



## **RME Question Bank SCOPE**

### **(2) Philippine Electrical Code, Parts 1 and 2:**

General requirements for installation of electric wiring and equipment.

Approved wiring methods.

Types of wiring materials and wiring devices.

Installation of switchboard and panel boards.

Installation in hazardous locations.

Wiring diagrams of different types of motor starters with motor protection.

Drawing symbols and wiring plants.

Other related subjects as may be prescribed by the Board.

## PEC 2009 REFRESHER 1

**1. Service overhead conductors to a building or other structure (such as a pole) on which a meter of disconnecting means is installed shall be considered as a \_\_\_\_\_ and installed accordingly.**

- (a.) temporary service
- (b.) service lateral
- (c.) **service drop**
- (d.) service point

**2. If a switch or circuit breaker serves as the disconnecting means for a permanently connected motor driven appliance of more than \_\_\_\_\_ horsepower, it shall be located within sight from the motor controller.**

- (a.)  **$\frac{1}{8}$**
- (b.)  $\frac{1}{4}$
- (c.)  $\frac{1}{2}$
- (d.)  $\frac{3}{4}$

**3. Overcurrent devices shall be enclosed in \_\_\_\_\_.**

**I. cabinets**

**II. Cutout boxes**

- (a.) I only
- (b.) II only
- (c.) **I or II**
- (d.) none of these

**4. Where reduced heating of the conductors results from motors operating on duty-cycle, intermittently, or from all motors not operating at one time, the feeder conductors \_\_\_\_.**

- (a.) are not allowed to have the ampacity reduced
- (b.) **may have an ampacity less than specified if acceptable to the authority having jurisdiction**
- (c.) must be sized no smaller than 125% of the largest motor connected to the feeder
- (d.) must be sized not smaller than 125 % of the largest motor plus other loads

**5. Live parts of generators operated at more than \_\_\_\_\_ volts to ground shall not be exposed to accidental contact where accessible to unqualified persons.**

- (a.) 30
- (b.) **50**
- (c.) 120
- (d.) 150

**6. A \_\_\_\_\_ is a circuit operating at 600 volts, nominal or less, between phases that connects two power sources or power supply points, such as the secondaries of transformers.**

**I. branch circuit    II. branch circuit multiwire**

**III. secondary tie**

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

**7. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with \_\_\_\_\_ warning signs forbidding unqualified persons to enter.**

- (a.) yellow
- (b.) blue
- (c.) **conspicuous**
- (d.) orange

**8. Overhead spans of open conductors and open multiconductor cables not over 600 volts shall have a vertical clearance of not less than \_\_\_\_\_ above the roof surface.**

- (a.) **8**
- (b.) 6
- (c.) 4
- (d.) 3

**9. Where single conductors #1/0 through 4/0 are installed in a ladder or ventilated trough cable tray they shall be installed in no more than \_\_\_\_\_.**

**I. a depth of 4"**

**II. a depth of 6"**

**III. a single layer**

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

**10. Where flexible cords are permitted by the code to be permanently connected, it is permissible to omit \_\_\_\_\_ for such cords.**

- (a.) switches
- (b.) **receptacles**
- (c.) grounding connections
- (d.) GFCI protection

**11. Lested or labeled equipment shall be installed, used, or both, in accordance with \_\_\_\_\_.**

- (a.) the fob specified
- (b.) the plans
- (c.) the instructions given by the authority having jurisdiction
- (d.) the instructions included in the listing or labeling**

**12. A grounding electrode connection that is encased in concrete or directly buried shall \_\_\_\_\_.**

- (a.) be made accessible
- (b.) be made only by exothermic welding
- (c.) be a minimum #4 bare
- (d.) not be required to be accessible**

**13. Wet niche or no niche lighting fixtures that are supplied by a flexible cord or cable shall all exposed noncurrent carrying metal parts grounded by an insulated copper equipment grounding conductor not smaller than the supply conductors and not smaller than \_\_\_\_\_.**

- (a.) #16** (c.) # 14
- (b.) # 18 (d.) #12

**14. If laid in notches in wood studs, joists, rafters, or other wood members \_\_\_\_\_ shall be protected against nails or screws by a steel plate at least 1/16" thick.**

- (a.) EMT
- (b.) rigid nonmetallic conduit
- (c.) intermediate steel conduit
- (d.) flexible conduit**

**15. A two pole circuit breaker that may be used for protecting a 3 phase corner grounded delta circuit shall be marked \_\_\_\_\_.**

- (a.) 1 phase 120/240v (b.) **1 phase – 3 phase**
- (c.) 1 phase/2phase/3phase (d.) 480Y/277v

**16. When installing a surge arrester at the service of less than 1000 volts, the grounding conductor shall be connected to \_\_\_\_\_.**

**I. the grounded service conductor II. the grounding electrode conductor**

**III. the grounding electrode for the service**

**IV. the equipment grounding terminal in the service equipment**

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

**17. A means shall be provided in each metal box over 100 cubic inches for the connection of an equipment grounding conductor. The means shall be permitted to be \_\_\_\_\_.**

- I. a tapped hole II. the cover screw III. a screw used to mount the box
- (a.) I only** (c.) I & II only
- (b.) II only (d.) I, II or III

**18. a lighting fixture installed outdoors is permitted to be supported by \_\_\_\_\_.**

**I trees**

**II. a metal pole**

**III. an outlet box**

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

**19. The outer metal shell of a lampholder shall be lined with insulating material that shall prevent more than \_\_\_\_\_, but shall prevent any current carrying part of the lamp base from being exposed when a lamp is in the lampholding device.**

- (a.) 1/16" (c.) 1/4"
- (b.) 1/8"** (d.) 1/2"

**20. A \_\_\_\_ shall be used to connect the equipment grounding conductors, the service equipment enclosures, and where the system is grounded, the grounded service conductor to the grounding electrode.**

(a.) bus bar

( c.) 5/8" ground rod

(b.) neutral conductor

**(d.) grounding electrode cond.**

**21. For equipment rated 1200 amperes or more 600 volts or less, and over 6 feet wide, containing overcurrent devices, switching devices, or control devices, there shall be one entrance not less than \_\_\_\_\_ inches wide and 6 ½ feet high at each end.**

- (a.) 24
- (b.) 30
- (c.) 36
- (d.) 48

**22. Appliances that have \_\_\_\_\_ that are to be connected by (1) permanent wiring method or (2) by field installed attachment plugs and cords with three or more wires (including the equipment grounding conductor) shall have means to identify the terminal for the grounded circuit conductor (if any).**

**I. screw shell lampholders**

**II. single pole overcurrent device in the line**

**III. single pole switch**

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

**23. Of the following, \_\_\_\_\_ box may be used for a floor receptacle.**

- (a.) a 4 11/6" x 1 ¼ square metal box with device ring listed for the purpose
- (b.) a 3" x 2" x 2 ½ " metal device box with device ring listed for the purpose
- (c.) a box listed specifically for this application
- (d.) any of these

**24. For one family dwelling, at least one receptacle outlet, in addition to any provided for laundry equipment, shall be installed in each \_\_\_\_\_.**

- I. basement
- II. detached garage with electric power
- III. attached garage
- (a.) I only
- (b.) II only
- (c.) I and III only
- (d.) I, II and III

**25. Where nonmetallic sheathed cable is used with boxes no larger than \_\_\_\_\_ mounted in walls or ceilings and where the cable is fastened within 8 inches of the box, securing the cable to the box shall not be required.**

- (a.) 2 1/4 x 4"
- (b.) 2 ½ " x 4"
- (c.) 2" x 4"
- (d.) 1 ¼" x 4"

**26. For swimming pool water heaters rated at more than \_\_\_\_\_ amperes that have specific instructions regarding bonding and grounding, only those parts designated to be bonded shall be bonded, and only those parts designated to be grounded shall be grounded.**

- (a.) 50
- (b.) 40
- (c.) 30
- (d.) 20

**27. Where a fixture is recessed in fire resistant material in a building of fire resistant construction, a temperature not higher than \_\_\_\_\_ shall be considered acceptable if the fixture is plainly marked that it is listed for that service.**

- (a.) 150°C
- (b.) 165°C
- (c.) 170°C
- (d.) none of these

**28. A manufactured assembly designed to support and energize lighting fixtures that are capable of being readily repositioned is \_\_\_\_\_.**

- (a.) ceiling grid lighting
- (b.) electric discharge lighting
- (c.) lighting track
- (d.) open circuit lighting



**29. For AC adjustable voltage, variable torque drive motors, the ampacity of conductors, or ampere ratings of switches, circuit breakers or fused and ground fault protection shall be based on the operating current marked on the nameplate. If the current does not appear on the nameplate, the ampacity determination shall be based on \_\_\_\_ of the values in tables 430-149 and 430-150.**

- (a.) 80%
- (b.) 100%
- (c.) 125%
- (d.) 150%

**30. Which of the following is a false statement?**

- (a.) An accessible plug and receptacle shall be permitted to serve as the disconnecting means for a cord and plug connected appliance
- (b.) For a household electric range, a plug and receptacle connection at the rear base is acceptable as the disconnect if it is accessible from the front by removal of a drawer
- (c.) A counter mounted cooking unit shall be connected by a permanent wiring method
- (d.) A switch with a marked off position that is a part of an appliance and disconnects all ungrounded conductors is permitted in a dwelling if the circuit is protected by a circuit breaker

**31. Where a transformer vault is constructed with other stories below it, the floor shall have a minimum fire resistance of 3 hours unless \_\_\_\_.**

- (a.) the floors in contact with the earth not less than 3" thick
- (b.) protected with automatic sprinkler
- (c.) constructed of fire rated wallboard
- (d.) constructed of steel studs and fire rated wallboard

**32. A storage battery having the cells connected to operate at a voltage exceeding 250 volts but not over 600 volts, shall have insulation between groups and shall have minimum separation between live battery parts of opposite polarity of \_\_\_\_ inch(es)**

**33. When calculating the conductor fill for strut-type channel raceway with internal joiners, the raceway shall be permitted to be filled to \_\_\_\_ % of the cross-sectional area.**

- (a.) 20
- (b.) 25
- (c.) 30
- (d.) 40

**34. Which of the following wiring methods may be used inside the duct used for vapor removal and ventilation of commercial type cooking equipment?**

- (a.) nonmetallic sheathed cable
- (b.) EMT
- (c.) rigid steel conduit
- (d.) none of these

**35. Splices and taps shall be permitted in surface nonmetallic raceways having a removal cover that is accessible after installation. The conductors, including splices and taps, shall not fill the raceway to more than \_\_\_\_ percent of its area at that point.**

- (a.) 31
- (b.) 40
- (c.) 53
- (d.) 75

**36. Cabinets and cutout boxes shall be deep enough to allow the closing of the doors when \_\_\_\_ ampere branch circuit panelboard switches are in any position; when combination cutout switches are in any position; or when other single throw switches are opened as far as their construction will permit.**

- (a.) 15
- (b.) 20
- (c.) 30
- (d.) 100

**37. Underfloor flat-top raceways over 4 inches but not over 8 inches wide with a minimum of 1 inch spacing between raceways shall be covered with concrete to a depth of not less than \_\_\_\_.**

- (a.)  $\frac{3}{4}$ "
- (b.) 1"
- (c.)  $1\frac{1}{2}$ "
- (d.) 2"





**38. Lighting fixtures located in the same room and not directly associated with a hydromassage bathrubs, shall be installed in accordance with the requirements covering the installation of that equipment in \_\_\_\_.**

