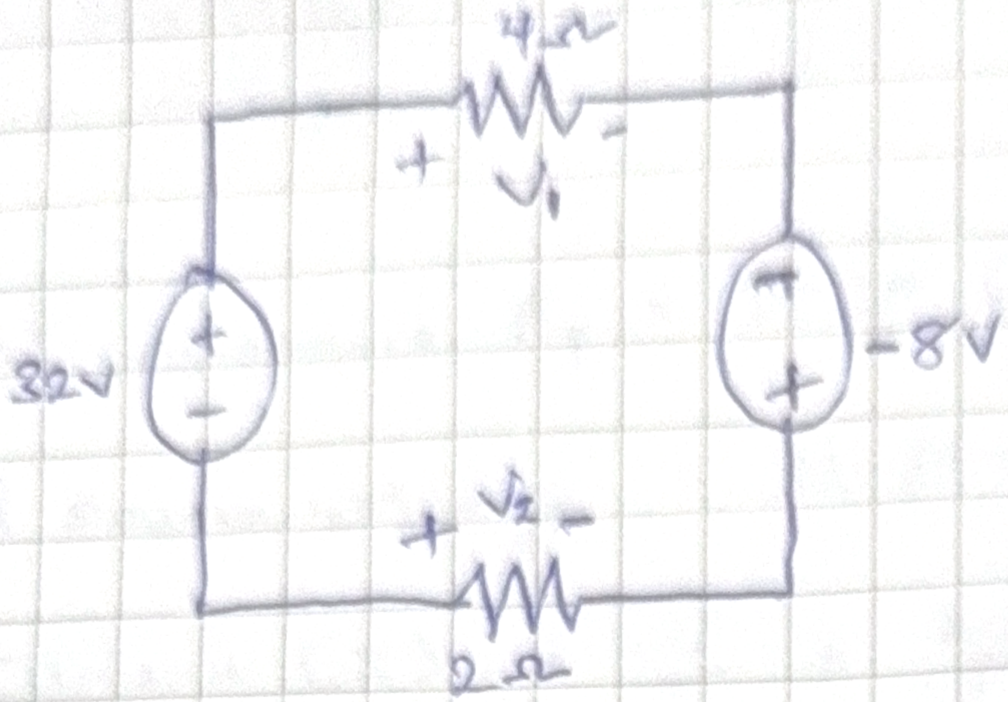
ASHAOLU OLUWATOBILOBA
- ANALOG ELECTRONICS
- ASSIGNMENT 1

(1)



