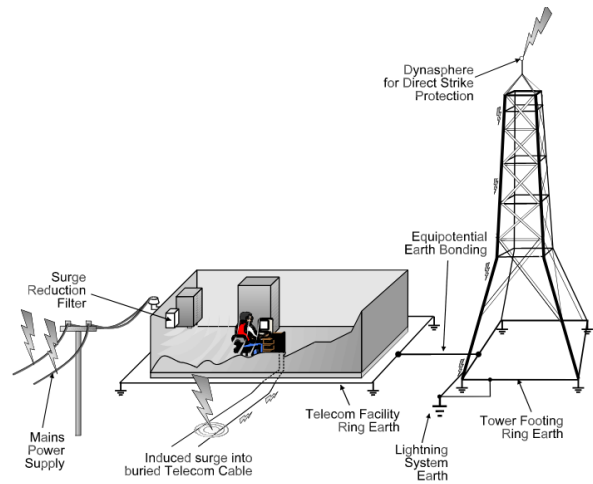


- 4) What are your suggestions to enhance the lightning protection of a control system room (see figure) from both high voltages and currents from outside sources?



- 5) In a wireless data acquisition system, what are the main interference sources that affect the communication between remote terminal units (RTU) with master sites. Explain the scenario.

- 6) In case there is no energy provision by power line, what could be a constraint of using solar panels in a remote terminal unit (RTU)?

- 7) Regarding the HART (high addressable remote transducer) protocol:

- a) What is its operation range (in mA)? _____
- b) What is the most common modulation technique it uses? _____
- c) What are the two individual frequencies used to represent 0 and 1? _____

8) Complete the following table:

Protocol	Associated port
Modbus	
Profibus	
Profinet	

9) In cyber-physical systems, the term *smartness* has been associated with elegance, intelligence, and easiness.

a) How useful is smartness in these systems?

b) Are there any differences and similarities among the terms associated with smartness?

c) Can we evaluate components and subsystems in some “*smart*” technical system?

10) Mention at least three features of a SCADA system.

11) Provide a brief list of common HART commands according to the following classification:

Common practice	Universal	Instrument specific