrations through fire-resistant rated walls, partitions, floors or ceilings shall be \_\_\_\_\_.

- a.) Bushed      b.) Sleeved      c.) Firestopped  
d.) Isolated

37. A generator exciter uses \_\_\_\_\_ current.

- a.) Alternating  
b.) Direct  
c.) Neither alternating nor direct  
d.) Either alternating or direct

38. When installing an instrument meter on a panel, to obtain accurate mounting \_\_\_\_\_.

- a.) Use the meter and drill through the holes      c.) Use a template  
b.) Drill oversize holes      d.) Drill firm back of panel

39. The advantage of cutting a metal rigid conduit with a hacksaw rather than a pipe cutter is \_\_\_\_\_.

- a.) You do not need a vice required      c.) Less reaming is required  
b.) Less energy required in cutting      d.) Threading oil is not

required

40. You would use an approved \_\_\_\_\_ to protect conductors from abrasion where they enter a box.

- a.) Locknut      b.) Bushing      c.) All thread      d.) Hickey

41. To reverse the rotation of a three-phase motor you would \_\_\_\_\_.

- a.) Reverse all the leads  
b.) Reverse two of the four leads  
c.) Turn it around  
d.) Reverse any two of the three leads

42. The output rating of a one horsepower motor is \_\_\_\_\_.

- a.) 1840 watts      b.) 746 watts      c.) 1500 watts      d.) 1000watts

43. In other than residential calculations, an ordinary outlet shall be calculated at \_\_\_\_\_.

- a.) 200 va      b.) 600 watts      c.) 300 watts      d.) 180 va

44. Impedance is present in the following type of circuit:

- a.) Resistance      b.) DC only      c.) AC only      d.) Both AC and DC

45. On an insulated conductor the type letter "TW" indicates \_\_\_\_\_.

- a.) Tie-wire      c.) Thermoplastic-waterproof  
b.) Thermoplastic-moisture resistant      d.) Thermal-with nylon

46. A load is considered to be continuous if it is expected to continue for \_\_\_\_.

- a.) ½ hour      b.) 1 hour      c.) 2 hours      d.) 3 hours

47. The standard classification of branch circuits applies only to those circuits with \_\_\_\_ outlets.

- a.) Two or more  
b.) More than two  
c.) More than three  
d.) Three or more

48. If the primary of a transformer is 480 volts and secondary is 240/120v, the wire on the \_\_\_\_ is larger.

- a.) Tertiary      b.) Secondary c.) Primary      d.) Winding

49. The important function of a type S fuse is \_\_\_\_.

- a.) Non-interchangeable  
b.) Slow burner  
c.) Motor protection  
d.) Fast Acting

50. If the voltage is doubled the ampacity of a conductor \_\_\_\_.

- a.) Increase    b.) Decrease      c.) Doubled      d.) Remains the same

## CLOSED BOOK EXAM #11

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_%

CB#11

JOURNEYMAN CLOSED BOOK EXAM #11 One Hour Time Limit

1. A \_\_\_\_\_ is a protective device for limiting surge voltages by discharging or by passing surge current, and it also prevents continued flow of follow current while remaining capable of repeating these functions.
  - a.) Surge arrester
  - b.) Automatic fuse
  - c.) Fused.
  - d.) Circuit Breaker
2. A \_\_\_\_\_ conductor is one having one or more layers of non-conducting materials that are not recognized as insulation.
  - a.) Bare
  - b.) Covered
  - c.) Insulated
  - d.) Wrapped
3. In a DC circuit, the ratio of watts to volt amperes is \_\_\_\_\_.
  - a.) Unity
  - b.) Greater than
  - c.) Less than one
  - d.) Cannot tell what it might be
4. A current limiting overcurrent protective device which will \_\_\_\_\_ the current flowing in the faulted circuit.
  - a.) Reduce of these
  - b.) Increase
  - c.) Maintain
  - d.) None
5. The horse power rating of a motor \_\_\_\_\_.
  - a.) Is a measure of motor efficiency
  - b.) Is the input to the motor
  - c.) Cannot be changed to watts
  - d.) Is the output of the motor
6. A common fuse and circuit breaker works on the principal that \_\_\_\_\_.
  - a.) Voltage develops heat
  - b.) Voltage breaks down insulation
  - c.) Current develops heat
  - d.) Current expands a wire
7. The voltage will lead the current when the \_\_\_\_\_ in the circuit.
  - a.) Inductive reactance exceeds the capacitive reactance
  - b.) Reactance exceeds the resistance in the circuit
  - c.) Resistance exceeds reactance
  - d.) Capacitive reactance exceeds the inductive reactance
8. Which of the following is an Allen head bolt?
9. \_\_\_\_\_ is self-acting, operating by its own mechanism when actuated by some impersonal influence, as for example, a change in current strength, pressure, temperature, or mechanical configuration.
  - a.) Remote-control
  - b.) Automatic
  - c.) Semi-automatic
  - d.) Controller
10. A 1000 watts, 120 volt lamp uses electrical energy at the same rate as a 14.4 ohm resistor on \_\_\_\_\_.



