Homework #5

(Module 5: Substation Automation)

**Question 1:** Which bus arrangement is the most reliable and most expensive?

1. Breaker and half
2. Single bus
3. Double bus, Double breaker
4. Double bus, Single breaker

**Question 2:** Which bus arrangement is shown in the following substation plan view?



1. Double bus, Single breaker
2. Single bus
3. Breaker and half
4. Ring Bus

**Question 3:** Which one of the following component do not help in substation automation?

1. Intelligent Electronic Devices
2. Wide Area Networks
3. Oil Circuit Breakers
4. Remote Terminal Units

**Question 4:** Which of the following communication protocols is most commonly used in in IED’s in the United States?

1. IEC 61850
2. UCA 2.0
3. UCA 1.0
4. DNP3.0

**Question 5:** Which of the following statements is correct?

1. UCA 1.0 is a subset of IEC 61850
2. IEC 61850 is a superset of UCA 2.0
3. IEC 61850 is a subset of UCA 2.0
4. All of the above

**Question 6:** The following one-line diagram shows the following switching configuration



1. Breaker and half
2. Ring Bus
3. Sectionalized Bus
4. Main and Transfer Bus

**Question 7:** Which of the following statements are correct?

1. The substation host processor is a part of the substation data acquisition and control layer
2. Voltage regulators are common equipment in transmission substations
3. The substation LAN should allow for interoperability and meet industry standards
4. Both 1 and 3 are correct

**Question 8:** What do objects A and B represent in the following substation automation architecture?

1. A = Intelligent Electronic Device; B= Fuses
2. A = Remote Terminal Unit; B = Intelligent Electronic Device
3. A = Router; B = Intelligent Electronic Devices
4. Both 2 and 3 are correct.

**Question 9:** Which of the following in not a common function performed within a substation?

1. Generation of control signals for the balancing of load generation
2. Interconnect generation to the bulk transmission system
3. Regulate voltage at the head of a distribution feeders
4. Provide switching capability between transmission lines

**Question 10:** Which of the following devices are the least vulnerable to cyber security attacks?

1. Relays
2. Manual disconnect switches
3. Substation LAN
4. All of the above are vulnerable to cyber attack