

Circle the letter of the correct answer: For example: (B)

Class 1 Questions: ANSI #'s and Basic Drawings

1. What is the voltage above which we call equipment Medium Voltage?
 - A 24V dc
 - B 480V ac
 - C 600V ac
 - D 1000V ac

2. What is the voltage above which we call equipment High Voltage?
 - A 600V ac
 - B 1000V ac
 - C 35kV ac
 - D 69kV ac

3. Which type of drawing shows the gear as it looks from the front?
 - A Elevation
 - B One-Line
 - C Plan
 - D Elementary

4. If you see a battery rack near a switchgear lineup, it is most likely for:
 - A Breaker tripping/closing
 - B Trip unit power
 - C Indicating lamps
 - D All of the above, during a utility outage

5. The GPO prints are an example of a:
 - A Main-Tie-Main breaker arrangement
 - B Double voltage substation
 - C Double ended substation
 - D 13.8kV dual Utility feed

6. Which type of relay protection is NOT provided in the GPO drawings?
 - A 27/59 Under- and Over-voltage protection
 - B 50/51 Instantaneous and Time overcurrent protection
 - C 25 Synch Check
 - D 89 Lockout Relay

Class 2 Questions: SWBDS vs SWGR

7. Which is NOT a draw-out breaker position?
- A Open
 - B Connected
 - C Disconnected
 - D Test
8. Which is NOT a breaker status position?
- A Tripped
 - B Withdrawn
 - C Open
 - D Closed
9. Which of the following is rated for 1000A?
- A ¼" x 4" copper bar
 - B SWGR with 800A main breakers
 - C Two 500 MCM copper cables
 - D 1/8" x 6" copper bar
10. Why is Switchgear deeper than switchboards?
- A SWGR has larger breakers
 - B SWGR has both horizontal and vertical bus
 - C SWGR has cable terminations in the rear
 - D SWGR has a separate bus compartment
11. Which of the following distinguishes switchboards from switchgear?
- A Switchboards have fixed-mounted breakers
 - B Switchboards are deeper
 - C Switchboards require rear access
 - D Switchboards are built to ANSI C37 standards
12. Which of the following distinguishes switchgear from switchboards?
- A Switchgear usually costs less
 - B Switchgear is built to UL standard
 - C Switchgear is shallower and more wide
 - D Switchgear is easier to maintain

Class 3 Questions: LV SWGR Design

13. What's the highest ampacity breaker we can stack 4-high in SWGR construction?
- A 800A
 - B 1600A
 - C 2000A
 - D 3000A
14. The amp-size/quantity of breakers we can fit into a single stack is determined by
- A Heat dissipation
 - B Breaker Size
 - C Bus ampacity
 - D Consulting engineer
15. A 500:5 CT is around a cable carrying 300 amps. The CT secondary current is:
- A 1.5A
 - B 3A
 - C 5A
 - D 100A
16. A breaker feeding a motor keeps nuisance tripping whenever the motor is started due to inrush current. The proper fix is to:
- A Call the manufacturer's rep and ask for advice
 - B Ask for the setting from the short circuit and coordination study
 - C Ask the foreman what setting to use on the trip unit
 - D Tweak the current trip screw up until the tripping stops
17. What's the largest frame breaker that will fit in a 30" wide stack?
- A 1600A
 - B 4000A
 - C 2000A
 - D 3200A
18. Which is NOT optional for Low Voltage Switchgear
- A Isolated Bus
 - B Compartmentalized Breakers
 - C Insulated Bus
 - D Overhead Lifting Device

Class 4 Questions: LV SWGR Installation

19. The analog meters on an older than dirt SWBD read 300A, 0V. The problem is most likely:

- A It's older than dirt
- B CT shorting pins were left in
- C Bad control power transformer
- D Blown PT fuse

20. The digital meter on a new SWGR reads 480V, 0A under load. Check:

- A Fuses for instrument transformers
- B CT Ratio's
- C CT shorting pins
- D Missing wires on meter current inputs

21. The three main installation parts for any SWGR lineup are:

- A Gear, breakers, trip units
- B Structure, power, control
- C Bus, breakers, cables
- D Shipment, delivery, construction

22. Only the first stack of breaker trip units is "lit up" on SWGR energization. Most likely because:

- A Installer didn't make all the controls connections
- B The horizontal bus is not bolted together
- C All the other breakers are spares
- D Control power fuses need to be checked

23. Cable landing order for any LV SWGR lineup should be:

- A Top to bottom
- B Bottom to top
- C Left to right
- D Center first, then top & bottom

24. Why should the angle of lifting cables/straps not be less than 45 degrees?

- A The cable/strap will vibrate
- B It will cause the load to swing
- C The cable/strap will kink
- D The horizontal force can damage the gear

