Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

___ 1. The article that covers TV wiring installations in residences is Article ____.
   a. 725
   b. 810
   c. 820
   d. none of these

___ 2. A lumber mill has had a major feeder go down and destroy the feeder panel and transformer. No permit is required if the following person(s) do the work.
   a. General journeyman
   b. Apprentice
   c. General supervisor
   d. None of these
   e. All of these

___ 3. A surge arrester is:
   a. only permitted to be installed outside of a building.
   b. only permitted to be installed inside of a building.
   c. permitted to be installed inside or outside of a building.
   d. only permitted to be installed by the utility with high-voltage training.
   e. only permitted to be installed on services rated more than 1000 amperes.

___ 4. Overheating of lighting fixtures, which often results in fires, is most often caused by ____.
   a. burying recessed fixtures under thermal insulation
   b. failure to ground metal fixture bodies properly
   c. overlampung
   d. both a and c

___ 5. NEC® 422.12 on central heating equipment requires that ____.
   a. electric furnace overcurrent protection be provided by fuses only
   b. central heating equipment be provided by a separate branch circuit
   c. electric furnaces be grounded according to the requirements of Article 250
   d. a disconnecting means be provided for central heating equipment

___ 6. Ceiling fans weighing more than ____ pounds are required to be supported independently of the outlet box.
   a. 15
   b. 25
   c. 35
   d. 50

___ 7. Which of the following medical equipment has partial exemption from licensing and permits in the State of Oregon?
   a. PET, X-Ray, Photometric
   b. CT, CATV, CATVX
   c. MRI, Panographic, Dental radiographic
   d. DAT, GEMI, Zeus

___ 8. Mandatory inspections include;
   a. service, feeders
   b. receptacles, switches
   c. data, fire alarm
   d. None of these

___ 9. When connecting conductors to receptacles at inserts in a cellular metal floor raceway, the conductors are:
   a. permitted to be cut and connected to the receptacle terminal screws.
   b. must be cut and pigtailed to each receptacle.
   c. only permitted to be supply one receptacle.
   d. not permitted to be installed as loop-wiring.
e. required to be attached to the receptacle terminals without cutting the conductors that feed on to other outlets.

10. Transformers and low-voltage wiring for doorbells are classified as ____ circuits under Article 725.
   a. Class 1
   b. Class 2
   c. Class 3
   d. Power-limited

11. An operating room in a hospital where flammable anesthetics are used is classified as a Class I, Division 1 location from the floor up to a height of:
   a. 3 ft (900 mm).
   b. 4 ft (1.22 m).
   c. 5 ft (1.52 m).
   d. 6 ft (1.8 m).
   e. the ceiling.

12. Grounding requirements for residential TV services must conform to the requirements of Article ____.
   a. 250
   b. 810
   c. 820
   d. all of these

13. In NEC® 210.52(A)(1), the "12 foot rule" for spacing receptacles applies to all the following areas of a house, except for ____.
   a. recreation rooms
   b. dining rooms
   c. master bedrooms
   d. attics

14. What is the feeder demand for one 15kW range?
   a. 15kW
   b. 12kW
   c. 9.2kW
   d. none of these

15. A line-voltage thermostat used to control household heating apparatus rated 240 volts disconnects ____.
   a. all circuit conductors
   b. both ungrounded conductors
   c. the grounded conductor only
   d. the grounding conductor only

16. Since the grounded (neutral) conductor is not permitted to be used for grounding the frames of electric ranges, ovens, or cooktops in new installations, these appliances require ____ power cords.
   a. three-wire
   b. double-insulated
   c. four-wire
   d. listed