- a.) 120 volts      b.) 115 volts    c.) 208 volts    d.) 240 volts

11. When using compressed air to clean electrical equipment the air pressure should not exceed 50 pounds. The main reason is higher pressures \_\_\_\_.

- a.) May loosen insulating tape  
b.) May blow dust to surrounding equipment  
c.) Introduce a personal hazard to the user  
d.) May rupture the air hose

12. Which of the following is not used to fasten equipment to concrete?

- a.) Expansion bolt      b.) Lead shield      c.) Rawl plug    d.) Steel blushing

13. A single-pole switch to operate a light will have the wiring connected in the \_\_\_\_ conductor.

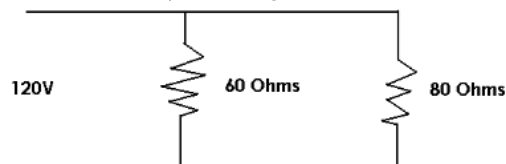
- a.) Grounded      b.) Identified    c.) Ungrounded    d.) Neutral

14. The decimal equivalent of  $9/16$  is \_\_\_\_.

- a.) 0.5625      b.) 0.675      c.) 0.875      d.) None of these

15. The information most useful in preventing the recurrence of a similar type accident when making out an accident report would be \_\_\_\_.

- a.) The nature of the injury      c.) The weather conditions at the time  
b.) The cause of the accident    d.) The age of the person involved



16. What is the total wattage of the circuit?

- a.) 3.5      b.) 420      c.) 16,800      d.) 140

17. Artificial respiration after a severe electrical shock is necessary when the shock results in \_\_\_\_.

- a.) Broken limbs  
b.) Bleeding  
c.) Stoppage of breathing  
d.) Unconsciousness

18. If the circuit voltage is increased, all else remains the same, only the \_\_\_\_ will change.

- a.) Resistance    b.) Current    c.) Ampacity    d.) Conductivity

19. The two methods of making joints or connections for insulated cables are soldered connections and by means of solderless connection devices (wirenuts). The advantage (s) of a solderless connection (wirenut) is/are \_\_\_\_.

- I. Will not fail under short circuit due to melting of solder  
II. Mechanical strength as great as solder  
III. Reduces the time required to make a splice

- a.) I only    b.) I and II only      c.) II and III only    d.) I, II, and III

20. Which of the following plugs is a polarized plug?

21. When accidentally splashing a chemical into the eyes the best

immediate first aid solution is to \_\_\_\_\_.

- a.) Look directly into the sun      c.) Flush eyes with clean water
- b.) Rub eyes with dry cloth      d.) Close eyes quickly

22. It is generally not good practice to supply lamps and motors from the same circuit because \_\_\_\_\_.

- I. It is more economical to operate motors on a higher voltage than that of a lighting circuit
- II. Overloads and short circuits are more common on motor circuits and would put the lights out
- III. When a motor is started it would cause the lights to dim or blink

- a.) I only    b.) II only    c.) III only    d.) I, II and III

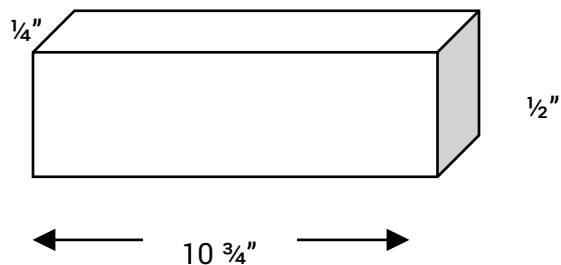
23. Which of the following is the correct wiring to a light controlled by two 3-way switches?

