

INSTITUTE OF INTEGRATED ELECTRICAL ENGINEERS OF THE PHILIPPINES
Albay-Legazpi Chapter

MAY 2010 RME PEC PREBOARD EXAM

Multiple Choice. *Select the correct answer for each of the following questions. Mark only one answer for each item by shading the box corresponding to the letter of your choice on the answer sheet provided.*

1. Differences in inductive reactance and unequal division of current can be minimized by
I. choice of materials II. methods of construction III. orientation of conductors
a.) I only c.) I and II only
b.) II only **d.) I, II and III**
2. What type of insulation material is used for type THHN copper conductor? (TABLE 3.10.1.13)
a.) flame-retardant, heat-resistant thermoplastic c.) moisture resistant
b.) flame-retardant, moisture-and heat-resistant thermoplastic d.) moisture- and heat-resistant
3. Trade name for XHHW conductor? (TABLE 3.10.1.13)
a.) thermoset c.) moisture-resistant thermoplastic
b.) moisture-resistant thermoset d.) moisture- and heat-resistant thermoplastic
4. The minimum insulation level for neutral conductors of solidly grounded system shall be (sec 2.50.11.5)
a.) 300 V c.) 1000 V
b.) 600 V d.) 750 V
5. The phase arrangement of a 3-phase buses shall be A, B, C from: sec. 3.84.1.3(f)
I. front to back
II. top to bottom
III. left to right
a.) I only c.) III only
b.) II only **d.) I, II & III**
6. Electric furnace transformers that have a total rating not exceeding _____ kVA shall be permitted to be installed without a vault in a building or room of fire-resistant construction, provided suitable arrangements are made to prevent a transformer oil fire from spreading to other combustible material. (sec 4.50.2.6 exception No. 2)
a.) 112 ½ **c.)** 75
b.) 10 d.) 150
7. Hazardous location that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.
a.) Class I **c.)** Class III
b.) Class II d.) All of the above
8. The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.
a.) Enclosure c.) Equipment
b.) Panelboard d.) Duct
9. Vertical clearance from ground over residential property and driveways, and those commercial areas not subject to truck traffic where the voltage does not exceed 300 volts to ground.
a.) 3100 mm **c.)** 3700 mm
b.) 4600 mm d.) 5500 mm
10. Each plate electrode shall expose not less than _____ per square metre of surface to exterior soil.
a.) one third c.) two third
b.) one fifth d.) one half
11. The minimum conductor size for Type IGS cable shall be _____ and the maximum size shall be _____.
a.) 100 mm², 2250 mm² c.) 250 mm², 2375 mm²
b.) 250 mm², 2000 mm² **d.)** 125 mm², 2375 mm²
12. Clearance in any direction to the water level, edge of water surface, base of diving platform, or permanently anchored raft for insulated supply or service droop cables 0 up to 750 volts to ground...
a.) 3,700 mm c.) 4,300 mm
b.) 5,500 mm **d.)** 6,700 mm
13. Where the overload relay selected using the factor 125% is not sufficient to start the motor or to carry the load, the multiplying factor shall be increased but shall NOT exceed _____ percent.
a.) 130 c.) 150
b.) 140 d.) 125
14. Which of the following electrodes shall not be permitted?
I. Rod and pipe electrodes II. Plate electrodes III. Aluminum electrodes
a.) I and II c.) I and III
b.) II and III **d.)** III only
15. What is the current carrying capacity of each conductor if 28-14 sq. mm THW copper conductors are installed in an auxiliary gutter?
a.) 32 A **c.)** 18 A
b.) 28 A d.) 36 A
16. System voltage in watercraft for both alternating current & direct current shall not exceed:
I. 500 V for cooking and heating equipment permanently connected to fixed wiring.
II. 250 V for lighting, heaters in cabins and public rooms, and other applications not mentioned above.
III. 55 V for emergency systems.