- (a.) swimming pool area
- (b.) kitchen
- (c.) exercise room
- (d.) bathroom**

**39. The allowable fill for an 1 ¼ inch rigid schedule 40 PVC with more than 2 conductors is \_\_\_\_ sq. inch.**

- (a.) 0.794
- (b.) 0.333
- (c.) 0.495
- (d.) 0.581**

**40. Induction coils shall be prevented from inducing circulating currents in surrounding metallic equipment, supports, or structures by \_\_\_\_.**

- I. isolation
- II. Shielding
- III. insulation of the current paths
- (a.) I only
- (b.) II only
- (c.) III only
- (d.) I, II and III**

**41. At least one receptacle shall be located a minimum of 5 feet from and not more than \_\_\_\_ feet from the inside wall of a spa or hot tub installed indoors.**

- (a.) 6
- (b.) **10**
- (c.) 12
- (d.) 20

**42. An electronically actuated fuse generally consists of all of the following EXCEPT \_\_\_\_?**

- (a.) a control module that provides current sensing (b.) electronically derived time-current characteristics
- (c.) an interrupting module that interrupts current when an overcurrent through it
- (d.) a thermally sensitive part that is heated and severed by passage of overcurrent through it**

**43. An underground pull box used for circuits of over 600 volts shall have the cover locked, bolted or screwed on, or the cover is required to weigh over \_\_\_\_ pounds.**

- (a.) 25
- (b.) 50
- (c.) 75
- (d.) 100**

**44. Given: On a circuit where a grounding means does not exist, a nongrounding-type receptacle is replaced with a ground-fault circuit-interrupter-type receptacle which supplies no other receptacles. This new GFCI receptacle shall be marked \_\_\_\_.**

- (a.) "Not Grounded"
- (b.) "GFCI Protected"
- (c.) "No Equipment Grounded"**
- (d.) "No Grounded Conductor"

**45. Ground-fault circuit-interrupter (GFCI) protection is required in all of the following locations EXCEPT \_\_\_\_.**

- (a.) kitchen receptacles in an office building lunchroom installed within 6' of the sink**
- (b.) kitchen receptacles in a dwelling installed to serve counter top surfaces 10' away from the sink
- (c.) receptacles in an office building restroom which has only a basin and toilet
- (d.) receptacle provided for servicing a rooftop air conditioning unit on the roof of a warehouse

**46. For dwelling units, all of the following are true EXCEPT \_\_\_\_.**

- (a.) outdoor outlets are permitted to be supplied through the small appliance branch circuits**
- (b.) the outlet for kitchen refrigeration equipment may be supplied by an individual 15 amp branch circuit
- (c.) bathroom receptacles shall be supplied by a 20 ampere branch circuit which shall have no other outlets
- (d.) the clothes washer shall be supplied by a 20 ampere branch circuit and outlets outside the laundry area are NOT permitted on this circuit

**47. In a recreational vehicle park, tent sites equipped with only 20 ampere supply facilities shall be calculated on the basis of \_\_\_\_ per site.**

- (a.) 180 va
- (b.) 300 va
- (c.) 360 va
- (d.) 600 va

**48. Where GFCI protection is located in the power supply cord for an outdoor portable sign, the ground-fault circuit interrupter shall be located within \_\_\_\_\_ inches of the attachment plug.**

- (a.) 6
- (b.) 12
- (c.) 18
- (d.) 24

**49. Given: A fixed electric space heater without a motor is installed in a multifamily dwelling. The heater has no supplementary over current protection.**

**The heater is controlled with a thermostat which does not have a marked “of” position. The branch circuit switch or circuit breaker is not “within sight from” the heater. For the branch circuit switch or circuit breaker to be permitted to serve as the disconnecting means for the heater, the switch or breaker must \_\_\_\_.**

- (a.) Be readily accessible
- (b.) not control lamps or other appliances
- (c.) be capable of being locked in the open position
- (d.) be located within the dwelling unit or on the same floor as the heater

**50. Given : A metal underground water pipe is used as a grounding electrode and used to bond other electrodes together. The grounding electrode conductor is connected to the water pipe on the interior of the building. The connection of the grounding electrode conductor to the interior water pipe shall be made a maximum of \_\_\_\_\_ feet from the point where the water pipe enters the building.**

- (a.) 3
- (b.) 5
- (c.) 8
- (d.) 10

**PEC 2009 REFRESHER 2**

**1. Potential transformers, and other switchboard devices with potential coils shall be supplied by a circuit that is protected by standard overcurrent devices rated \_\_\_\_ amperes or less.**

- (a.) 15 (c.) 25  
(b.) 20 (d.) 30

**2. Which of the following is a false statement?**

- (a.) Where a building is supplied by more than one service, a permanent plaque or directory shall be installed at each service disconnect denoting the location of all other services.  
(b.) Service conductors supplying a building are permitted to pass through the interior or another building.  
(c.) Conductors other than service conductors shall not be installed in the same service raceway.  
(d.) Conductors run above the top level of a window shall be permitted to be less than 3 feet away from a window that is designed to be opened.

**3. Type \_\_\_\_ cable consists of three or more flat copper conductors placed edge-to-edge and separated and enclosed within an insulating assembly.**

- (a.) NMC (c.) MI  
(b.) AC (d.) FCC

**4. A cord connector that is supported by permanently installed cord pendant shall be considered \_\_\_\_.**

- (a.) receptacle outlet (b.) permanent cord  
(c.) lighting outlet (d.) outlet device

**5. Equipment intended to break current at fault levels shall have an interrupting rating sufficient for the system voltage and the current which is \_\_\_\_ at the line terminals of the equipment.**

- (a.) at maximum (c.) available  
(b.) operating (d.) required

**6. Electrodes of nonferrous metal shall be at least \_\_\_\_ in thickness.**

- (a.) 0.06mm (c.) 1.52"  
(b.) .186" (d.) 0.06"

**7. Examples of resistance heaters are \_\_\_\_.**

- I. heating blankets II. heating tape III. heating barrel  
(a.) I and II only (c.) III only  
(b.) II and III only (d.) II only

**8 Metal surface raceways having splices and taps shall be permitted as long as the splices and taps and conductors do not fill the raceway more than \_\_\_\_\_ percent of the area of the raceway at that point.**

- (a.) 40
- (b.) 50
- (c.) 70
- (d.) 75

**9. Receptacles in damp or wet locations flush mounted shall \_\_\_\_\_.**

**I. be protected from the weather where located under canopies or marquees not subject to water run off**

**II. have an attachment plug cap inserted**

**III. be made weatherproof by means of a weatherproof faceplate assembly**

**IV. be located so that water accumulation is not likely to touch the outlet cover or plate**

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

**10. Circuits that only supply neon tubing installations shall not be rated in excess of \_\_\_\_\_ amperes.**

- (a.) 15
- (b.) 20
- (c.) 30
- (d.) 50

**11. A portable motor which has an attachment plug and receptacle may use this type of attachment as the controller provided the motor does not exceed \_\_\_\_\_ hp.**

- (a.) 1/8
- (b.) 1/3
- (c.) 1
- (d.) 3

**12. Metal canopies supporting lampholders, shades, etc., exceeding \_\_\_\_\_ pounds shall not be less than 0.020 inch in thickness.**

- (a.) 4
- (b.) 6
- (c.) 8
- (d.) 10

**13. Live parts exposed on the front of a switchboard are present, the working space in front of the switchboard shall not be less than \_\_\_\_\_ inches.**

- (a.) 24
- (b.) 30
- (c.) 36
- (d.) 42

**14. Armored cable installed in thermal insulation shall have conductors rated at \_\_\_\_\_. The ampacity of cable installed in these applications shall be that of 60 degree C conductors.**

- (a.) 60 degrees C
- (b.) 194 degrees F
- (c.) 75 degrees C
- (d.) 90 degrees F

**15. For hallways of \_\_\_\_\_ feet or more in length at least one receptacle outlet shall be required.**

- (a.) 6
- (b.) 8
- (c.) 10
- (d.) 12

**16. In panelboards, where the voltage on busbars is 150 volts and the bars are opposite polarity, held free in air, the minimum spacing between the parts is \_\_\_\_\_.**

- (a.) 3/4"
- (b.) 1"
- (c.) 1 1/2"
- (d.) 2"

**17. Alkali-type battery cells in jars of conductive material shall be installed in trays of nonconductive material with not more than \_\_\_\_\_ 24 volt cells in the series circuit in any one tray.**

- (a.) ten
- (b.) twenty
- (c.) thirty
- (d.) forty

**18. Exposed live parts within porcelain fixtures shall be suitably recessed and so located as to make it improbable that wires will come in contact with them. There shall be a spacing of at least \_\_\_\_\_ between live parts and the mounting plane of the fixtures.**

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



**19. The grounding conductor for secondary circuits of instrument transformers and for instrument cases shall not be smaller than #12 \_\_\_\_.**

**I. metal**

**II. Aluminum**

**III. copper**

(a.) I only

(c.) **III only**

(b.) II only

(d.) I, II, III

**20. A current-limiting overcurrent protective device is a device which will \_\_\_\_ the current flowing in the faulted circuit.**

(a.) **reduce**

(c.) maintain

(b.) increase

(d.) none of these

**21. An office is to be wired with the number of receptacles unknown, the demand for the receptacles is \_\_\_\_va per square foot.**

(a.) **1**

(c.) 3.5

(b.) 3

(d.) 180

**22. In a recreational vehicle park with electrical supply, at least \_\_\_\_% of the sites shall be equipped with 30 ampere, 125 volt receptacles.**

(a.) 5

(c.) **70**

(b.) 20

(d.) 100

**23. No parts of pendants shall be located within a zone measured \_\_\_\_feet horizontally and 8 feet vertically from the tip of the bathtub rim.**

(a.) 2

(c.) 4

(b.) **3**

(d.) 6

**24. The lead wires of heating cables are color coded for \_\_\_\_identification.**

(a.) lead

(c.) wire

(b.) **voltage**

(d.) cable

**25. Plug fuses must have what specific shape?**

(a.) octagonal

(c.) **hexagonal**

(b.) square

(d.) round

**26. Fixtures in clothes closets shall be \_\_\_\_.**

**I. a surface-mounted or recessed incandescent fixtures with a completely enclosed lamp**

**II. a surface-mounted or recessed fluorescent fixture**

**III. pendant fixture**

(a.) I only

(c.) I and III

(b.) **I and II only**

(d.) I, II & III

**27. All heating elements that are replaceable \_\_\_\_and are a part of an electric heater shall be legibly marked with the rating in volts and watts, or in volts and amperes.**

(a.) in the shop

(c.) **in the field**

(b.) by the manufacturer

(d.) none of these

**28. Plug fuses and fuseholders can be used in circuits supplied by a system having a grounded neutral and having no conductor at over \_\_\_\_ volts to ground.**

(a.) 115

(c.) 125

(b.) 120

(d.) **150**

**29. EMT shall not be used \_\_\_\_.**

(a.) for exposed work

(b.) **where protected from corrosion solely by enamel**

(c.) for concealed work

(d.) none of these





**30. Where a motor is connected to a branch circuit by means of an attachment plug and receptacle and individual overload protection is omitted, the rating of the attachment plug and receptacle shall not exceed \_\_\_\_\_ or 250 volts.**

- (a.) 15 amperes at 110 volts
- (b.) 20 amperes at 115 volts
- (c.) 25 amperes at 120 volts
- (d.) 15 amperes at 125 volts**

**31. All type FCC cable connections shall use connectors identified for their use, installed such that \_\_\_\_\_ against dampness and liquid spillage are provided.**

**I. electrical continuity**

**II. Insulation**

**III. Sealing**

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

**32. The disconnecting means of a hermetic-type refrigerator compressor shall have an ampacity of at least \_\_\_\_\_ of the nameplate full load current.**