- a.) I only      b.) II only      c.) III only      d.) IV only

24. The Code considers low voltage to be \_\_\_\_\_.

- a.) 480 volts or less      b.) 600 volts or less    c.) 24 volts    d.) 12 volts

25. The Cross-sectional area of the bus bar is \_\_\_\_\_ square inch.



- a.) 0.125      b.) 1.34375    c.) 11.5      d.) None of these

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26. A high spot temperature in a corroded electrical connection is caused by a (an) \_\_\_\_\_.

- a.) Increase in the flow of current through the connection
- b.) Decrease in the voltage drop across the connection
- c.) Increase in the voltage drop across the connection
- d.) Decrease in the effective resistance of the connection

27. \_\_\_\_\_ is the symbol used for the delta connection.

- a.)  $\Omega$       b.)  $\Sigma$       c.)  $\emptyset$       d.)  $\Delta$

28. Because aluminum is not a magnetic metal, there will be \_\_\_\_\_ present when aluminum conductors are grouped in a raceway.

- a.) No heat due to voltage      c.) No induced current
- b.) No heating due to hysteresis    d.) None of these

29. A switch is a device for \_\_\_\_\_.

- I. Making or breaking connections
- II. Changing connections
- III. Interruption of circuit under short-circuit conditions

- a.) I only    b.) I and II only      c.) II and III only    d.) I, II, and III

30. At least two persons are required to be present during a high-voltage test because \_\_\_\_\_.

- a.) One person can cover while the one is on break

- b.) High voltage is too heavy for one  
c.) If one person is hurt the other person can help  
d.) It eliminates over time
31. One of the essential functions of any switch is maintain a \_\_\_\_\_.  
  
a.) Good high-resistance contact in the closed position  
b.) Good low-resistance contact in the closed position  
c.) Good low-resistance contact in the open position  
d.) Good high-resistance contact in the open position
32. Which of the following is a 30 amp receptacle?
33. When the ground resistance exceeds the allowable value of 25 ohms, the resistance can be reduced by \_\_\_\_\_.  
  
I. Parallel ground rods  
II. Using a longer ground rod  
III. Using a larger diameter ground rod  
IV. Chemical treatment of soil
- a.) II and III only  
b.) I, II and III only  
c.) II, III and IV only  
d.) I, II, III and IV
34. Silver and gold are better conductors of electricity than copper; however, the main reason copper is used is its \_\_\_\_\_.  
  
a.) Weight   b.) Strength   c.) Melting point   d.) Cost is less
35. Standard lengths of conduit are in 10 foot lengths. A required feeder raceway is 18 yards in length, how many lengths of 10 foot conduit would you need?  
  
a.) 4      b.) 5      c.) 6      d.) None of these

36. The term "open circuit" means \_\_\_\_\_.  
  
a.) The wire is in an open area  
b.) The wiring is exposed on a building  
c.) All parts of the circuit are not in contact  
d.) The circuit has one end exposed
37. Which of the items below is used to test specific gravity?
38. Conduit should be installed as to prevent the confliction of water in it between outlets. The conduit should not have a \_\_\_\_\_.  
  
a.) Low point at an outlet  
b.) High point at an outlet  
c.) High point between successive outlets  
d.) Low point between successive outlets
- CB#11
39. Brass is an alloy of \_\_\_\_\_.  
  
a.) Zinc and copper  
b.) Lead and copper  
c.) Tin and lead  
d.) Lead and tin
40. Which type of the following portable fire extinguishers should be used on a live electrical fire?  
  
a.) Carbon dioxide      b.) Water      c.) Foam      d.) Soda-acid
41. Enclosed knife switches that require the switch to be open before the housing door can be opened, are called \_\_\_\_\_

switches.

- a.) Release Service      b.) Air-break      c.) Safety      d.)