$V_T = 32v - 8V = 24V$

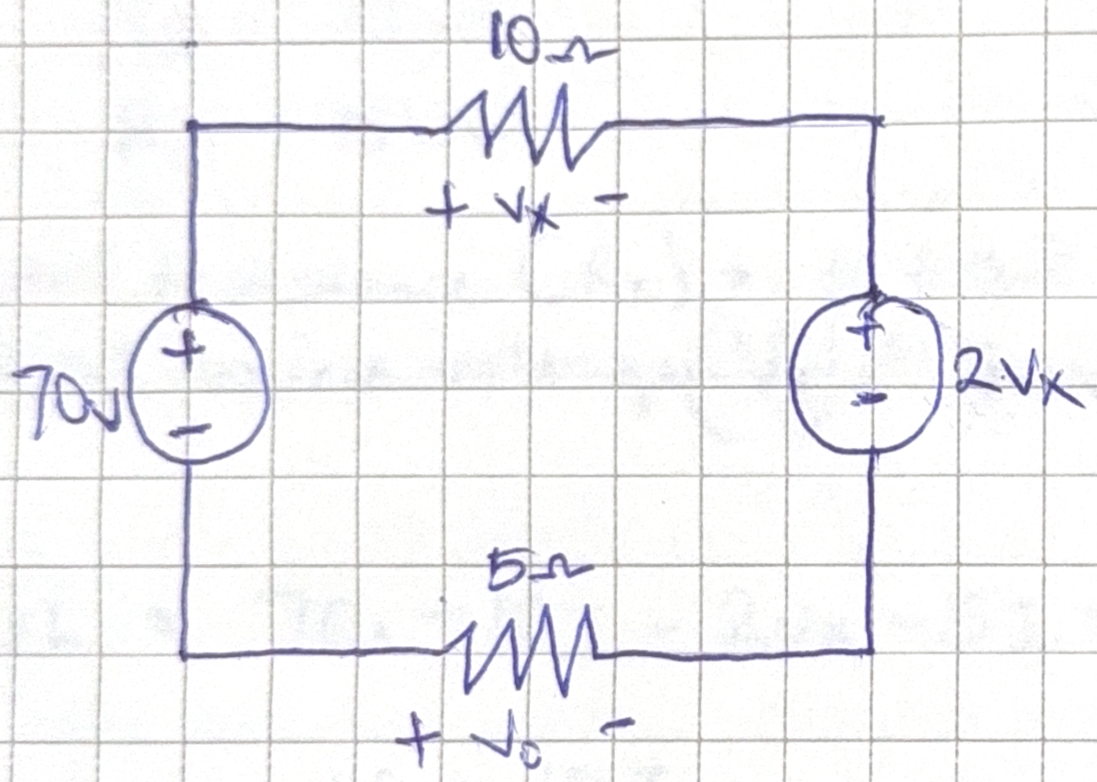
$R_T = 4\Omega + 2\Omega = 6\Omega$

$I = V/R = \frac{24V}{6\Omega} = 4A$

If $I = 4A$, then $V_1 = I \cdot R_1 = 4A \times 4\Omega = \underline{16V}$

$V_2 = I \cdot R_2 = 4A \times 2\Omega = \underline{8V}$

(2)