- (a.) 125%
- (b.) 80%
- (c.) 100%
- (d.) 115%**

**33. Fixtures shall be so constructed that adjacent combustible material will not be subject to temperature in excess of \_\_\_\_\_ degrees C.**

- (a.) 60
- (b.) 75
- (c.) 90**
- (d.) 110

**34. A factory installed duplex receptacle in a baseball heater, where the heater is to be permanently installed in a commercial building is \_\_\_\_\_.**

- (a.) prohibited by the code
- (b.) allowed only when the receptacle is factory connected to the heater circuit
- (c.) not allowed to be used as the required receptacle outlet for flexible cords with attachment plugs, when wired on a separate circuit from the heater circuit
- (d.) allowed to be used in lieu of the required receptacle outlet for flexible cords with attachment plugs, when wired on a separate circuit from the heater circuit**

**35. Type FCC cable, cable connectors, and insulating ends shall be covered with carpet squares no larger than \_\_\_\_\_ square.**

- (a.) 24"
- (b.) 914"
- (c.) 36mm
- (d.) 36"**

**36. Vegetation such as trees shall not be used for support of \_\_\_\_\_.**

- (a.) lighting fixtures
- (b.) brackets or clamps
- (c.) overhead conductor spans**
- (d.) none of these

**37. Fixed electric space heating loads shall be computed at \_\_\_\_\_ % of the total connected load; however in no case shall a feeder load current be less than the rating of the largest branch circuit supplied.**

- (a.) 80
- (b.) 100
- (c.) 115
- (d.) 125

**38. The adjustable speed drive incoming branch circuit or \_\_\_\_\_ to power conversion equipment included as a part of an adjustable speed drive system shall be based on the rated input to the power conversion equipment.**

- (a.) service
- (b.) feeder
- (c.) lateral
- (d.) none of these



**39. Separation of junction box from motor shall be permitted to be separated from the motor not more than \_\_\_\_\_.**

- (a.) 6 feet
- (b.) 4 feet
- (c.) 1.83
- (d.) none of these

**40. A single 1500w cord and plug connected load on 120v would draw \_\_\_\_\_ amps, this requires a number \_\_\_\_\_ wire and \_\_\_\_\_ circuit breaker for the branch circuit.**

- (a.) 8-#14-15amp
- (b.) 10.5-#14-15amp
- (c.) 12.5-#14-15amp
- (d.) 12.5-#12-20amp

**41. SE cable used to supply \_\_\_\_\_ shall not be subject to conductor temperature in excess of the temperature specified for the type of insulation involved.**

- (a.) lighting
- (b.) appliances
- (c.) motors
- (d.) generators

**42. Torque motors are rated for operation \_\_\_\_\_.**

- (a.) at full torque
- (b.) at F.L.C.
- (c.) at standstill
- (d.) with code letter

**43. The rating of an overcurrent device for a capacitor shall be \_\_\_\_\_.**

- (a.) not over 20amp
- (b.) as low as practicable
- (c.) less than 50amp
- (d.) none of these

**44. \_\_\_\_\_ of insulating material shall be permitted to be used without boxes in exposed cable wiring.**

**I. switch devices      II. outlet devices      III. tap devices**

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

**45. The following pool equipment shall be grounded \_\_\_\_\_. I.**

**ground-fault circuit-interrupters**

**II. transformer enclosures**

**III. electric equipment located within 5 feet of the inside wall of the pool**

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

**46. It is the intent of the Code that \_\_\_\_\_ wiring or the construction of equipment need not be inspected at the time of installation of the equipment, if the equipment has been listed by a qualified electrical testing laboratory.**

- (a.) factory-installed internal
- (b.) factory-installed
- (c.) underground
- (d.) raceway

**47. Distances from signs, radio and TV antennas, tanks or other nonbuilding or nonbridge structures, clearances, vertical, diagonal and horizontal, shall not be less than \_\_\_\_\_ feet.**

- (a.) 2
- (b.) 3
- (c.) 6
- (d.) 8

**48. Any motor application shall be considered as \_\_\_\_\_ unless the nature of the apparatus it drives is such that the motor will not operate continuously with load any condition of use.**

- (a.) short-time duty
- (b.) varying duty
- (c.) continuous duty
- (d.) periodic duty

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

- (a.) ungrounded conductor
- (b.) grounded conductor
- (c.) overcurrent device
- (d.) transformer



**50. The grounded conductor of a mineral-insulated, metal-sheathed cable shall be identified at the time of installation by \_\_\_\_\_ marking at its termination.**

**(a.) distinctive**

(c.) solid

(b.) neutral

(d.) identified

**PEC 2009 REFRESHER 3**

1. An assembly drawing for a switchboard appears to have some errors. As supervisor, what steps will you take?
  - a. Report the apparent error to your supervisor.
  - b. Make the connections per drawing but be prepared to correct it if orders.
  - c. Hold the job until you have checked with the person who initiated the plans.
  - d. proceed making the corrections on the drawing.
2. Vertical clearances of all service drop conductors above roofs shall NOT be less than one of the following values.
  - a. 2,000 mm
  - b. 2,750 mm
  - c. 3,000mm
  - d. 2,500 mm
3. According to its make, conduits maybe classified as
  - a. rigid metal
  - b. rigid non-metal
  - c. flexible metal
  - d. all of these
4. The Philippine Electrical Code, Part 1 does not cover wiring of equipment installed within or to or from one of the following. Which is one is this?
  - a. Trailers
  - b. Mobile homes
  - c. Water crafts
  - d. Airplanes
5. When the wiring a raceway at least a certain length of free conductors shall be left at each outlet. What is this minimum length?
  - a. 75 mm
  - b. 100 mm
  - c. 150 mm
  - d. 200 mm
6. When a rigid metal conduit is used, there shall NOT be more than equivalent of \_\_\_\_\_ quarter bends between pull points.
  - a. three
  - b. four
  - c. five
  - d. two
7. Which of the following wires has 75-ohm impedance?
  - a. Foam-filled twin lead
  - b. Coaxial
  - c. Flat twin lead
  - d. None of these
8. In a battery room, it is important that no hot spot due to loose connections or sparking will occur, due to a serious event may happen. What can this be?
  - a. An explosion might follow
  - b. A short circuit may occur
  - c. an electric shock can happen to electrician
  - d. the electrolyte might overheat.
9. For dwelling units, the demand factor for the first 3000 volt-amperes of load is?
  - a. 95%
  - b. 85%
  - c. 100%
  - d. 80%
10. In which method of starting of a motor is the starting current a minimum?
  - a. star-delta
  - b. starter-rotor starter
  - c. direct on line
  - d. autotransformer
11. In television studios, wiring for stage, set lighting, stage effects and other electric equipment which are fixed shall be done with approved flexible cables protected by circuit breakers. The approved rating is which one of the following?
  - a. 30 A
  - b. 40 A
  - c. 20 A
  - d. 10 A
12. A convenience outlet circuit consisting of 8 outlets connected across to a 220-V supply considering 180 W per outlet, what is the maximum circuit current?
  - a. 4.56 A
  - b. 6.54 A
  - c. 8 A
  - d. None of these
13. The minimum electrical trade size of flexible metallic tubing shall be \_\_\_\_\_.
  - a. 15 mm
  - b. 20 mm
  - c. 32 mm
  - d. 100 mm
14. Open wiring on insulators shall be supported at intervals NOT longer than what distance?
  - a. 1,300 mm
  - b. 500 mm
  - c. 2,000 mm
  - d. 750 mm
15. The term given to insulated stranded wire.
  - a. Durability
  - b. Cord
  - c. Length
  - d. Volume
16. Surface metal raceway should not be allowed in the following, EXCEPT?
  - a. where it is subject to corrosive favors
  - b. where location is dry and ventilated
  - c. where the voltage is over 300 volts
  - d. where subject to severe physical damage
17. Where passing through wood cross member in plastered partitions, conductors in concealed knob and tube wiring shall be protected by insulating tubes extending NOT less than \_\_\_\_\_ beyond the wood member.
  - a. 80 mm
  - b. 70 mm
  - c. 76 mm
  - d. 64 mm

18. A type of a cable which is a single or multi-conductor solid dielectric insulated cable rated 2001 volts or higher.

- a. MC                      b. MV                      c. FCC                      d. AC

19. An exposed or enclosed upright panel carrying switches and other protective, controlling and measuring devices for electric machinery and equipment.

- a. Switchgear              b. Panel board              c. Switchboard              d. Switch box

20. In indoor wet locations, the entire wiring system including all boxes, fittings, control boards and panel boards shall be installed on walls with a minimum clearance. What is this clearance?

- a. 10 mm                      b. 5 mm                      c. 20 mm                      d. 15 mm

21. The primary winding of a step down transformer shall be protected on the primary side by overcurrent device rated NOT more than a certain percentage of the primary current. What is this percentage?

- a. 110 %                      b. 125%                      c. 80%                      d. 150%

22. Consist of three or more flat copper conductor placed edge to edge separated and enclosed with an insulating assembly.

- a. Armored cable              b. Flat cable assemblies              c. Sheathed cable              d. Flat conductor cable

23. As compared with solid wires, stranded wires of the same cross sectional area have the following advantages EXCEPT one. Which one is this?

- a. It is larger in overall diameter              b. It is easier to skin off the insulation  
c. It is better for high voltage              d. It has a higher current rating

24. Dry type transformer rated over \_\_\_\_\_ volts, shall be installed in vaults.

- a. 25,000              b. 10,000              c. 35,000              d. 50,000

25. Are rectangular sheet metal enclosures equipped with removable covers providing access to conductors inside.

- a. Metal clad cable              b. Multiple cable conductors              c. Busway              d. Wireways

26. What is the maximum number of over current devices of a lighting and appliance panel board that shall be installed in a cabinet?

- a. 36 devices              b. 24 devices              c. 48 devices              d. 52 devices

27. For the installations of 2.0 mm<sup>2</sup> conductors in 600-volts circuits. What is the minimum insulation resistance allowed by the Philippine Electrical code?

- a. 1,000,000 ohms              b. 750,000 ohms              c. 250,000 ohms              d. 500,000 ohms

28. The following are types of protection for single phase induction motors, EXCEPT

- a. Overload protection              b. ground fault protection  
c. under voltage protection              d. single phasing protection

29. Branch circuit conductors supplying a single phase motor shall have an ampacity NOT exceeding

- a. 100%                      b. 125%                      c. 200%                      d. 115%

30. Flat conductor cables maybe installed in any of the following locations Except one. Which one of this?

- a. On hard concrete flooring              b. In wet locations  
c. For branch circuits              d. In damp locations

31. For voltages above 600 V, the minimum insulation resistance shall be \_\_\_\_\_.

- a. 1,500,000 ohms per kilovolt rating              b. 500,000 ohms per kilovolt rating  
c. 1,000,000 ohms per kilovolt rating              d. 2,000,000 ohms per kilovolt rating

32. A device actuated by the operation of some devices with which it is directly associated, to govern succeeding operations of some or allied devices.