17. A 37.5 kVA, three-phase transformer is connected 480 volts on the primary and 208/120 volts on the secondary. The primary full-load current of the transformer is 45 amperes. The transformer supplies a panelboard, 25 ft (7.5 m) away that has a 100 ampere main circuit breaker. The conductor from the transformer to the panelboard is size 3 AWG copper. The primary of the transformer is protected with a 60 ampere circuit breaker. The minimum size copper conductors with 75°C insulation and terminations permitted to supply the primary of the transformer is:
   a. 3 AWG.
   b. 4 AWG.
   c. 6 AWG.
   d. 8 AWG.
18. Strut-type channel raceway:
   a. is only permitted to contain conductors that supply fixtures supported by the raceway.
   b. shall not have a conductor fill in excess of 20% of the cross-sectional area of the raceway.
   c. is required to be supported at intervals not to exceed 3 ft.
   d. shall not be permitted to penetrate partitions or walls.
   e. shall not be installed where concealed.

19. A standard 15- or 20-ampere, 125 volt receptacle that is used on normal building circuits is permitted to be supplied by a technical power system and installed in an audio equipment room if:
   a. the room is restricted to use by qualified personnel.
   b. the circuits are arc-fault circuit interrupter protected.
   c. no other receptacles supplied by the normal power system with a grounded neutral conductor are present in the room.
   d. only isolated ground type receptacles are used.
   e. all lighting in the room is also supplied by the technical power receptacles.

20. Where fixed glass panels (i.e., windows or non-sliding parts of door) do not permit installation of wall-mounted receptacles, ____ are typically used to satisfy the receptacle spacing requirements of NEC\textsuperscript{®} 210.52(A)(3).
   a. extension cords
   b. floor-mounted receptacles
   c. quad receptacles
   d. outdoor GFCI-protected receptacles

21. When figuring kitchen load to calculate residential service size, which of the following must be located?
   a. 1,500 volt-amperes for each of two small-appliance branch circuits
   b. 180 volt-amperes for each kitchen receptacle not on the small-appliance circuits (refrigerator, gas range, clock, etc.)
   c. 100 volt-amperes for lighting
   d. none of these

22. Luminaire is a term that refers to ____.
   a. incandescent lighting fixtures
   b. fluorescent lighting fixtures
   c. outdoor pole-mounted fixtures
   d. All of the above

23. When an appliance is not marked with its maximum overcurrent protection, the branch circuit protection device is sized according to ____.
   a. Table 220.55
   b. the ampacity of the branch circuit conductors supplying the appliance
   c. 30 amperes maximum
   d. none of these

24. A building has underfloor raceway installed to supply power to office desk locations in an open room. If a floor outlet is removed, the conductors that were connected to the receptacle outlet:
   a. are permitted to be taped and placed back into the underfloor raceway.
   b. must be marked as an abandoned cable if left in the raceway.
   c. shall have the bare conductor covered with a listed insulating material.
   d. shall have the conductors cut and spliced with tape applied to exceed the original insulation value.
   e. shall be removed from the raceway.

25. Receptacle outlets must be installed in any wall space ____ or more in width.
   a. 12 in. (300 mm)
b. 24 in. (600 mm)
c. 18 in. (450 mm)
d. 36 in. (900 mm)

26. When 120-volt receptacles and TV outlets are mounted in double-gang boxes, ____ is required in the box to isolate the TV conductors from the power wiring.
   a. a metal EMI shield
   b. a barrier
   c. double-grounding
   d. double-insulation

27. Chapter 479 of the Oregon Revised Statutes covers ______.
   a. the installation of electrical systems
   b. fire sprinkler and alarm systems
   c. protection of buildings from fire and electrical safety law
   d. smoking in public elevators

28. NEC® 422.60(A) requires that an appliance nameplate show ____.
   a. the appliance rating in volts and amperes
   b. the appliance connected load in volts and watts
   c. the appliance branch circuit conductor size
   d. either a or b

29. Rigid nonmetallic conduit is run from the metal forming shell of a wet-niche lighting fixture in a permanent swimming pool to the junction box installed in the concrete deck surface. A size 8 AWG copper bonding conductor run in rigid nonmetallic conduit connects the metal forming shell to the surface junction box. The bonding conductor is:
   a. required to be solid.
   b. permitted to be bare.
   c. not permitted to be bare but can be covered rather than insulated.
   d. required to be stranded.
   e. required to be insulated and permitted to be stranded.

