**Exercises on High Voltage Engineering (May 29, 2025):**

**Exercise 9-1:** When lightning strikes the ground, what factors determine the potential of the hit point? Suppose that the lightning current amplitude is *I*=100kA, the surge impedance of the lightning channel is *Z*0=300Ω and the ground resistance of the hit point *A* is *R*=30Ω, please calculate the potential of point *A* (*UA*, kV).

**Exercise 9-2:** A cylindrical oil storage tank with the diameter of 10m and the height of 10m is protected by a single lightning rod, which is 5m away from the wall of the oil tank. What is the minimum height of the lightning rod?

**Exercise 9-5:** When lightning strikes an overhead transmission line, does the circuit breaker trip every time?

**Exercise 9-6:** When determining the lightning withstand level of an overhead transmission line, what polarity of the 50% impulse flashover voltage of the insulator string is used to calculate the amplitude of overvoltage when lightning strikes the phase conductor or the top of tower respectively?

**Exercise 9-8:** What are the parameters to evaluate the lightning withstand level of an overhead transmission line? For lightning strike the phase conductor or the top of tower, which case the value of this parameter will be greater than the other, and why?

**Supplementary Exercise 1:** The weight of the silicone rubber composite surge arrester is much lighter than that of the porcelain one, so it can be suspended on the transmission tower, see Page 49 of the document for May 29. Please analyze how the line arrester improves the lightning withstand level of the line when lightning strikes different part of transmission line (strike tower top or phase conductor).

**Supplementary Exercise 2:** Describe the working principle of ZnO arrester briefly.

**Supplementary Exercise 3:** What is the residual voltage of surge arrester? What is the reference voltage of surge arrester?