42. Which of the following is a solenoid?

43. What Article of the Code addresses high-voltage (over 600 volts)?

- a.) 450      b.) 230      c.) 680      d.) 490

44. A close nipple \_\_\_\_.

- a.) Is always  $\frac{1}{2}$ " or less in length      c.) Has only internal threads  
b.) Has no threads      d.) Has threads over its entire length

45. When applying rubber tape to an electrical splice, it would be necessary to \_\_\_\_.

- a.) Stretch the tape properly during the application  
b.) Apply an adhesive to the splice before applying the tape  
c.) Apply the rubber tape after any other tape  
d.) Apply heat to the tape when installing

46. A stranded wire with the same AWG as a solid wire \_\_\_\_.

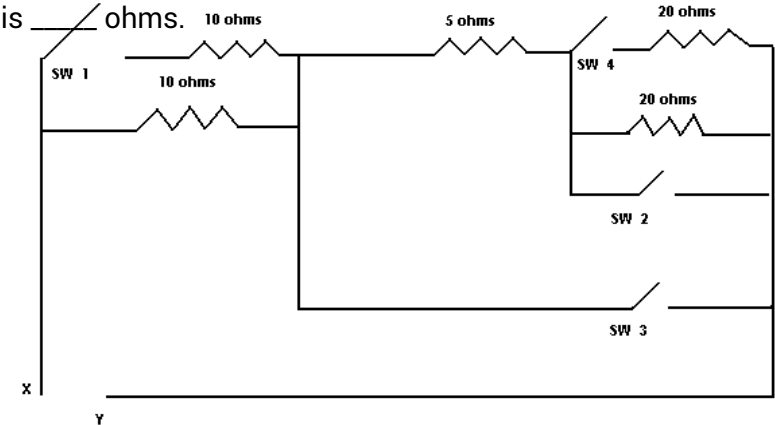
- a.) Is used for higher voltages      c.) Is larger in total diameter  
b.) Has a higher ampacity      d.) has the same resistance

47. A limit switch is used on a piece of machinery to open the circuit when the \_\_\_\_.

- a.) Current exceeds a preset limit

- b.) Travel reaches a preset limit  
c.) Pressure exceeds a preset limit  
d.) temperature reaches a preset limit

48. With switches 1 and 2 closed the combined resistance of the circuit is \_\_\_\_ ohms.



- a.) 30      b.) 25      c.) 10      d.) 3

49. When rigid metal conduits are buried the minimum cover required by the Code is \_\_\_\_.

- a.) 6"      b.) 12"      c.) 18"      d.) 24"

50. A fixture that weighs more than \_\_\_\_ pounds shall not be supported by the screw shell of a lamp holder.

- a.) 2      b.) 3      c.) 4      d.) 6

CLOSED BOOK  
EXAM  
#12

50 QUESTIONS  
TIME LIMIT – 1 HOUR

TIME SPENT \_\_\_\_ MINUTES

SCORE \_\_\_\_%

CB#12

JOURNEYMAN CLOSED BOOK EXAM #12 One Hour Time Limit

1. Your foreman asked you to measure the insulation resistance of some conductors. To do this you would use a \_\_\_\_\_.  
a.) Hydrometer    b.) Megger    c.) Bell tester    d.) Wattmeter
2. The main difference between a pipe thread and a machine thread is that the pipe thread is \_\_\_\_\_.  
a.) Finer            b.) Longer    c.) Uneven    d.) Tapered
3. Receptacles in residential wiring are regularly connected in \_\_\_\_\_.  
a.) Parallel            b.) Perpendicular    c.) Series    d.) Diagonal
4. A foreman in charge of a crew of men preparing to work on a low voltage tension circuit should caution them to \_\_\_\_\_.  
a.) Work only when the load is zero  
b.) Consider the circuit hot at all times  
c.) Never work on any circuit alone  
d.) Wait until the circuit has been killed
5. The term pneumatic refers to \_\_\_\_\_.  
a.) Electricity    b.) Steam    c.) Air    d.) Oil
6. What type of fastener would you use to mount a box to a hollow tile wall?  
a.) Expansion bolt                            c.) Rawl plugs  
b.) Toggle bolts                            d.) Bolts with backing plates
7. If a low resistance is connected in parallel with a higher resistance, the combined resistance is \_\_\_\_\_.  
a.) Higher or lower than the low resistance depending on the size of the higher resistance  
b.) Always less than the low resistance  
c.) Always more than the higher resistance  
d.) The total would be the low and high added together
8. The lubricant use to make pulling wires through a conduit easier is \_\_\_\_\_.  
a.) Grease  
b.) Powdered pumice  
c.) Vaseline  
d.) Powdered soap tone
9. The instrument by which electric power is measure is a \_\_\_\_\_.  
a.) Ammeter    b.) Rectifier    c.) Voltmeter    d.) Wattmeter