30. For purposes of calculating residential service load, the load for each two feet of lighting track is calculated at ____.
   a. 1,440 watts
   b. 150 volt-amperes
   c. 1,920 watts
   d. 2,400 volt-amperes

31. All of the following are included when calculating the usable area of a dwelling to compute the required lighting load, except for ____.
   a. living room
   b. crawl space
   c. unfinished basement
   d. powder rooms

32. A 20-ampere branch circuit requires ____ AWG conductors, ignoring the effects of voltage drop.
   a. 14 copper
   b. 14 aluminum
   c. 12 copper
   d. 12 aluminum

33. GFCI protection is required for which of the following?
   a. outdoor receptacles installed at eaves for snow melting equipment
   b. a kitchen receptacle installed inside a cabinet to supply a microwave oven
   c. a receptacle installed within 6 feet of a wet-bar sink
   d. a receptacle installed for a kitchen clock
34. A multioutlet assembly is a raceway that contains receptacles and is either surface mounted, flush mounted, or free standing such as a power pole, and is permitted to be installed in:
   a. concealed locations.
   b. outside in damp locations.
   c. inside or outside in damp locations.
   d. locations subject to severe physical damage when constructed of steel with a minimum thickness of 0.040 in.
   e. dry locations.

35. All receptacle outlets rated 20 amperes or less at 125 volts installed in the patient vicinity of a hospital general care area are required to be:
   a. listed hospital grade and so identified.
   b. of the insulated ground type.
   c. protected by a ground fault circuit interrupter.
   d. twist lock type to prevent equipment from being accidentally disconnected.
   e. commercial grade receptacles.

36. The conductors that run from the standby generator to the transfer switch and to the generator panel must be sized not less than ____ of the generators nameplate rating.
   a. 125 percent
   b. 115 percent
   c. 80 percent
   d. 150 percent

37. The total load of an air conditioner shall not exceed ____ percent of the rating of a separate branch circuit.
   a. 50
   b. 75
   c. 80
   d. 125

38. A facility occupied by more than 100 people that is not considered to be a place of assembly is:
   a. a dance hall.
   b. a museum.
   c. a restaurant.
   d. an office building.
   e. a multi-purpose room of a commercial building.

39. All of the following types of cables may be used for fire protective signaling systems, except for ____.
   a. Type PLFA
   b. Type FPLR
   c. Type CMP
   d. Type NPLFP

40. When an existing two-wire, nongrounding-type receptacle is replaced in a location where the Code requires a GFCI receptacle, it is permitted to be replaced by a ____.
   a. GFCI receptacle
   b. two-wire, nongrounding-type receptacle
   c. three-wire, grounding-type receptacle
   d. all of these

41. In the international system of units, the prefix kilo- means ____.
   a. hundred
   b. thousand
   c. million
   d. billion
42. In general, equipment grounding conductors can be either solid or stranded, insulated or bare; but, some applications have particular requirements. Give the Code Section that requires swimming pool grounding conductors to be insulated in order to protect them from corrosion.
   a. Article 100
   b. NEC® 250.36(b)
   c. NEC® 310.1
   d. NEC® 680.23(B)(2)(b)

43. Nationally Recognized Testing Laboratories (NRTL) ____ electrical products to provide a basis for approval by inspectors in the field.
   a. approve
   b. list
   c. rate
   d. none of these

44. Since the grounded (neutral) conductor is not permitted to be used for grounding the frames of dryers, these appliances require ____ power cords when receptacle connection is used.
   a. three-wire
   b. 16 AWG
   c. four-wire
   d. listed

45. Of the following, the one not permitted to serve as an equipment grounding conductor for a 30 ampere rated circuit is:
   a. electrical metallic tubing.
   b. rigid metal conduit.
   c. nonmetallic-sheathed cable Type NM-B with a size 10 AWG bare copper wire.
   d. metal clad cable Type MC with a size 10 AWG insulated green copper wire.
   e. a 3 ft (900 mm) length of Flexible Metal Conduit terminating in fittings listed as suitable for grounding.