- a. Selsyn                      b. Automatic                      c. Interlock                      d. Relay

34. Concealed knob and tube wiring maybe used in which of the following locations?

- a. Theaters                      b. Hazardous Location  
c. Commercial garages              d. Hollow spaces of walls and ceilings

35. Four (4) 3-phase motor are supplied by one common feeder cable. The full load current ratings of the motors are 10 A, 20 A, 30 A, 40 A. What should be the minimum ampacity of the cable?  
a. 110 A      b. 125 A      c. 150 A      d. 100 A
36. Lead wires furnished as part of a weather proof lamp holder shall be stranded and rubber covered and approved for such service, shall not be less than what wire size?  
a. 3.5 mm<sup>2</sup>      b. 2.0 mm<sup>2</sup>      c. 0.75 mm<sup>2</sup>      d. 5.5 mm<sup>2</sup>
37. Which of the following wiring cables is most suitable for shipboard installations?  
a. Flat cable assembly      b. Shielded non-metallic sheathed cable  
c. metal clad cable      d. Armored cable
38. What is the maximum allowable voltage drop from the main circuit breaker to the farthest lamp?  
a. 10 %      b. 5 %      c. 5%      d. 3 %
39. Flexible cords and cables shall be used for the following applications, EXCEPT  
a. elevator wirings      b. pendants      c. fixed wirings      d. wiring of fixtures
40. In starting a large DC motor, a starter is primarily used in order to  
a. save electrical power      b. limit the starting current  
c. add more power      d. reduce the voltage drop
41. The frequency of the output voltage of an AC generator depends on which of the following?  
a. Excitation circuit      b. Load      c. Power factor      d. Speed
42. Busways shall not be installed in the following EXCEPT  
a. where there are corrosive fumes      b. where they are located in the open and visible  
c. where they are subject in severe physical damage      d. where they are in damp locations
43. In the Electrical Engineering Law, what is the official designation of "Master Electrician"?  
a. Master Electrician      b. Registered Electrician  
c. Licensed Electrician      d. Registered Master Electrician
44. In judging the suitability of an electrical equipment for proper mounting, the following factors should be considered, one of which is the Least important. Which one is this?  
a. Type of enclosure      b. Wire bending  
c. Electrical Insulation      d. Mechanical strength
45. According to the Code the minimum insulation level for neutral conductor of residential installation which has solidly grounded system shall be \_\_\_\_\_.  
a. 300 V      b. 600 V      c. 750 V      d. 1,000 V
46. A lighting fixture shall be wired with lighting cord with a cross sectional area of NOT less than a certain minimum area. Which is this?  
a. 0.75 mm<sup>2</sup>      b. 2.00 mm<sup>2</sup>      c. 0.50 mm<sup>2</sup>      d. 1.25 mm<sup>2</sup>
47. The surge arrester for devices less than 1,000 volts connected by copper conductor to ground electrode conductor or equivalent grounding terminal shall NOT be smaller than \_\_\_\_\_.  
a. 8.0 mm<sup>2</sup>      b. 5.5 mm<sup>2</sup>      c. 3.5 mm<sup>2</sup>      d. 2.0 mm<sup>2</sup>
48. The electrical drawing of a single family dwelling shall show the following EXCEPT  
a. floor plan      b. computation of illumination      c. location plan      d. one-line diagram
49. AC equipment on board watercraft shall operate satisfactory at the following voltage limitations. Which one is correct?  
a. Minus 5% to plus 10%      b. Minus 6% to plus 10%  
c. Minus 10% to plus 6%      d. Minus 10% to plus 10%
50. Which of the following statements on lighting fixtures NOT correct?  
a. Outdoor lighting fixtures and associated equipment shall be permitted to be supported by trees  
b. Metal fixtures and enclosures rated at 250 V and installed up in the ceiling shall be grounded  
c. Stranded conductors shall be used in wiring a fixture supporting chain and other movable flexible parts  
d. Fixtures and lighting equipment operating at over 250 V shall be grounded



**PEC 2009 REFRESHER 4**

1. Open conductors passing over residential driveways and those commercial areas not subject to truck traffic where the voltage exceeds 300 V to ground shall have vertical clearance of \_\_\_\_\_.  
a. 3,700 mm    **b. 4,600 mm**    c. 3,100 mm    d. 5,500 mm
2. What is the radius of a solid round conductor, which is the nearest equivalent of a stranded conductor whose total area is exactly 8.0 mm<sup>2</sup>?  
a. 1.597 mm    b. 1.596 mm    **c. 3.191 mm**    d. 3.192 mm
3. Where galvanized steel conduit is used, the primary purpose of galvanizing in which one of the following?  
a. It provides good electrical contact for grounding  
b. It increases the mechanical strength  
c. It provides good surface for painting  
**d. It retards rusting**
4. Equipment to be installed shall be fully specified in the name plate EXCEPT which of the following considered optional?  
a. Power and speed ratings    b. Name of Manufacturer  
c. Voltage, current, frequency    **d. Date Manufactured**
5. A three-phase general purpose squirrel cage motor draws a full load current of 40 A. What is the maximum size of time delay fuses that may be used for short circuit protection?  
a. 120 A    **b. 80 A**    c. 40 A    d. 100 A
6. Busways shall be permitted to be installed behind panels if means of access are provided and if the conditions below are met. One of them is NOT valid. Which one is this?  
a. No overcurrent devices are installed on the busway other than for an individual fixture  
b. The busway is so installed that the joints between sections and fitting are accessible for maintenance purpose  
**c. The busway is open and of ventilator type**  
d. The space behind the panels is not for air handling purposes
7. 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. superconductive effect    b. capacitive effect    c. outer effect    **d. skin effect**
8. The \_\_\_\_\_ shall not be less than the continuous load plus 125% of the continuous load.  
a. conductor size    **b. branch circuit rating**    c. non continuous load    d. continuous load
9. What is the maximum rating of a molded case circuit breaker to protect a 10 hp squirrel cage induction motor rated at 230 volts, 3-phase, 60 Hz with a full load rating of 28 A?  
a. 30 A    b. 50 A    **c. 70 A**    d. 100 A
10. Any motor application shall be considered as \_\_\_\_\_ duty unless the nature of the apparatus it drives is such that the motor will not operate continuously with load under any condition of use.  
a. short time    b. periodic    **c. continuous**    d. varying
11. What is the metric size equivalent of 1,000 MCM?  
a. 250 mm<sup>2</sup>    b. 750 mm<sup>2</sup>    **c. 500 mm<sup>2</sup>**    d. 1,000 mm<sup>2</sup>
12. No-metallic sheathed cable shall not be permitted for the installation in the following locations EXCEPT  
a. storage battery    b. corrosive locations    c. moist location    **d. dry locations**
13. Instrument pilot lights and potential transformers shall be protected by OCD of \_\_\_\_\_ amps or less.  
a. 50    **b. 15**    c. 30    d. 20
14. Insulators used to support wires under cross arm are called \_\_\_\_\_.  
a. pin    b. spool    **c. suspension**    d. strain

15. The unit lighting for a dwelling unit express in watts per square meter shall be  
a. 8 watts b. 40 watts c. 24 watts d. 16 watts
16. Where the conduits enter a switchboard at the bottom, a sufficient space shall be provided to permit installation of the conductors in the enclosure. The minimum spacing between the bottom of the enclosure and the non-insulated bus bar shall be \_\_\_\_\_.  
a. 155 mm b. 300 mm c. 255 mm d. 200 mm
17. To make sure that the voltage switchboard is not energized, what final step should you take for assurance?  
a. ground all bus bars inside the switch board  
b. Assign a person to guard the disconnect switch  
c. Open the disconnect switch  
d. Put a sign board that the switch should not be turned on
18. Type FCC ( flat conductor cable) are permitted for the following installation, EXCEPT  
a. on wall surfaces in surface metal raceways  
b. on hard, sound and smooth continuous surface  
c. in residential buildings  
d. for general purpose branch circuit wiring
19. Which of the following listed materials is considered among the best insulation material for motor rewinding?  
a. Nomex b. Red fiber c. Mylar d. Fish paper
20. In a switchboard there shall be an air space of at least \_\_\_\_\_ between the energized metal part and the door of the cabinet.  
a. 30 mm b. 20 mm c. 15 mm d. 25 mm
21. The maximum size of liquid tight flexible metal conduit shall be \_\_\_\_\_ trade size.  
a. 50 mm b. 125 mm c. 150 mm d. 100 mm
22. Feeders should be of such size that the voltage drop up to the final distribution panel should NOT exceed  
a. 2½ % b. 4½ % c. 3 % d. 6 %
23. Resistors and reactors shall not be installed in close proximity to combustible materials such that it constitutes a fire hazard. What minimum clearance is required by the code?  
a. 250 mm b. 300 mm c. 400 mm d. 100 mm
24. All circuit conductors between the service equipment or the generator switchboard of an isolate plant, and the final branch circuit overcurrent device.  
a. Service b. Feeder c. Branch circuit d. All of these
25. The code requires that all energized parts of electrical equipment operating at \_\_\_\_\_ or more shall be guarded against accidental contacts by approved enclosures. What is this voltage?  
a. 24 volts b. 110 volts c. 230 volts d. 50 volts
26. In order to protect a personnel and prevent shock, the equipment should be connected good earth ground through the  
a. conduit pipe b. hot water pipe c. cold water pipe d. rigid conduit pipe
27. In the interrupting rating of a circuit breaker is lower than the required, what will happen to the breaker if there is a dead short between the downstream breaker terminals?  
a. Only the conductors will burn out  
b. Nothing  
c. The entire breaker will be completely damaged  
d. The breaker may trip but may reset

28. The \_\_\_\_\_, or other descriptive marking by which the organization responsible for the product maybe identified, shall be placed on all electric equipment

I. trademark

II. Cost

III. Manufacturer's name

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

29. Conductors of AC and DC rated up to 600 V nominal shall be permitted to occupy the same equipment wiring enclosures, cable tray or raceway. Is this being allowed under Section 5.1.1.3 (c) (1) Article 5.1 in PEC?

- a. Installation is correct    b. False    c. True    d. Acceptable

30. Consist of a group of wire twisted to form a metallic string

- a. duplex wire    b. Loomex wire    c. solid wire    d. stranded wire

31. If an electrician does not understand the instruction that were given by the supervisor, which of the following is best for him to do?

- a. He works out the solution himself  
b. He ask to repeat and clarify the instruction  
c. he gets one of the electrician to do the job  
d. He does the job the way he thinks best

32. The inner strands of ACSR is made of what?

- a. brass    b. steel    c. copper    d. lead

33. The grounding electrode for grounding communications systems may be connected to the nearest accessible location on any of the following EXCEPT one. Which one is this?

- a. Buried interior PVC water piping system  
b. Grounding electrode conductor  
c. Building structure of a concrete building  
d. Grounding terminal of service equipment if provided by the utility company

34. In rigid metal conduit, conduits shall be supported at least every

- a. 2,000 mm    b. 2,500 mm    c. 3,500 mm    d. 3,000 mm

35. Employees shall be familiarize themselves with approved methods of \_\_\_\_\_ rescue techniques and fire extinguishment.

- a. playing    b. first aid    c. wiring    d. heating

36. Branch lighting circuits shall be protected by overcurrent devices not rated more than

- a. 40 A    b. 20 A    c. 30 A    d. 50 A

37. In all case where there are energized parts on the front of the switchboard or motor control centers, the working space in front of such equipment shall NOT be less than a minimum distance. What is this distance?

- a. 2,000 mm    b. 500 mm    c. 1,500 mm    d. 1,000 mm

38. A protective devices for assembly as an integral part of a motor or motor compressor and which when properly applied protects the motor against dangerous overheating due to overload and failure to start.