10. The connection between the grounded circuit conductor and the equipment grounding conductor at the service is called \_\_\_\_ bonding jumper.

- a.) Circuit    b.) Equipment    c.) Main    d.) Appliance

11. The larger the conductor, the \_\_\_\_.

- a.) Higher the resistance                      c.) Higher the voltage  
b.) Lower the ampacity                      d.) Lower the resistance

12. A hook on the end of a fish tape is not to \_\_\_\_.

- a.) Keep it from catching on joints and bends  
b.) Tie a swab to  
c.) Tie the wires, to be pulled  
d.) Protect the end of the wire

13. Which of the following is a LL conduit body?

14. When soldering two copper conductors together, they are kept clean while heating by \_\_\_\_.

- a.) The use of flux  
b.) Applying the solder quickly  
c.) Rubbing often with emery cloth  
d.) Not permitting the open flame to touch them

CB#12

15. Metal cabinets used for lighting circuits are grounded to \_\_\_\_.

- a.) Reduce shock hazard  
b.) Eliminate electrolysis  
c.) Assure that the fuse will blow in a defective circuit  
d.) Simplify the wiring

16. In sockets, extension cord is protected by means of the \_\_\_\_ knot.

- a.) Underwriters'  
b.) Clove hitch  
c.) Sheepshank  
d.) Western union

17. A branch circuit that supplies a number of outlets for lighting and appliances is a \_\_\_\_ branch circuit.

- a.) Individual    b.) Multi-purpose                      c.) General purpose    d.) Utility

18. When three equal resistors are connected in parallel, the total resistance is \_\_\_\_.

- a.) Equal to the resistance of each                      c.) Greater than any one resistance  
b.) Less than anyone resistor    d.) None of these

19. The efficiency of a motor is measure of \_\_\_\_.

- a.) The natural speed of the motor  
b.) The torque the motor produces  
c.) How well it converts electrical energy into mechanical energy  
d.) The power output of the motor in horsepower

20. When stripping insulation from an aluminum conductor \_\_\_\_.

- I. Remove insulation as you would sharpen a pencil  
II. Ring the conductor and slip the insulation off the conductor  
III. Peel the insulation back and then cut out wards

- a.) I, II and III                      b.) I and II only    c.) I and III only    d.) II and III only

21. The \_\_\_\_ angle is the angle between the real power and the apparent power.

- a.) Lag    b.) Power factor    c.) Voltage-current    d.) Watt

22. The most heat is created when current flows through which of the following?

- a.) A 10 ohm condenser    c.) A 10 ohm resistor  
b.) A 10 ohm inductance coil    d.) Heat would be equal

23. 60 cycles frequency travels 180 degrees in how much many seconds?

- a.) 1/60    b.) 1/120    c.) 1/180    d.) 1/30

24. The current-carrying capacity of conductors expressed in amperes is \_\_\_\_.

- a.) Demand    b.) Pressure    c.) Ampacity    d.) Duty-cycle

25. The electrician's tapered reamer is used for \_\_\_\_.

- a.) Reaming the threads on couplings  
b.) Reaming the holes in bushings  
c.) Reaming the ends of rigid conduit after it is cut  
d.) Making holes in boxes

26. Electricity is sold by the kilowatt which is \_\_\_\_ watts.

- a.) 10,000    b.) 1000    c.) 100    d.) 100,000

27. Three-way switching does not use the following conductor:

- a.) Ungrounded    b.) Traveler    c.) Grounded    d.) Switch leg

28. The greater the number of free electrons the better the \_\_\_\_ of a metal.

- a.) Insulation value    b.) Resistance    c.) Voltage drop  
d.) Conductivity

29. To cut Wiremold you would \_\_\_\_.

- a.) Use a chisel  
b.) Use an improved cutter like an M.M. cutter  
c.) Use a pair of tin snips  
d.) Use a hacksaw and remove the burr with a file

30. Electrical contacts are opened or closed when the electrical current energizes the coils of a device called a \_\_\_\_.

