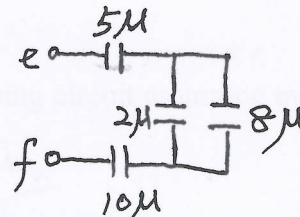
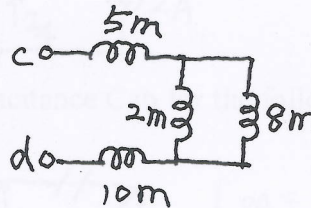
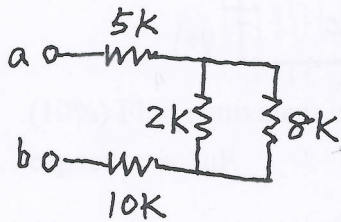
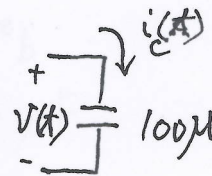
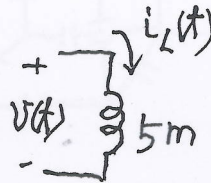
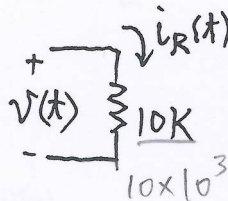


NOTE: 每一題都要寫出計算過程

1. (15%) Find equivalent resistance R_{ab} , equivalent inductance L_{cd} , and equivalent capacitance C_{ef} .

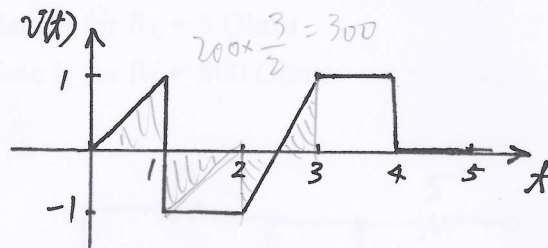


2. (15%) For $v(t) = 100\sin(100t) + 10$ volts, find $i_R(t)$, $i_L(t)$, and $i_C(t)$



3. (15%) For the same circuits in Question #2, assume $v(t)$ has a waveform as following, draw waveforms of $i_R(t)$, $i_L(t)$, and $i_C(t)$

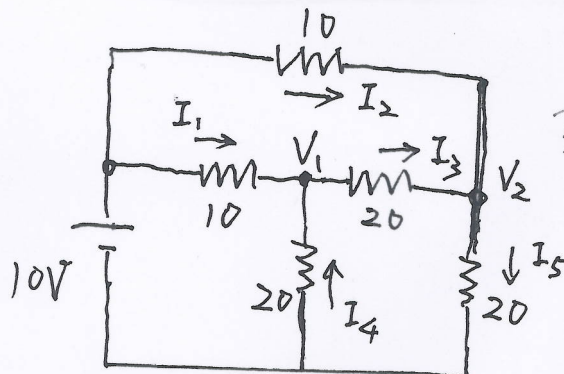
$$v(t) = L \frac{di}{dt}$$



$$\int 100 \sin 100t \, dt = \frac{100}{100} (-\cos(100t))$$

$$\frac{1000}{5} = 200$$

4. (15%) Find V_1 , V_2 , I_1 , I_2 , I_3 , I_4 , and I_5

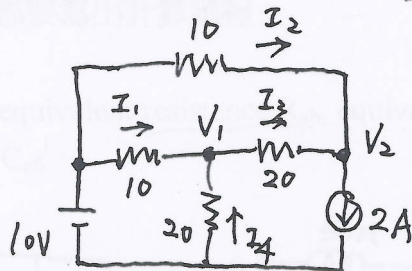


$$\frac{20}{3} \times \frac{20}{3} = \frac{10}{3}$$

5. (20%) Find V_1 , V_2 , I_1 , I_2 , I_3 , and I_4 using

A. Node-Voltage Analysis.

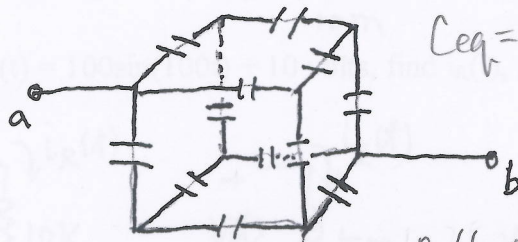
B. Mesh-Current Analysis



$$\frac{110}{11} \times 10 - \frac{40}{11} = \frac{70}{11}$$

$$\frac{110}{11} \times 10 + \frac{60}{11} = \frac{170}{11}$$

6. (10%) Find equivalent capacitance C_{ab} for the following circuit assuming every capacitor is $1\mu F$.



$$C_{eq} = \frac{Q_{eq}}{V_{eq}}$$

$$0.4 \mu F$$

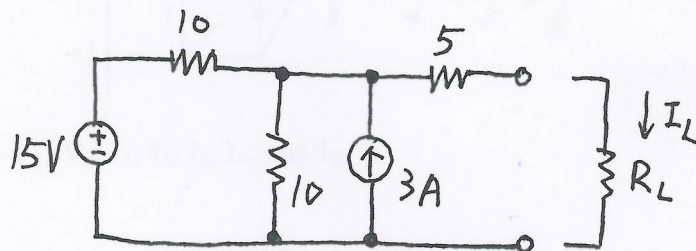
7. (20%)

A. Find Thevenin's equivalent circuit

B. Find Norton's equivalent circuit

C. Calculate I_L for $R_L = 5 \text{ Ohms}$

D. Calculate I_L for $R_L = 500 \text{ Ohms}$



$$\frac{172}{55+17} = 24$$