- a. Fault current    b. Ground fault    c. Thermal heat    d. Thermal protector

39. Wirings allowed to be installed outside the buildings are enumerated below EXCEPT one. Which one is this?

- a. Type MC cable    b. Flat conductor cable  
c. Rigid metal conduit    d. Open wires on insulator

40. Employees shall read \_\_\_\_\_ and warn others who are in danger near energized equipment or lines

- a. first aid equipment and materials  
b. manhole and vaults  
c. warning signs and signals  
d. body belts and safety straps

41. A 20-ampere rated branch circuit with 3.5 mm<sup>2</sup> wire supplying a duplex receptacle can be loaded to a maximum of \_\_\_\_\_ amperes.  
a. 16                      b. 20                      c. 30                      d. 12
42. For better illumination you would provide \_\_\_\_\_.  
a. joint lights                      b. even spacing numerous lights  
c. random spacing lights                      d. evenly space high ceiling
43. What is the allowable ampacity of THW insulated copper conductor with an area of 8.0 mm<sup>2</sup> and exposed to an ambient temperature of 30°C?  
a. 45 A                      b. 20 A                      c. 30 A                      d. 60 A
44. Electrical equipment may best be mounted on a concrete wall by using one of the following. Which one is this?  
a. wooden plug                      b. expansion bolt                      c. load plug                      d. plastic plug
45. If there are three wires of 150 mm<sup>2</sup> connected to one terminal entering a cabinet or a switchboard, the bending space at each terminal shall NOT be less than \_\_\_\_\_, provided the conductors do not enter or leave the enclosures through the wall opposite its terminals.  
a. 200 mm                      b. 300 mm                      c. 400 mm                      d. 250 mm
46. For an ambient temperature of 30°C, a THW insulated copper conductors with a cross sectional area of 3.5 mm<sup>2</sup> and buried underground has the following ampacity. Which one is correct?  
a. 20 A                      b. 40 A                      c. 15 A                      d. 30 A
47. Transformer exceeding 112.5 kVA, shall not be located within \_\_\_\_\_ from combustible materials on the building.  
a. 400 mm                      b. 300 mm                      c. 200 mm                      d. 500 mm
48. The following copper conductors have the same cross sectional area but are made up of different number of strands. Which one has the least resistance to AC current?  
a. 19-strand conductor  
b. single solid conductor  
c. 7-strand conductor  
d. 37-strand conductor
49. Lighting fixtures suspended from the ceiling by chains should be wired so that the \_\_\_\_\_.  
a. chain is grounded                      b. wires help support the fixture  
c. wires will not touch the chain                      d. wires do not support the fixture
50. In rigid metal conduit wiring, conduits shall be supported at least every a. 2,500 mm b. 3,500 mm c. 3,000 mm d. 2,000 mm

## PEC 2009 REFRESHER 5

1. Equipment for installation in hazardous locations must be tested and approved for use according to the classification of the hazards involved. These are divided into \_\_\_\_\_ groups.  
a. 4                                      **b. 3**                                      c. 7                                      d. 6
2. Compliance with the provisions of the PEC will result in \_\_\_\_\_.  
I. freedom of hazards                      II. good electrical service                      III. an efficient system  
**a. I, II and III**                      b. I and II only                      c. II only                      d. I only
3. Auxilliary gutters shall not contain more than \_\_\_\_\_ current carrying conductors at any cross section.  
a. 36                                      b. 32                                      **c. 30**                                      d. 24
4. IN hazardous locations, the use of non-metallic conduit shall be permitted provided it is buried NOT less than \_\_\_\_\_ below the earth level.  
a. 400 mm                                      **b. 600 mm**                                      c. 1,000 mm                                      d. 500 mm
5. Hazardous locations in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used.  
**a. Class III, Division 1**                      b. Class III, Division 2  
c. Class I, Division 1                      d. Class I, Division 2
6. There are situations where deviations from the code requirements are necessary. Before such deviations are made, there must be a written permission from one of the following entities. Which one is this?  
**a. Board of Electrical Engineering**                      b. Code of Enforcing Authority  
c. IEEE Code Committee                      d. Philippine Regulation Board
7. A point in a wiring system at which current is taken to be used in some equipment. a. grounded b. conductor c. service entrance **d. outlet**
8. Circuits with rigid non-metallic conduit approved for direct burial and placed under streets, hi-ways, roads, alleys, driveways and parking lots shall have a minimum cover distance of \_\_\_\_\_.  
a. 760 mm                      b. 900 mm                      c. 1,000 mm                      **d. 600 mm**
9. A building or other structure serve shall be supplied by only one service drop EXCEPT for  
a. multiple occupancy building                      b. fire pumps  
c. emergency electrical system                      **d. all of these**
10. This type of cable is a fabricated assembly of insulated conductors enclosed in a flexible metal sheath.  
a. ground wire                                      b. integrated gas spacer  
c. medium voltage cable                      **d. armored cable**
11. The following are common splicing rules EXCEPT one. Which one is this?  
a. A splice must provide a path for the current to pass  
b. A joint must be mechanically as strong as the wire itself  
c. All splices must be mechanically and electrically secured by means of solder  
**d. Wires of the same size should be spliced together in line**
12. Communication wires and cables shall be separated at LEAST a certain minimum distance from service drops of electric light and power conductors, which are not installed in a raceway or in cable. What is this minimum distance?  
a. 150 mm                                      b. 175 mm                                      **c. 300 mm**                                      d. 200 mm
13. Overhead conductors used in festoon lighting shall NOT be less than \_\_\_\_\_.  
a. 0.75 mm<sup>2</sup>                                      **b. 3.5 mm<sup>2</sup>**                                      c. 2.0 mm<sup>2</sup>                                      d. 5.5 mm<sup>2</sup>
14. When circuit breakers are installed in enclosed switchboards, they are usually derated to a certain percentage. What is this percentage?  
a. 60%                                      **b. 80%**                                      c. 50%                                      d. 70%

15. The clearance from the top of a switch to a ceiling which is combustibile shall NOT be less than \_\_\_\_\_.  
 a. 1,000 mm      b. 800 mm      c. 900 mm      d. 1,250 mm
16. The rating of the overcurrent device shall not be less than the non-continuous load plus a percentage of the continuous load.  
 a. 125%      b. 80%      c. 100%      d. 140%
17. In concealed knob and tube wiring, the clearance to be maintained between conductors is \_\_\_\_\_.  
 a. 55 mm      b. 45 mm      c. 76 mm      d. 50 mm
18. Where no standard electrical equipment of the exact size or rating is available and the next larger size is neither available the next smaller size or rating maybe used provided a special permission is obtained from one of the following. Which one is this?  
 a. Barrio Captain      b. Mayor      c. Electrical Inspector      d. Fire Chief
19. A box with a blank cover which is inserted in one or more runs of raceway to facilitate pulling of the conductors.  
 a. coupling box      b. junction box      c. terminal box      d. pull box
20. What is the total number of mechanical degrees that a PVC conduit run maybe bent between pull points (pull boxes, junction boxes or utility boxes)?  
 a. 360 degrees      b. 180 degrees      c. 120 degrees      d. 270 degrees
21. Where extensive metal in or on buildings may become energized and is subject to personal contact \_\_\_\_\_ provided additional safety.  
 a. bonding      b. suitable ground detectors  
 c. suitable arresters      d. adequate bonding and grounding
22. Below are the factors that affect the ampacity of an electrical conductor EXCEPT one. Which one is this?  
 a. Insulation resistance      b. Length of conductor  
 c. conductor material      d. cross-sectional area of the conductor
23. Where flexible tubing is used to encased the conductors, the tubing shall extend from the last insulating support to no less than \_\_\_\_\_ inside the nonmetallic boxes.  
 a. 8 mm      b. 10 mm      c. 5.5 mm      d. 6.4 mm
24. The sum of the cross sectional area of all conductor in a wireway must not exceed \_\_\_\_\_ percent of the cross sectional area of the wire way.  
 a. 15      b. 20      c. 10      d. 25
25. Lighting fixtures shall be wired with a fixture flexible cord with a cross sectional area of NOT less than  
 a. 0.50 mm<sup>2</sup>      b. 2.00 mm<sup>2</sup>      c. 1.25 mm<sup>2</sup>      d. 0.75 mm<sup>2</sup>
26. The total load on overcurrent device located in panel board shall NOT exceed a certain percentage of its rating. What is this percentage?  
 a. 100 %      b. 90 %      c. 80%      d. 125 %
27. Flexible metal conduits must not be used in  
 a. wet locations      b. hoist ways      c. storage battery room      d. all of these
28. The use of surface non-metal raceway is NOT permitted in all those mentioned below EXCEPT one. Which one is this?  
 a. Dry locations      b. where subject to severe physical damage  
 c. where the voltage is over 300 V      d. where concealed
29. What is the lowest dielectric strength of transformer oil, which is acceptable to the PEC?  
 a. 20,000 volts      b. 22,000 volts      c. 25,000 volts      d. 17,500 volts

**30. Flat conductor cable (FCC) system shall NOT be used in the location enumerated below EXCEPT one. Which one is this?**

- a. Locations where subject to corrosive favors
- b. Damp locations**
- c. Residential buildings
- d. Outdoors

**31. The surface nonmetallic raceway may NOT be used in the following locations EXCEPT one. Which one is this?**

- a. In dry locations**
- b. Where concealed
- c. Where subject to severe physical damage
- d. In hoist ways

**32. For grounding electrode to which portable or mobile equipment system neutral impedance is connected, shall be isolated from the ground by at least a certain distance from any other system or equipment grounding electrode. What is this distance?**

- a. 4,000 mm
- b. 6,000 mm**
- c. 5,000 mm
- d. 3,000 mm

**34. A run conduit between outlets, between fittings, between outlet and fittings shall not contain more than the equivalent of \_\_\_\_\_ quarter bends.**

- a. 2
- b. 4**
- c. 3
- d. 5

**35. A storage battery supplying emergency lighting an DC power shall maintain no less than 87.5 % of full voltage at total load for a period of at least**

- a. 1.5 hours**
- b. 2.5 hours
- c. 2.0 hours
- d. 1.0 hours

**36. What is the temperature rating of THW insulation?**

- a. 60°C
- b. 85°C
- c. 75°C**
- d. 90°C

**37. This is a single conductor or multi-conductor assembly provided with or without an overall covering, primarily used for services.**

- a. tray cable
- b. clad cable
- c. service entrance cable**
- d. flat conductor cable

**38. Transformer that contains liquid that will burn shall be installed only in approved vaults and shall also comply with following conditions EXCEPT one. Which one is this?**

- a. Ample ventilation shall be provided for the continuous removal of flammable gases
- b. Vent openings shall lead to a safe location outside the buildings
- c. All vent ducts and openings shall be sufficient areas to reliable explosion pressures within the vault
- d. There shall be a robust door between the vault and any non-hazardous location**

**39. What locations do NOT allow the installation of PVC rigid conduits?**

- a. Hazardous locations**
- b. Corrosive locations
- c. Wet locations
- d. In concealed locations

**40. To provide for small appliance load in a dwelling unit, the feeder should be computed at**

- a. 2,400 watts
- b. 3,000 watts
- c. 1,500 watts**
- d. 3,600 watts

**41. The circuit conductors between the service entrance equipment or isolated generating plant and the branch circuit overload device or devices.**

- a. overcurrent protector
- b. feeder**
- c. motor controller
- d. disconnecting switch

**42. Conductors shall be securely attached to the buildings using fasteners. Fasteners shall be spaced NOT more than**

- a. 760 mm
- b. 600 mm
- c. 880 mm
- d. 900 mm**

**43. Concealed knob and tube wiring conductors shall be rigidly supported on knobs not more than a certain minimum distance apart. What is this distance?**