46. A dwelling service entrance is rated at 150 amperes and the service entrance conductors are size 2/0 AWG aluminum with 75°C insulation and terminations. The minimum size copper grounding electrode conductor permitted to the metal underground water pipe is:
   a. 8 AWG.
   b. 6 AWG.
   c. 4 AWG.
   d. 3 AWG.
   e. 2 AWG.

47. A single or duplex receptacle installed in a basement or garage for a cord-and-plug connected receptacle in a dedicated space for an appliance such as a freezer or refrigerator ____ required to be protected by a ground-fault circuit-interrupter.
   a. is
   b. is not

48. A raised plaster cover (often called a plaster ring or mud ring) is permitted to increase the maximum number of conductors permitted in an outlet box when it is ____.
   a. listed as a box extension
   b. by the same manufacturer as the box
   c. marked with its cubic-inch volume
   d. metallic and capable of being grounded

49. A 25 kVA single-phase transformer is connected 480 volts on the primary and 240 volts on the secondary. The primary full-load current of the transformer is:
   a. 104 amperes.
b. 52 amperes.
c. 30 amperes.
d. 65 amperes.
e. 60 amperes.

50. Receptacles rated 15 or 20 amperes, 125 volts installed adjacent to the sink of a bathroom in a patient general care room of a hospital is:
   a. supplied from an isolated power system.
   b. grounded with a size 10 AWG insulated copper equipment grounding wire.
   c. required to be arc-fault circuit interrupter protected.
   d. required to be ground-fault circuit interrupter protected for personnel.
   e. required to be grounded to the room equipment bonding point.

51. A journeyman electrician and an apprentice are on a job. They get a call that the supervisor has resigned the firm. The electrical contractor has indicated that he is looking for a new supervisor and instructs the journeyman and the apprentice to complete the work. The job they are working on has a valid permit when they started that morning. The requirements for the journeyman and the apprentice are:
   a. to follow the direction of the electrical contractor
   b. send the apprentice home and the journeyman continue to work
   c. pack up and leave the jobsite, return to the office
   d. None of these

52. In a hospital, the receptacles at the bed location circuit of a critical care patient area is a part of the:
   a. equipment system.
   b. critical branch of the emergency system.
   c. normal power system.
   d. alternate power branch of the normal power system.
   e. life safety branch of the emergency system.
MULTIPLE CHOICE

1. ANS: C  
   PTS: 1

2. ANS: E  
   479.540(7) In cases of emergency in industrial plants, a permit is not required in advance for electrical installation made by a person licensed as a general supervising electrician, a general journeyman electrician or an electrical apprentice under ORS 479.630 if an application accompanied by appropriate fee for a permit is submitted to the Department of Consumer and Business Services within five days after the commencement of such electrical work.  
   PTS: 1

3. ANS: C  
   280.11  
   PTS: 1

4. ANS: D  
   NEC® 410.76(B)  
   PTS: 1

5. ANS: B  
   NEC® 422.12  
   PTS: 1

6. ANS: C  
   NEC® 314.27(D)  
   NEC® 422.18  
   PTS: 1

7. ANS: C  
   918-261-0000  
   Partial Exemption for Medical Diagnostic Imaging and Therapy Equipment  
   (1) An exemption from electrical licensing of ORS 479.620 is created under ORS 479.540 for certain persons installing or working on designated medical equipment under this rule.  
   (a) Only the following medical equipment can be involved: General X-ray systems, vascular systems, computer tomography scanners (CT), magnetic resonance imaging systems (MRI), nuclear medicine systems, positron emission tomography scanners (PET), radiation therapy systems, image-guided therapy systems, dental radiographic, panographic systems, film processors and newly developed imaging or therapy equipment approved by order of the board  
   PTS: 1