- a.) Thermostat    b.) Reactor    c.) Condenser    d.) Relay

31. A clamp-on ammeter will measure \_\_\_\_.

- a.) Voltage when clamped on a single conductor  
b.) Current when clamped on a multi-conductor cable  
c.) Accurately only when parallel to cable  
d.) Accurately only when clamped perpendicular to a conductor

32. When a current leaves its intended path and returns to the source by passing the load the circuit is \_\_\_\_.

- a.) Open    b.) Shorted    c.) Incomplete    d.) Broken

33. The electric pressure or electromotive force is measured by the \_\_\_\_.

- a.) Volt    b.) Electric meter    c.) Watt    d.) Kilowatt

CB#12



34. Conduit installed in a concrete slab is considered a \_\_\_\_.

- a.) Damp location
- b.) Moist location
- c.) Wet location
- d.) Dry location

35. It is best as a safety measure, not to use water to extinguish electrical equipment fires. The main reason is that water \_\_\_\_.

- a.) May transmit shock to the user
- b.) Will turn to steam
- c.) Will not put the fire out
- d.) May damage the wiring

36. The total opposition to current flow in an AC circuit is expressed in ohms and is called \_\_\_\_.

- a.) Impedance   b.) Conductance   c.) Reluctance   d.) Resistance

37. Which of the item below is a rotometer?

38. When a person is buried the basic care steps are \_\_\_\_.

- a.) Cover and cool the burned area   c.) Care for shock
- b.) Prevent the infection   d.) All of these

39. A multimeter is a combination of \_\_\_\_.

- a.) Ammeter, ohmmeter, and wattmeter
- b.) Voltmeter, ohmmeter, ammeter
- c.) Voltmeter, ammeter, and megger
- d.) Voltmeter, wattmeter, ammeter

40. A good magnetic material is \_\_\_\_.

- a.) Brass   b.) Copper   c.) Iron   d.) Aluminum

41. Since fuses are rated by an amperage and voltage a fuse will work on \_\_\_\_.

- a.) AC only   b.) AC or DC   c.) DC only   d.) any voltage

42. A fuse puller is used in replacing \_\_\_\_.

- a.) Cartridge fuses   b.) Plug fuses   c.) Link fuses   d.) Ribbon fuses

43. A pendant fixture is a \_\_\_\_.

- a.) Hanging fixture
- b.) Recessed fixture
- c.) Bracket fixture
- d.) None of these

44. To fasten an outlet box between the studs in a wall constructed of metal lath and plaster, you would use \_\_\_\_.

CB#12

- a.) Cement or mortar   c.) Nylon twine
- b.) Iron wire   d.) An approved box hanger

45. The unit of measurement for electrical resistance to current is the

- a.) Watt   b.) Ohm   c.) Volt   d.) Amp

46. A low energy power circuit \_\_\_\_.

- a.) Is a remote-control circuit

- b.) Is a signal circuit
- c.) Has its power supplied by transformers and batteries
- d.) None of these

47. To convert AC or DC you will use a \_\_\_\_\_.

- a.) Generator   b.) Rectifier   c.) Vibrator   d.)  
Auto-transformer

48.  $S_3$  is a symbol used on a drawing to indicate a \_\_\_\_\_ switch.

- a.) Flush   b.) Single-pole   c.) Four-way   d.) Three-way

49. Action requiring personal intervention for its control:

- a.) Controller   b.) Automatic   c.) Periodic duty   d.)  
Non-automatic

50. A volt meter is connected in \_\_\_\_\_ with the load.

- a.) Series   b.) Parallel   c.) Series-parallel   d.) Series-shunt