- a. 2,000 mm
- b. 1,500 mm
- c. 1,300 mm**
- d. 2,500 mm

**44. For motor starter to be in sight of the controlled motor, it must NOT be more than \_\_\_\_\_ meters away.**

- a. 20
- b. 15**
- c. 25
- d. 10



45. Stage equipment like foot lights, border lights and others shall be so arranged that no branch circuit supplying such equipment will carry a load exceeding \_\_\_\_\_.  
a. 20 A                      b. 15 A                      c. 30 A                      d. 10 A
46. The branch circuit conductors that supply one or more units of data processing system shall have an ampacity NOT less than \_\_\_\_\_ percent of the total connected load.  
a. 150                      b. 100                      c. 125                      d. 200
47. Which of the raceway methods is NOT allowed to be used in a hazardous location?  
a. Rigid metal conduit                      b. Liquid tight flexible metal conduit  
c. Rigid non-metallic conduit                      d. None of these
48. Explosion hazards exist due to the presence of the following materials EXCEPT one. Which one is this?  
a. Combustible dust                      b. Flammable vapors  
c. Flammable liquids                      d. Carbon dioxide gas
49. What is the temperature rating of THHN insulation?  
a. 60°C                      b. 90°C                      c. 85°C                      d. 75°C
50. Some of the principal factors that affect the operating temperature of a cable are the following EXCEPT one. Which one is this?  
a. Voltage                      b. Ambient Temperature  
c. Ventilation                      d. Load current



**PEC 2009 REFRESHER 6**

1. Metal clad cables shall be supported and secured at intervals NOT exceeding  
a. 1,800 mm      b. 1,500 mm      c. 1,600 mm      d. 2,000 mm
2. Sizes of building wires manufactured in the Philippines are standard in square millimeters. What is the area of copper conductor, which is next larger than 8 square millimeters?  
a. 12 mm<sup>2</sup>      b. 10 mm<sup>2</sup>      c. 14 mm<sup>2</sup>      d. 9 mm<sup>2</sup>
3. According to PEC, the minimum insulation resistance level for neutral conductor in residential installations, which have solidly grounded system, shall NOT be less than this voltage, which one is this?  
a. 1,000 volts      b. 300 volts      c. 600 volts      d. 750 volts
4. Which of the following electric wires has the highest ampacity?  
a. 5.5 mm<sup>2</sup>      b. 8.0 mm<sup>2</sup>      c. 30 mm<sup>2</sup>      d. 50 mm<sup>2</sup>
5. A 15-A or a 20-A branch circuit shall be permitted to supply lighting units and other utilization devices. The rating of any one cord and plug connected appliance shall NOT exceed a certain percentage on the branch circuit rating. What is this percentage?  
a. 80%      b. 90%      c. 70%      d. 60%
6. Metal clad cables shall be permitted for installations in the following locations EXCEPT one. Which one is this?  
a. Signal circuits      b. Branch circuits      c. Direct burial in earth      d. Ariel cable
7. Concealed knob and tube wiring shall be supported within \_\_\_\_\_ of each side of each tap or splice.  
a. 150 mm      b. 125 mm      c. 100 mm      d. 200 mm
8. What is the insulation resistance acceptable by the Philippine Electrical Code for 600 V circuits consisting of 2.0 mm<sup>2</sup> conductor?  
a. 250,000 ohms      b. 750,000 ohms      c. 500,000 ohms      d. 1,000,000 ohms
9. The usual function of a disconnect switched in high voltages circuit is to  
a. Isolate from energized buses, equipment which are not in service  
b. Open or close the circuit under load  
c. Open the circuit in the event of an overload  
d. Maintain continuity of service
10. An overheated cord often indicates  
a. Defective cord  
b. Corroded terminals  
c. Corroded terminals and defective cord  
d. None of these
11. The usual nameplate data on DC motors include in the following EXCEPT one. Which one is this?  
a. Manufacturer's name  
b. Rated frequency  
c. Rated voltage  
d. Rated speed
12. What is the purpose of using locknuts?  
a. To make tighter connection  
b. To make it difficult to tamper connections  
c. To able to make more connections to one stud  
d. To prevent the connections from loosening under severe vibrations
13. Insulated ground conductor of 14 mm<sup>2</sup> or smaller shall be identified by a continuous white outer finish along its entire length on another color is  
a. Green      b. natural gray      c. striped green      d. striped white

14. Which of the following statements is NOT correct?

- a. Overcurrent devices shall be located where they will not be exposed to physical damage
- b. Overcurrent devices shall be readily accessible
- c. In a multi-family dwelling, each occupant shall have ready access to all overcurrent devices protecting his occupancy
- d. **Overcurrent devices may be located inside clothes closets**

15. Lamp protection shall be provided by elevation of at least \_\_\_\_\_ meters from the normal working space.

- a. **2**
- b. 1
- c. 2.5
- d. 3

16. What is the maximum number of conductors permitted in a wireway at any cross-section, signal circuits or starter-control wires are not included?

- a. **30 conductors**
- b. 50 conductors
- c. 40 conductors
- d. 25 conductors

17. The largest size of electrical metallic tubing is

- a. 75 mm
- b. 125 mm
- c. 150 mm
- d. **100 mm**

18. The use of underground feeder cables may NOT be used in the following conditions EXCEPT one. Which one is this?

- a. Embedded in concrete
- b. Hazardous locations
- c. **Direct burial**
- d. Theaters

19. Which of the following colors identifies the grounded conductor of a branch circuit?

- a. Green
- b. Black
- c. **White**
- d. Blue

20. Any box not over \_\_\_\_\_ cm<sup>2</sup> in size, intended for the mounting in closed building construction shall be affixed with anchors or clamps as to provide a rigid and secure installation.

- a. 1,540
- b. 1,760
- c. 1,800
- d. **1,640**

21. Conductors in open wiring on insulators shall be rigidly supported within \_\_\_\_\_ from a tap or splice.

- a. 200 mm
- b. 100 mm
- c. 250 mm
- d. **150 mm**

22. Connection between conductive or inductive metal object in an element of a lightning protection system to accomplish electrical continuity.

- a. Connectors
- b. Interlink
- c. Counterpoise
- d. **Bonding**

23. Flexible cords used in locations where there is a lot of flying flint or fibers shall comply with the following EXCEPT one. Which one is this?

- a. It shall be approved for use in locations which are vapor-filled
- b. It shall contain in addition to the conductors, a grounding conductor
- c. **It shall be of type approved for extra hard usage**
- d. It shall be provided with suitable seal to prevent the entrance of dust

24. Article 1.10.2 of PEC 1 requires working spaces for equipment operating 600 V nominal or less to ground. This is required for live parts on the other side, like concrete, brick or tile walls and shall be considered as grounded. What is this minimum distance for condition 2?

- a. 1300 mm
- b. 1400 mm
- c. 1200 mm
- d. **1100 mm**

25. When installing cables or raceway type wiring method parallel to the framing members such as joist, rafters or studs, the cable or raceway shall be installed and supported so that the nearest outside surface of the cable or raceway is NOT less than a certain distance from the nearest edge of the framing member. What is this distance?

- a. 20 mm
- b. 30 mm
- c. 10 mm
- d. **50 mm**

26. The multiplying factor for determining the size of branch circuit protection for non-time delay fuse is

- a. **300%**
- b. 175%
- c. 250%
- d. 150%

27. Each transformer up to 600 V nominal shall be protected by an individual overcurrent device on the primary side at not more than a certain percentage of the rated primary current of the transformer. What is this percentage?  
a. 110%      **b. 125%**      c. 100%      d. 140%
28. What is the maximum fuse rating allowed by the Code to protect single phase motor that draws 20 A at full load against short circuit but at the same time will not fail at start?  
a. 30 A      **b. 60 A**      c. 50 A      d. 20%
29. Conductors supplying one or more motor-compressor with or without additional loads shall have an ampacity not less than the sum of the rated load plus \_\_\_\_\_ percent of the highest motor-compressor rating in the group.  
a. 30      **b. 25**      c. 20      d. 15
30. Motor A has a full load current of 8 A and motor B, 10 A. What is the ampacity of the feeder conductor supplying this two motors?  
a. 9 A      **b. 20.5 A**      c. 18 A      d. 24.2 A
31. The minimum size of wire used in electrical wiring is the former number 14 AWG. Under the metric system shown in the PEC, the diameter is  
a. 2.0 mm      b. 3.2 mm      **c. 1.6 mm**      d. 2.6 mm
32. The ampacity of type UF cable shall be of that \_\_\_\_\_ conductor.  
a. 60°F      b. 140°C      **c. 60°C**      d. 75°C
33. For each small appliance branch circuit, the feeder load shall be \_\_\_\_\_ per 20 A circuit.  
a. 1,000 VA      b. 1,200 VA      **c. 1,500 VA**      d. 1,800 VA
34. What is the nominal supply voltage specified by the Philippine Electrical Code for residential homes?  
a. 225 Volts AC      **b. 230 Volts AC**      c. 240 Volts AC      d. 220 Volts AC
35. When thermal overload relay are used for the protection of a three phase induction motor, their primary purpose is to protect the motor in case of  
a. Short circuit between lines  
b. Reversal of phase sequence  
c. High voltage  
**d. Sustain overload**
36. The electrical plans for residential house include the following items EXCEPT one. Which one is this?  
**a. Substation plan**  
b. Location plan  
c. Floor plan showing location of service  
d. Layout of wiring plan for general lighting and receptacles outlet
37. For rigid steel conduit of trade diameter 50mm, the field bend shall be so made that the radius of the inner edge shall not be less than a certain radius for conductors without lead sheathed. What is the radius?  
a. 450 mm      b. 250 mm      **c. 300 mm**      d. 375 mm
38. The Electrical Code requires that electrical plans and drawings shall be drawn on sheets of the following standard size. Which one is NOT considered standard?  
a. 600 mm x 900 mm  
**b. 217 mm x 279 mm**  
c. 760 mm x 1000 mm  
d. 500 mm x 760 mm

39. Type SE service entrance cable shall be permitted in interior wiring system where all of the circuit conductors of the cable are of the \_\_\_\_\_ type.
- I. Rubber-covered      II. Thermoplastic      III. Metal
- I, II and III
  - II only
  - II and III only
  - I and II only**
40. A multi-contact switch, which fixes the operation sequence of the major device during starting and stopping or during other sequential switching operations.
- Motor operation sequence**
  - Manual transfer switch
  - Position switch
  - Field circuit sequence switch
41. A test lamp using ordinary bulb is used to test one of the following. Which one is this?
- Overload test
  - DC or AC check
  - Polarity check
  - Ground check**
42. Air conditioning load has a demand load of \_\_\_\_\_.
- 80%
  - 100%**
  - 125%
  - 150%
43. In every kitchen, family room, dining room, living room, parlor room, library, bedroom or similar room or area of dwelling units, receptacles shall be installed so that no point along the floor line any wall space is more than \_\_\_\_\_ measured horizontally from an outlet in that space.
- 2,000 mm
  - 1,800 mm**
  - 1,900 mm
  - 2,100 mm
44. If an electrician does not understand the instruction that were given by the supervisor, which of the following is the best for him to do?
- He ask that instruction be repeated and clarified**
  - He does the job the way he thinks best
  - He works out the solution to the problem himself
  - He gets one of the other electrician to do the job
45. The branch circuit load for drying equipment is the larger of either the VA rating of the nameplate or \_\_\_\_\_.
- 5,000 VA**
  - 6,000 VA
  - 4,000VA
  - 3,000VA
46. An outlet box should be fastened to a concrete wall by the use of
- Wood plug and nail
  - Toggle bolts
  - Porcelain insert and screw
  - Expansion bolts**
47. Wiring methods / materials allowed by the code for gasoline stations include all the following EXCEPT on. Which one is this?
- Type MI cable with approved terminal fitting
  - Threaded steel intermediate conduit
  - Rigid non-metallic conduit**
  - Threaded rigid metal conduit
48. What does the symbol consisting of rectangular with solid shading indicate?
- Fuse cutout
  - Telephone exchange
  - safety switch
  - Lighting panelboard**
49. Branch circuits shall be classified according to the maximum permitted \_\_\_\_\_.
- kW rating
  - voltage rating
  - ampere rating
  - all of these

