Home Work # 7 — Major Exam # 2

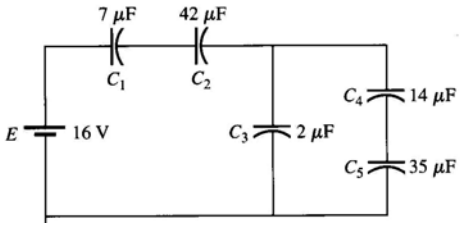
Question # 1 For the circuit shown below, **find the following**:

a. the **total capacitance** seen by the voltage source

b. the **energy** stored in C_2

c. the **voltage** across C_5

d. If $E = 10\cos(10^4 t + 30°)$ replaces the voltage source, find the **current** passing through this source.

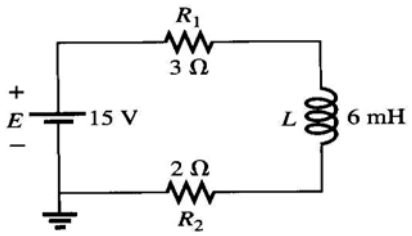


Question # 2 For the circuit shown below,

a. **Find** the **energy stored** in the inductor.

b. If the **source E** is **replaced** by a **current** source I_s given by the equation stated below, **find** the **voltage** on the new source.

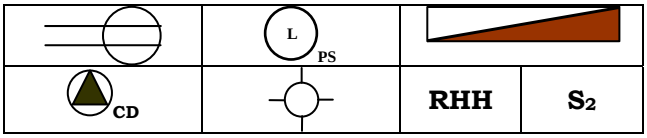
$$I_s = \begin{cases} (2 - 2e^{-500t}) & \text{for } t \geq 0 \\ 0 & \text{for } t < 0 \end{cases} \quad \&$$



Question # 3

a. A **120-V** DC voltage source is connected to a **20-Ω** resistor through a **1500-ft** length wire. The wire has a diameter of **¼-in** and a resistivity of 2.825×10^{-6} **Ω-cm**. **Calculate** the **power absorbed** by the resistor. ***(Hint: 1 in = 2.54 cm and 1 ft = 12 in)***

b. What does each of the following **represent**?



Question # 4 A balanced & **positive** sequenced **Y - Y** connected three phase system has a voltage $V_{ac} = 208 \angle 25^0$ V & a **per-phase** impedance of **10**Ω. The lines connecting the source to the load have impedance of **2Ω** each. **Find the following** for this system.

a. The source **voltages** V_{ab}, V_{cb} & V_{bn}

b. The **currents** I_{aA}, I_{cC} & I_{AN}

c. The load **voltages** V_{CN}, V_{AB} **&** V_{CB}

d. The **total true power** delivered to the load

Question # 5

a. A given **10 kw** device needs an **AC voltage** source with a **peak** value **of 220 V** to operate. What is the **size** of the **circuit breaker** required to **protect** this device.

b. **Indicating the coloring** of the wires, **show** one possible **connection** for each of the **two** circuits shown below. The two **ceiling** lamps are controlled by the switch shown. The receptacle is always available. **Use minimum colors and specify the type of each switch.**