- a.) I only
b.) II only
- c.) I & II only
d.) I, II & III only
17. What is the minimum size THW copper-clad aluminum service entrance conductors for a calculated load of 195 amps to a 3-wire single phase dwelling unit?
a.) 80 sq mm
b.) 50 sq mm
c.) 100 sq mm
d.) 125 sq mm
18. 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 the load under any condition of use.
a. short time duty
b. varying duty
c. continuous duty
d. periodic duty
19. Liquidtight flexible conduit shall not be permitted _____.
a.) In hazardous locations
b.) In high temperature
c.) In exposed and concealed work
d.) Where installations requires flexibility or protection from liquids, vapors or solids
20. Type _____ cable is a factory assembly of one or more conductors, each individually insulated and enclosed in a metallic sheath of interlocking tape, or a smooth or corrugated tube.
a.) MI
b. AC
c. MC
d. MV
21. What shall be the voltage regulation of transformers in watercraft if it is single phase 5 kVA or more, & three-phase 15 kVA or more?
a.) 2.5%
b.) 3.0%
c.) 4.0 %
d.) 5.0%
22. A 3-phase, 230 V 40 Hp motor has 30 minute duty cycle. Find the size of THW copper conductor required to supply this intermittent-duty motor.
a.) 8.0 mm² THW
b.) 14 mm² THW
c.) 22 mm² THW
d.) 30 mm² THW
23. In the installation of cables for fixed electric space-heating equipment in concrete or poured masonry floors, constant wattage heating cables shall not exceed _____ of cable.
a.) 10 watts/linear meter
b.) 35 watts/linear meter
c.) 45 watts/linear meter
d.) 55 watts/linear meter
24. The current-carrying conductors in cablebus shall have an insulation rating of _____ or higher of an approved type and suitable for the application in accordance with Articles 3.10 and 4.90.
a.) 60 °C
b.) 75 °C
c.) 90 °C
d.) 120 °C
25. Fixtures in clothes closets shall be _____.
I. a surface mounted or recessed incandescent fixture with a completely enclosed lamp
II. a surface mounted or recessed fluorescent fixture
III. pendant fixture
a. I only
b. I and II only
c. I and III only
d. I, II and III
26. An accessible means external to enclosures for connecting intersystem bonding and grounding conductors shall be provided at the service by at least one of the following means:
I. Exposed nonflexible metallic service raceways.
II. Exposed grounding electrode conductor.
III. Approved means for external connection of a copper or other corrosion-resistance bonding or grounding conductor to the service raceway or equipment.
a.) I only
b.) I & II only
c.) II & III only
d.) I, II, and III
27. Where a main bonding jumper is a screw only, the screw shall be identified with a ____ finish that shall be visible with the screw installed.
a.) white
b.) gray
c.) green
d.) black
28. A feeder runs from one part of a building to another under the floor in two parallel sets of rigid nonmetallic conduits with type RHW copper conductors size 250 mm² and is protected by 800 ampere fuses. It must have a minimum size copper equipment grounding conductor in each conduit run of no less than which of the following:
a.) 38 mm²
b.) 80 mm²
c.) 50 mm²
d.) 30 mm²
29. For purpose of lightning protection, high rise building is a building over ____ in height.
a.) 25 m
b.) 200 m
c.) 100 m
d.) 23 m
30. The rating of a time-delay fuse (dual-element) shall be permitted to be increased but shall in no case exceed ____ of the full-load current.
a.) 125%
b.) 150%
c.) 225%
d.) 400 %
31. In PEC 2000, Article 5.17 is
a.) Multioutlet Assembly
b.) Wiring Protection
c.) Motors, Motor Circuits, and Controllers
d.) Health Care Facilities
32. A nonmetallic wireway is not permitted in which of the following locations unless it is specifically marked otherwise:
a.) Where the wireway would be exposed to sunlight
b.) Where subject to corrosive vapors
c.) In wet locations
d.) All of the above