Class 5 Questions: MV SWGR Installation

25. The proper method of checking for voltage over 600V is to:

- A Use a proper rated voltage tester
- B Use a Tic Tracer, wearing proper PPE
- C Look for a voltmeter on the gear
- D Send in a squirrel

26. Which is not present in MV SWGR?

- A Overhead Lifting Device
- B Insulated Bus
- C Isolated Bus
- D Shutters

27. Which is not an MV breaker frame size?

- A 800A
- B 1200A
- C 2000A
- D 3000A

28. What is needed for removing MV upper cell breakers?

- A A forklift
- B Overhead lifting device
- C Breaker jack
- D Breaker lift truck

29. The most common PT ratio used for MV SWGR is:

- A 13200:120
- B 14400:120
- C 15000:120
- D 13800:120

30. A Ground & Test device is used for:

- A Verifying proper protective relay operation
- B Grounding the horizontal bus
- C Testing the horizontal bus
- D The previous 2 answers

Class 6 Questions: APL Substation Drawings

31. The fault current rating of the APL SWGR is:

- A 65kA
- B 85kA
- C 100kA
- D 200kA

32. The current (Mains) rating of the APL SWGR is:

- A 3200A
- B 4000A
- C 5000A
- D 6000A

33. Who is the architect/engineer for the APL SWGR?

- A Century Engineering
- B Electrico
- C Hagemeyer
- D Schneider Electric

34. In what year was the APL SWGR built?

- A 2007
- B 2009
- C 2011
- D 2017

35. The throwover scheme for the APL SWGR is:

- A Auto
- B Closed Transition
- C Open Transition
- D User selectable

36. The Kirk Key interlock on the APL SWGR is to prevent:

- A Opening x'fmr primary switch under load
- B Opening x'fmr secondary breaker under load
- C Starving the transformer
- D Opening both mains at once

Class 7 Questions: Circuit Breakers

37. The necessary Short Circuit rating of circuit breakers is determined by:
- A The engineer
 - B The loads
 - C The cable sizing
 - D The source
38. Proper coordination means:
- A Minimal loads are interrupted
 - B The right ratio of fuses to breakers
 - C The source matches the loads
 - D The breaker closest to the fault trips
39. The reason a circuit breaker's time-current curve has its kinked L-shape is because:
- A It exhibits both thermal and magnetic characteristics
 - B The trip unit has 4 adjustments
 - C It needs to show Long-time, Short-time, Instantaneous, and Ground-Fault settings (LSIG)
 - D We have to allow for I^2T setting to be in or out
40. Breaker springs are fully charged, and it is open. Which is possible without recharging?
- A Trip – Close - Trip
 - B Close – Trip - Close
 - C Trip - Close
 - D Close - Trip
41. The purpose of an arc chute is to:
- A Stretch the arc length until it extinguishes
 - B Cool the breaker after interruption
 - C Collect carbon residue from arcing contacts
 - D Serve as an alternative to the arc ladder
42. An advantage of fuses over circuit breakers is:
- A Fuses have higher fault ratings
 - B Fuses last longer
 - C Fuses allow for better coordination
 - D Fuses only interrupt the phase with high current

43. Why is AC Power better than DC Power Distribution?

- A Zero crossings aid in interruption
- B Voltage changes are easier
- C Equipment is smaller
- D All of the above

Class 8 Questions: PLC Throwover Schemes

44. What is the purpose of a “healthy source timer” before returning to normal breaker statuses on an autothrowover scheme (usually PLC-based)

- A Keeps breakers from operating too quickly
- B Prevents nuisance re-exercising of the ATO scheme
- C Allows the PLC to catch up with status inputs
- D Keeps from overloading the utility source

45. A Main-Tie-Main arrangement that only allows 2 of the 3 breakers to be closed at a time is:

- A Out of Synch
- B Open Transition
- C Closed Transition
- D Not PLC Controlled

46. On a Main-Tie-Gen throwover scheme, a synch check relay (25) is only needed if:

- A The generator needs to run in parallel with the utility
- B The generator needs to close into a dead bus
- C The utility needs to close into a dead bus
- D The tie breaker remains open

47. We tend to use the terms “open” and “tripped” synonymously. A PLC throwover scheme needs to know the difference because:

- A A breaker in Test can't be tripped
- B The PLC can only trip, not open breakers
- C The PLC should not reclose an open breaker
- D The PLC should not reclose a tripped breaker

48. MOC stands for _____ Operated Contact

49. TOC stands for _____ Operated Contact

50. Name the 4 U.S. SWGR manufacturers that make their own breakers.