- 50. Medium voltage cable shall be permitted for installation on the following EXCEPT one. Which one is this?**
- a. Where installed in cable trays
  - b. Where exposed to direct sunlight**
  - c. Power systems up to 35,000 volts in dry locations
  - d. Power systems up to 35,000 volts in wet locations

## PEC 2009 REFRESHER 7

1. If there will six or more 2-wire branch circuits, the service disconnecting means shall NOT be smaller than \_\_\_\_\_.  
 a. 100 A                      b. 90 A                      c. 60 A                      d. 30 A
2. To improve the insulation resistance of a motor, it is first cleaned, washed, varnished then baked. Which is very economical and effective method of baking particular the inside coils of a large motor?  
 a. Putting incandescent lamp around the winding and cover  
 b. Hanging resistor strips inside the core and cover  
 c. Putting it inside the baking oven and control the oven temperature  
 d. Connecting the terminals to a variable low voltage supply and increase the baking current gradually until the desired baking temperature is attained, making sure that the rated current is not exceeded.
3. The construction of metal cabinets and cutout boxes shall be such as to secure strength and rigidity. If constructed of uncoated sheet steel, the metal thickness should NOT be less than  
 a. 1.55 mm   b. 1.75 mm   c. 1.00 mm   d. 1.35 mm
4. Where raceways are exposed to widely different temperatures they shall be \_\_\_\_\_. a. Grounded   b. Sealed   c. Isolated   d. Bonded
5. The uses of non-metallic extension are NOT allowed in all EXCEPT one of the following. Which one is this?  
 a. As an aerial cable  
 b. Where exposed to corrosive vapors  
 c. Where subject to corrosive vapors  
 d. Through floors or partitions
6. When the voltage between conductors does not exceed 300 V and the roof has a slope of not less than 100 mm to 300 mm, the clearance can be reduced to  
 a. 500 mm                      b. 800 mm                      c. 1000 mm                      d. 900 mm
7. A circle with letter B stands for  
 a. Buzzer outlet                      b. Push button outlet                      c. Outlet with blank cover                      d. Bell outlet
8. Exposed energized parts of motor and controllers operating at \_\_\_\_\_ volts or more between terminals against accidental contact by enclosure.  
 a. 50                                      b. 30                                      c. 40                                      d. 60
9. Wires or cables used in dry and wet locations for over 2000 volts insulation and ozone resistant with moisture and heat resistant rubber and has a maximum operating temperature of 90 °C is \_\_\_\_\_ type.  
 a. MI                                      b. RHW                                      c. THW                                      d. THHN
10. A certain residential house has a lighting load of 1.1 kVA and an appliance load of 10 A at 220 volts, single phase, two wires, 60 Hz. The branch circuits fuse protection for lighting and appliance loads are \_\_\_\_\_ and \_\_\_\_\_ respectively.  
 a. 30 A, 60 A                      b. 20 A, 30 A                      c. 15 A, 30 A                      d. 15 A, 20 A
11. The building code (PD 1096) of the Philippines has several referral codes. The only no-referral code is  
 a. The Philippines Electrical Code  
 b. Fire Code  
 c. Structural Code  
 d. Chemical Engineering Code
12. At least \_\_\_\_\_ of free conductor shall be left at each outlet, junction and switch point for splices or the connection of fixtures or devices.  
 a. 200 mm                      b. 100 mm                      c. 150 mm                      d. 300 mm

13. Which of the following is NOT used as an electrical cable?  
a. Flat cables   b. Optical fiber cables   c. Armored cable   d. Steel cables
14. Motors with marked temperature rise not over 40°C shall have an overload protection equal to \_\_\_\_\_ percent of the motor full load current.  
a. 115   b. 125   c. 110   d. 100
15. What is the temperature rating of a TW insulated conductor?  
a. 60 °C   b. 90 °C   c. 75°C   d. 100°C
16. The minimum clearance of service drops over sidewalk.  
a. 8 ft   b. 14 ft   c. 10 ft   d. 12 ft
17. What is the diameter of a solid wire which is equivalent to 5.5 mm²?  
a. 2.26 mm   b. 1.62 mm   c. 1.75 mm   d. 2.65 mm
18. The combined cross sectional area of all conductors or cables shall NOT exceed \_\_\_\_\_ percent of the internal cross-sectional area of the raceway.  
a. 50   b. 60   c. 40   d. 70
19. To cut rigid steel conduits, an electrician should  
a. Use a hack saw and ream the ends  
b. Use a three-wheel pipe cutter  
c. Use a cold chisel and ream the ends  
d. Order it to cut to size
20. The maximum distance between open service conductor supports for a voltage of up to 300 volts?  
a. 2,000 mm   b. 1,000 mm   c. 1,500mm   d. 1,300mm
21. Where coaxial cables are attached to building, they should have a separation of at least \_\_\_\_\_ from the electric light or power cables.  
a. 100 mm   b. 50 mm   c. 250 mm   d. 200 mm
22. A phase converter is usually employed to convert single-phase to three-phase power supply so that three-phase motor maybe used. For this service, the PEC specifies that the single-phase conductors shave an ampacity of NOT less than \_\_\_\_\_ of the full load current rating of motor or load being served where the input and output voltages are identical.  
a. 173 %   b. 240 %   c. 216 %   d. 350 %
23. What is the minimum insulation resistance of a building's electrical wiring for circuits using 2.0 mm² or 3.5 mm² conductors?  
a. 500,000 ohms   b. 250,000 ohms   c. 1,000,000 ohms   d. 750,000 ohms
24. In the installation of power resistors, a thermal barrier shall be required if the space between the resistors and any combustible materials is less than \_\_\_\_\_ mm. What is this minimum clearance?  
a. 150 mm   b. 300 mm   c. 200 mm   c. 250 mm
25. In estimating the loading of a branch circuit, what loading shall be used for each receptacle?  
a. 160 VA   b. 120 VA   c. 180 VA   d. 150 VA
26. Festoon lighting is a string of outdoor lights suspended between two points more than \_\_\_\_\_ apart.  
a. 4,000 mm   b. 3,800 mm   c. 4,5000 mm   d. 5,000 mm
27. With respect to the safety value of the insulation on electrical maintenance tools, it can be said properly that  
a. The insulation provides very little real protection  
b. Its value is mainly to the untrained electrician helper  
c. The insulation should not be used as the only protective measure  
d. It adequately insures the safety of the user

28. Outlets for heavy-duty lamp holders shall be rated \_\_\_\_\_.  
 a. 500 VA      **b. 600 VA**      c. 660 VA      d. 550 VA
29. When fastening an outlet to a brick wall, the electrician should use one of the following. Which one is this?  
 a. **Expansion bolt**      b. Toggle bolts      c. Temporary nail      d. Wooden plug and nail
30. When soldering two copper surfaces together, they should be kept clean while heating by  
 a. Applying the solder quickly  
 b. Not admitting the open flame to touch the copper surfaces  
 c. Frequently rubbing the tip with emery cloth  
 d. **The use of flux**
31. When testing the insulation integrity of a new or old electrical wiring installation circuit of 5.5 mm<sup>2</sup> the Code specifies a minimum insulation resistance of what value?  
 a. 1,000,000 ohms      **b. 250,000 ohms**      c. 500,000 ohms      d. 100,000 ohms
32. In general, layout of motors and power outlets not exceeding a total of \_\_\_\_\_ maybe include in the lighting layout provided such inclusion will not make the reading, interpretation and or checking of the said plan difficult.  
 a. 8      **b. 10**      c. 12      d. 6
33. Before an ammeter is disconnected from an energized current transformer circuit, one of the procedures should be followed. Which one is this?  
 a. Primary winding should be shorted  
 b. Secondary winding should be shorted  
 c. Secondary winding should be opened  
 d. **Primary winding should be opened**
34. Give the minimum vertical clearance from finish grade of a service drop conductor installed between buildings on residential properties and driveways?  
 a. 5,500 mm      **b. 4,600 mm**      c. 3,700 mm      d. 3,100 mm
35. When measuring to determine the size of stranded conductor, you would place the wire gauge over \_\_\_\_\_.  
 a. The insulation      **b. all of the strands**  
 c. one strand of the conductor      d. the outer of the covering
36. Who shall make the final decision in the interpretation of controversial provisions of the Philippine Electrical Code?  
 a. IIEE Board of Governors  
 b. **Board of Electrical Engineering**  
 c. Building Official  
 d. IIEE Code Committee
37. A continuous electrical load is one where the maximum current is expected to continue for minimum duration of time. What is this minimum duration of time?  
 a. 1 hour      b. 4 hours      **c. 3 hours**      d. 2 hours
38. S<sub>2</sub> means?  
 a. **Duplex switch**      b. two-pole switch      c. 2-way switch      d. two-throw switch
39. Under floor raceways may be occupied up to \_\_\_\_\_ percent of the area.  
 a. 55      b. 38      **c. 40**      d. 30
40. The minimum size of service drop copper conductors allowed by the Philippine Electrical Code is one of the following. Which is this size?  
 a. 3.5 mm<sup>2</sup>      b. 5.5 mm<sup>2</sup>      c. 2.0 mm<sup>2</sup>      **d. 8.0 mm<sup>2</sup>**
41. Appliance outlets installed in a dwelling unit for specific appliances, such as laundry equipment, shall be installed within \_\_\_\_\_ of the intended location of the appliance.  
 a. **1,800 mm**      b. 1,500 mm      c. 2,000 mm      d. 1,000 mm



42. As a general rule, equipment rated 1,000 A or more and measuring more than 1,900 mm wide, containing OCD, shall have an entrance at both ends of the switchboard room. The width and height of each entrance shall NOT be less than the following dimensions. Which one is correct?
- 800 mm wide and 2,000 mm high
  - 600 mm wide and 2,000 mm high
  - 600 mm wide and 2,000 mm high
  - 800 mm wide and 2,200 mm high
43. Which is the most important thing to do when a person has been shocked by electricity?
- Separate the victim from the electric wire as soon as possible making sure that you do not become another victim
  - Call for competent help
  - Apply for resuscitation
  - Disconnect the switch
44. A stranded wire is given the same designation as a solid wire if it has the same \_\_\_\_\_.
- Overall diameter
  - weight per foot
  - cross-sectional area
  - strength
45. Communication conductors shall be separated at least \_\_\_\_\_ from conductors of any electric light or power circuits.
- 50 mm
  - 40 mm
  - 60 mm
  - 75 mm
46. A general-purpose single-phase motor rated 0.5 hp has a current rating of 5 A. What should be the setting of the overload relay that is installed to protect the motor? Assume the service factor of the motor to be 1.0.
- 5.75 A
  - 5.5 A
  - 5.0 A
  - 6.25 A
47. To support conduit on a hollow block wall, use one of the following methods. Which one is this?
- Machine screw
  - Lag screw
  - Toggle bolt
  - Through bolt
48. Which of the motor starters does not stress the motor winding severely?
- Across the line starter
  - Wye-delta starter
  - Soft-start starter
  - Transformer-type starter
49. What is the minimum depth of clear working space in front of a switchboard rated at 4,160 volts, where there are exposed energized parts on the both sides of the workspace?
- 1,000 mm
  - 1,900 mm
  - 1,600 mm
  - 2,000 mm
50. Rigid metal conduit shall be firmly fastened within \_\_\_\_\_ of each outlet box.
- 800 mm
  - 900 mm
  - 760 mm
  - 600 mm