33. If a feeder conductor contains type RHW 500 kcmil copper conductors protected by a 400 amp circuit breaker, and a tap is made to the feeder in order to supply a 100 amp main circuit breaker 6,800 mm from the tap location, then the minimum size copper type THWN conductor that is permitted between the tap and the panelboard is which of the following:
- a.) 50 mm² c.) 60 mm²
 b.) 30 mm² d.) 38 mm²
34. Electrical systems that are grounded must meet which of the following requirements:
- a.) Be connected to the earth in a way that limits the voltage caused by line surges
 b.) Be connected to the earth in a manner that will stabilize the voltage to the earth during normal operation
 c.) Both of the above
 d.) Either of the above
35. In a separately derived system, the TVSS shall be connected in which of the following manners:
- a.) To each ungrounded connector c.) To the corner grounded delta
 b.) Outdoors, in an easily accessible location d.) To the load side of the first overcurrent device
36. If a feeder conductor carries the total load supplied by the service conductors with an ampacity of 50 amps, then which of the following standards must be met:
- a.) The feeder ampacity must be greater than the service conductor ampacity
 b.) The feeder ampacity must be less than the service conductor ampacity
 c.) The feeder ampacity must be 30 amps
 d.) None of the above
37. Type MI cable shall not be used for which of the following applications:
- a.) Where embedded in plaster or concrete c.) Attached to cable trays
 b.) As service cabling d.) None of the above
38. When conductors of different systems are installed in a common raceway or cable the derating factors used shall be which of the following:
- a.) Applied only to the number of power and lighting conductors
 b.) Be increased by one over the total derating factor
 c.) Be at least 50% of the highest rated cable
 d.) None of the above
39. An industrial control panel supply conductor shall have an ampacity of which of the following:
- a.) No less than 125% of the full-load current rating of all resistance heating loads and no more than 125% of all combined continuous loads
 b.) No less than 125% of the full-load current rating of all resistance heating loads plus 125% of the full-load current rating of all other connected motors based on their duty cycle if they are all in operation at the same time
 c.) No less than 125% of the full-load of two or more components of a systematic assembly
 d.) Not to exceed the ampacity listed for all resistance heating equipment and connected motor nameplates
40. A 167 kVA 34.5kV/460 V 3-phase transformer has 7.2 % impedance will be installed in unsupervised location. What size of fuses is required to protect the transformer primary? What size of circuit breaker is required to protect the transformer's secondary?
- a.) 6A 175 AT c.) 10A, 225 AT
 b.) 8A, 300AT d.) 6A, 200 AT
41. In order to balance a 3-wire, single-phase 230/115 volt circuit, which of the following must be done:
- a.) The neutral conductor must carry the unbalanced current. c.) The hot conductor must carry the total current.
 b.) The neutral conductor should be used for grounding only. d.) None of the above
42. Open conductors shall be supported on which of the following:
- I. Glass or porcelain knobs II. Racks or brackets III. Strain insulators
- a.) I or III c.) I or II
 b.) II or III d.) Any of the above
43. Type UF cable shall not be used in ____
- I. solar photovoltaic system III. In theaters
 II. nonheating leads for heating cables IV. underground requirements
- a.) I and II only c.) III only
 b.) I and III only d.) all of the above
44. 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 c.) 150 mm
 b.) 100 mm d.) 300 mm
45. Low voltage equipment in a hospital that comes in frequent contact with people's bodies must be which of the following:
- a.) Able to operate at an electrical potential of 10 volts or less c.) Be moisture resistant
 b.) Approved as intrinsically safe d.) All of the above
46. In order to correct the power factor, a three-phase, 480 volt, 92 kVAR capacitor bank located 1800 mm from the main service of a 300 square meter office building has a minimum required ampere rating for the conductors in the capacitor bank of which of the following:
- a.) 240 amps c.) 180 amps
 b.) 150 amps d.) 110 amps
47. If there are more than three current-carrying conductors grouped together in a raceway then which of the following must occur:
- a.) The cables must be separated by a nonmetallic barrier c.) The ampacity must be derated
 b.) The conductors shall not be run with electric light or power cables d.) All of the above

48. The required branch-circuit conductor ampacity for X-ray equipment must be at least which of the following:
- a.) 100 percent of the momentary demand rating of the two largest X-ray machines
 - b.) 100 percent of the momentary demand rating of the two largest X-ray machines plus 20 percent of the momentary demand of other X-ray units**
 - c.) 100 percent of the continuous demand rating of the two largest X-ray apparatus
 - d.) 50 percent of the continuous demand rating of the two largest X-ray machines plus 10 percent of the momentary demand of other X-ray units
49. Which of the following shall be permitted to be used at any power takeoff opening to make power connections to a busway:
- a.) Circuit-breaker cubicle
 - b.) Cable tap box
 - c.) Fusible switch adapter
 - d.) All of the above**
50. When an EMT raceway contains 12 three-meters long 3.5 mm^2 THHN copper conductors where there are nine current carrying conductors and the ambient temperature is 42 degrees C, then the ampacity of the THHN conductors is closest to which of the following ratings:
- a.) 15 amperes
 - b.) 25 amperes
 - c.) 18 amperes**
 - d.) 30 amperes

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- Table 2.50.6.13
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 - d.) All of the above
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 - b.) 100 percent of the momentary demand rating of the two largest X-ray machines plus 20 percent of the momentary demand of other X-ray units
 - c.) 100 percent of the continuous demand rating of the two largest X-ray apparatus
 - d.) 50 percent of the continuous demand rating of the two largest X-ray machines plus 10 percent of the momentary demand of other X-ray units

49. Which of the following shall be permitted to be used at any power takeoff opening to make power connections to a busway:
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 - b.) Cable tap box
 - c.) Fusible switch adapter
 - d.) All of the above
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