8. ANS: A  
   918-271-0040  
   Mandatory Inspections  
   (1) Electrical inspectors shall inspect appropriateness of the size, placement, protection and termination of the following electrical installations, note discrepancies and require correction of code violations:  
   (a) Service entrance conductors;
(b) Service equipment;
(c) Grounding electrode and grounding electrode conductor;
(d) Bonding;
(e) Overcurrent protection;
(f) Branch circuits;
(g) Feeders;
(h) Ground-fault circuit interrupter devices (GFCI) and ground-fault protection systems (GFP); and
(i) Underground installations.

PTS:  1
9.  ANS:  E
  374.6

PTS:  1
10.  ANS:  B  
11.  ANS:  C
    517.60(A)(1)

PTS:  1
12.  ANS:  D
    NEC® 810.21(J)
    NEC® 820 Part III

PTS:  1
13.  ANS:  D
    NEC® 210.52(A)

PTS:  1
14.  ANS:  C
    NEC 220-19 Note 1

    15kW - 12kW = 3kW  
    3 X .05 = .15  Make this a multiplier by putting a 1 in front.
    Go to Table 220-19, Col C....one range is 8kW.  Increase this by the multiplier, 1.15.
    8 X 1.15 = 9.2kW

PTS:  1
15.  ANS:  B
    NEC® 424.20(A)

PTS:  1
16.  ANS:  C
    NEC® 250.140

PTS:  1
17.  ANS:  C
    240.4(B) Table 310.16
18. ANS: E

384.12(1)

19. ANS: A

647.7(A)(4)

20. ANS: B

NEC® 210.53(A)(3)

21. ANS: A

NEC® 220.52(A)

22. ANS: D

NEC® 410.15(B)

23. ANS: B

NEC® 240.4(B)

24. ANS: E

390.7

25. ANS: B

NEC® 210.52

26. ANS: B

NEC® 810.18(C)

27. ANS: C

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28. ANS: D

680.23(B)(2)(b)

29. ANS: E

680.23(B)(2)(b)

30. ANS: B

NEC® 220.43(B)
31. ANS: B  
*NEC® 220.12*  
PTS: 1

32. ANS: C  
PTS: 1

33. ANS: C  
*NEC® 210.8(A)(7)*  
PTS: 1

34. ANS: E  
*380.2(A)*  
PTS: 1

35. ANS: A  
*517.18(B)*  
PTS: 1

36. ANS: B  
*NEC® 445.13*  
PTS: 1

37. ANS: C  
*NEC® 440.62(C)*  
PTS: 1

38. ANS: D  
*518.2*  
PTS: 1

39. ANS: C  
*NEC® Article 760*  
PTS: 1

40. ANS: A  
*NEC® 406.3(D)(2)*  
PTS: 1

41. ANS: B  
PTS: 1

42. ANS: D  
PTS: 1

43. ANS: B  
*NEC® 90.4*  
PTS: 1

44. ANS: C  
*NEC® 250.140*  
PTS: 1

45. ANS: E
250.118

PTS: 1
46. ANS: B
   250.66 & Table 250.66

PTS: 1
47. ANS: B
   NEC® 210.8(A)(5) Exception No. 2

PTS: 1
48. ANS: C
   NEC® 314.16(A)

PTS: 1
49. ANS: B
   25 kVA × 1000 / 480 V = 52 A

PTS: 1
50. ANS: D
   517.20(A), 210.8(B)

PTS: 1
51. ANS: C
   479.560 Issuance of permit; when permit becomes void; master electrical inspection permit. (1) The
   Department of Consumer and Business Services or a designated agent shall issue a permit to:
   (2) A permit issued to an electrical contractor upon the request of the contractor’s supervising electrician is
   void upon the end of the employment of such supervising electrician before completion of the electrical
   installation.

PTS: 1
52. ANS: B
   517.33(A)

PTS: 1