**PEC 2009 REFRESHER 8**

1. Which of the following statements is NOT correct?
  - a. The use of an inductive ballast for fluorescent lamps is usually because it is the most efficient.
  - b. Lighting fixtures having exposed ballast shall be installed that they will not be in contact with combustible materials.
  - c. A ballast which incorporates an autotransformer to raise the voltage to more than 300 V shall be supplied only by a supply system which is grounded.
  - d. A receptacle outlet installed outdoors shall be located so that water accumulation is likely to touch the outlet cover or plate.
2. When pulling wires into a conduit, a certain percent of the conduit area should unoccupied. What is the purpose of this?
  - a. To permit pulling in additional wires later
  - b. To permit pulling out of the wires for replacement even if the insulation has swelled
  - c. To allow pulling in the wire without strain on the conductors or abrasion
  - d. To permit circulation of air so that the insulation will not be damage by heat
3. If a bare live conductor is touched accidentally, the severity of electric shock is determined primarily by
  - a. The size of the conductor
  - b. The type of the power supply, whether AC or DC
  - c. The contact resistance between the bare wire and the person at the point of contact
  - d. The current flowing in the conductor
4. Intermediate metal conduit shall shipped in standard lengths of \_\_\_\_\_.
  - a. 5,000mm
  - b. 4,000mm
  - c. 2,000mm
  - d. 3,000mm
5. Hazardous locations are classified by the Philippine Electrical Code in how may classes?
  - a. Two classes
  - b. Four classes
  - c. Three classes
  - d. One classes
6. Bonding jumpers which connect communications cable grounding conductors and the grounding electrode of the building shall NOT be smaller than what copper size?
  - a. 5.5 mm<sup>2</sup>
  - b. 8.0mm<sup>2</sup>
  - c. 14.0 mm<sup>2</sup>
  - d. 3.5 mm<sup>2</sup>
7. Underground cable feeder and branch circuit cables shall be permitted for use in any of the following applications EXCEPT one. Which one is this?
  - a. Where embedded in poured concrete
  - b. For interior wiring
  - c. For direct burial
  - d. Where used in corrosive locations
8. The minimum size of conductors to be used for lighting purposes is
  - a. 1.5 mm<sup>2</sup>
  - b. 1.25 mm<sup>2</sup>
  - c. 1.75 mm<sup>2</sup>
  - d. 2.0 mm<sup>2</sup>
9. Any unguarded metal sheathed service cable, service conduits, metal fixtures and similar non-current carrying parts, if located in urban districts and where liable to be charge to more than a certain voltage to ground shall be isolated or guarded so as not to be exposed to accidental contact by unauthorized persons. What is this voltage?
  - a. 1,000 V
  - b. 500 V
  - c. 150 V
  - d. 300 V
10. Where an intermediate metal conduit is used, there shall NOT be more than the equivalent of \_\_\_\_\_ quarter bends between pull points.
  - a. 2
  - b. 4
  - c. 3
  - d. 5
11. Service entrance conductors passing over roofs shall have a clearance over the roof which they pass of
  - a. 1,000 mm
  - b. 2,000 mm
  - c. 1,500 mm
  - d. 2,500 mm
12. Flexible metal conduit shall be secured by an approved means at intervals NOT exceeding \_\_\_\_\_.
  - a. 1,200 mm
  - b. 1,300 mm
  - c. 1,500 mm
  - d. 1,400 mm

13. Overcurrent in transformers affect all of the following EXCEPT

- a. Breather effectiveness
- b. Mechanical stress
- c. Life insulation
- d. Rise in temperature

14. An electrician should consider all electrical equipment live unless he definitely knows that they are not. The main reason of this practice is to avoid

- a. Personal injury
- b. Energizing the wrong circuit
- c. De-energizing the wrong circuit
- d. Unnecessary work

15. The rating of the branch circuit serving a continuous load shall NOT exceed \_\_\_\_\_ percent of the continuous load.

- a. 100
- b. 130
- c. 125
- d. 115

16. What is the maximum allowable voltage drop from the distribution panel to the farthest load?

- a. 10%
- b. 5%
- c. 3%
- d. 2%

17. The use of rigid metal conduits shall be permitted under all atmospheric conditions subject to the following conditions EXCEPT one. Which one is this?

- a. Aluminum fittings and enclosures shall be permitted to be used with rigid steel conduits
- b. Ferrous metal conduits shall be permitted to be installed in concrete
- c. Conduits shall be permitted to be used in sand fill which is subject to permanent moisture
- d. Where the ferrous raceways are protected solely by enamel, the use is permitted only indoors

18. Communication conductors shall NOT be attached to a cross arm below electric light and power conductors under Article 10.1.3.1 (a) (2).

- a. No one cares
- b. True
- c. False
- d. Allowed with approval from utility

19. Where receptacles are connected to a 30-A branch circuit, the maximum allowable cord and plug connected load shall not be more than

- a. 30
- b. 24
- c. 16
- d. 20

20. In every drawing, the title block shall be standard strip, which shall contain the name of the project, owner, title of the sheet, scale used, name and signature of the PEE. How wide is this strip?

- a. 35 mm
- b. 30 mm
- c. 40 mm
- d. 45 mm

21. The disconnecting means for motor circuits rated up to 600 volts, shall have an ampere rating of at least \_\_\_\_\_ percent of the full load current of the motor.

- a. 200
- b. 115
- c. 150
- d. 125

22. Underground communications conductors in a raceway, handhole or manhole containing electric light and power conductors, shall be in a section \_\_\_\_\_ from such conductor by means of a separator ( brick, concrete or tile ) under Article 10.1.3.2 (a).

- a. Combined
- b. Separated
- c. Included
- d. Inside

23. Refers to the power plant mounted on wheels as used in the railroad transportation industry.

- a. Electric locomotive
- b. Electric train
- c. LRT
- d. None of these

24. Power and control tray cables (type TC) maybe used under one of the following conditions. Which one is this?

- a. Where exposed to physical damage
- b. Where installed as open cable or brackets
- c. Where installed in industrial establishment where a registered master electrician will service the installation
- d. Where direct buried underground

25. Which component of a DC motor is used to control the speed?
- a. carbon brush assembly
  - b. armature winding
  - c. commutator
  - d. field winding
26. A repulsion motor equipped with one of the following. Which one is this?
- a. A set of slip rings
  - b. A commutator
  - c. Both commutator and slip rings
  - d. Neither a commutator nor a slip rings
27. A frequency meter is connected as a potential device, which is connected across the line because of one of the following reasons. Which one is this?
- a. A transformer maybe used for different voltages
  - b. The reading will be independent of the varying current
  - c. Only the voltage has frequency
  - d. It is safer than a series device
28. Which of the following is NOT one of the considerations that must be evaluated in judging the equipments?
- a. Electrical insulation
  - b. Arcing effects
  - c. Wire bending and connection space
  - d. Longevity
29. In each conduit run entering an enclosure for switches, circuit breakers, relays and others that may produce high temperatures, seals on the conduit shall be installed with a certain length before entering the enclosure. What is this length?
- a. 900 mm
  - b. 750 mm
  - c. 250 mm
  - d. 460 mm
30. Rigid non-metallic conduit approved for direct burial without concrete encasement shall have a minimum burial of
- a. 500 mm
  - b. 400 mm
  - c. 460 mm
  - d. 440 mm
31. Non-metallic boxes not over \_\_\_\_\_ cu. Cm shall be permitted only on non-metallic wiring method.
- a. 1,725
  - b. 1,520
  - c. 1,700
  - d. 1,640
32. A wye-delta starter for a single voltage three phase squirrel cage induction motor would requires the connection of a certain number of wires from the motor. How many wires would be needed?
- a. 3 wires
  - b. 9 wires
  - c. 6 wires
  - d. 12 wires
33. What size using non-time delay fuse does the Code requires for a 2 hp, 208 volts, single-phase motor?
- a. 40 A
  - b. 30 A
  - c. 35 A
  - d. 20 A
34. For raceway 20 mm trade size or larger containing conductors 22 mm<sup>2</sup> or larger, the minimum length of the box in straight pulls shall NOT be less than \_\_\_\_\_ times the trade diameter of the largest raceway.
- a. 8
  - b. 10
  - c. 6
  - d. 12
35. An assembly drawing for a switchboard appears to have some errors. As a supervisor, what step will you take?
- a. Report the apparent error to your supervisor
  - b. Make the connections per drawing but be prepared to correct it if ordered
  - c. Hold the job until you have checked with the person who initiated the plan
  - d. Proceed making the correction on the drawing

36. Vertical clearances of all the service drop conductors above roof shall NOT be less than one of the following values.  
a. 2,000 mm      b. 2,750 mm      c. 3,000 mm      d. 2,500 mm
37. According to its make, conduits may be classified as  
a. Rigid metal      b. rigid non-metal      c. flexible metal      d. all of these
38. The Philippine Electrical Code, Part 1 does not cover wiring of equipment installed within or to or from one of the following. Which one is this?  
a. Trailers      b. Mobile homes      c. Water crafts      d. Airplanes
39. When wiring a raceway at least a certain length of free conductors shall be left at each outlet. What is this minimum length?  
a. 75 mm      b. 100 mm      c. 150 mm      d. 200 mm
40. Where a rigid metal conduit is used, there shall NOT be more than the equivalent of \_\_\_\_\_ quarter bends between pull points.  
a. Three      b. four      c. five      d. two
41. Which of the following wires has 75-ohms impedance?  
a. Foam-filled twin lead  
b. Coaxial  
c. Flat twin lead  
d. None of these
42. A single-phase motor is taking 20 A from a 400- V supply at unity pf. What is the power taken?  
a. 6,000 W      b. 8,000 W      c. 4,000 W      d. none of these
43. The common use for autotransformer in electrical power work is  
a. Current-limiting reactor  
b. Instrument current transformer  
c. Starting compensator for motor  
d. Insulating transformer
44. A 5.5 mm<sup>2</sup> TW copper conductor has a conductor ampacity of \_\_\_\_\_.  
a. 30 A      b. 40 A      c. 20 A      d. 50 A
45. MC cable insulation shall have a maximum operating temperature of NOT less than \_\_\_\_\_.  
a. 75 deg. C      b. 80 deg. C      c. 90 deg. C      d. 60 deg. C
46. The branch circuit load for continuous duty receptacles shall be calculated at \_\_\_\_\_ VA per receptacle.  
a. 150      b. 175      c. 180      d. 200
47. Mandatory rules of the PEC are characterized by the use of the word \_\_\_\_\_.  
a. Shall      b. Should      c. Both A and B      d. Neither A or B
48. Plug fuses shall not be installed in circuits exceeding \_\_\_\_\_ between conductors.  
a. 125 V      b. 250 V      c. 300 V      d. 150 V
49. The minimum number of branch circuits shall be determined from the \_\_\_\_\_.  
a. Total computed load and the size of disconnect needed  
b. Total computed loads and the rating of the circuits used  
c. Size or the rating of the circuits  
d. Minimum number required by the PEC
50. Where rear access is required to work on de-energized parts on the back of enclosed equipment, a minimum working space of \_\_\_\_\_ horizontally shall be provided.  
a. 1,000 mm      b. 900 mm      c. 800 mm      d. 600 mm

**END**

***GOOD LUCK!***  
***IF NO PAIN, NO GAIN!***  
***LEAVE EVERYTHING TO GOD, ASK GUIDANCE***  
***AND PRAY!***

***Aim for this....***