KVL :- $-70 + 10I + 5I + 2V_x = 0$

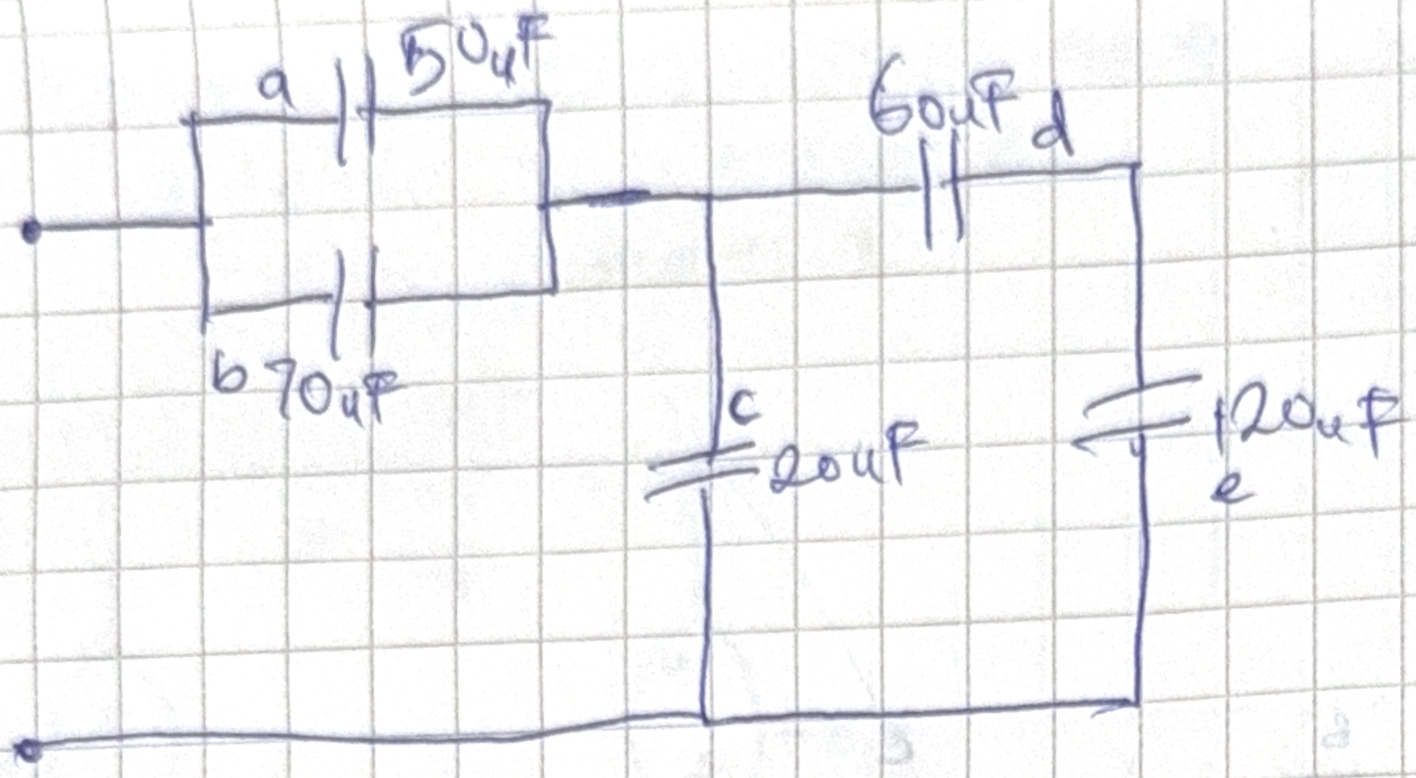
$V_x = 10I$

$\therefore -70 + 10I + 5I + 2(10I) = 0$

$-70 + 15I + 20I = 0$

$35I = 70, \quad I = \frac{70}{35}, \quad I = 2A$

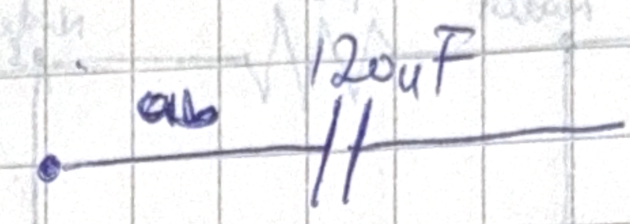
(4)



a & b is parallel,

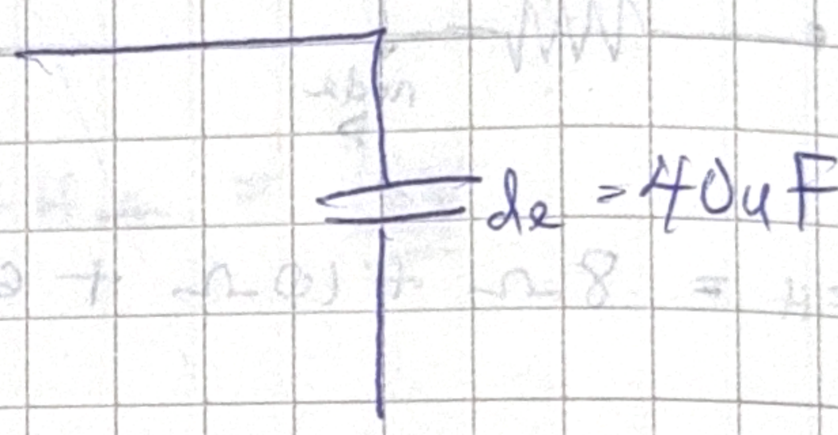
$C_{ab} = 70\mu F + 50\mu F$

$= 120\mu F$



d & e are in series

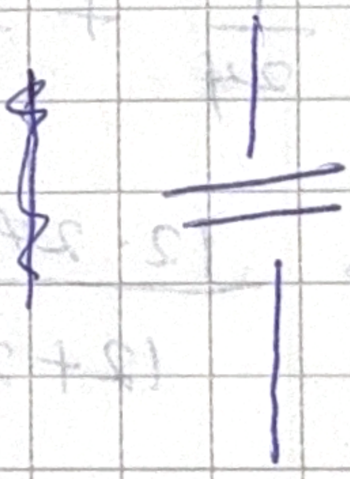
$C_{de} = \frac{60 \times 120}{60+120} = 40\mu F$



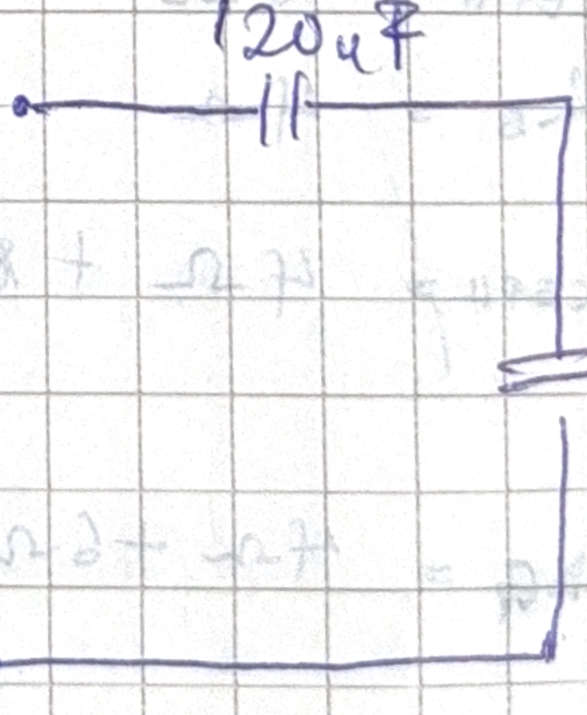
c and de are parallel

$C_{cde} = 20\mu F + 40\mu F$

$= 60\mu F$



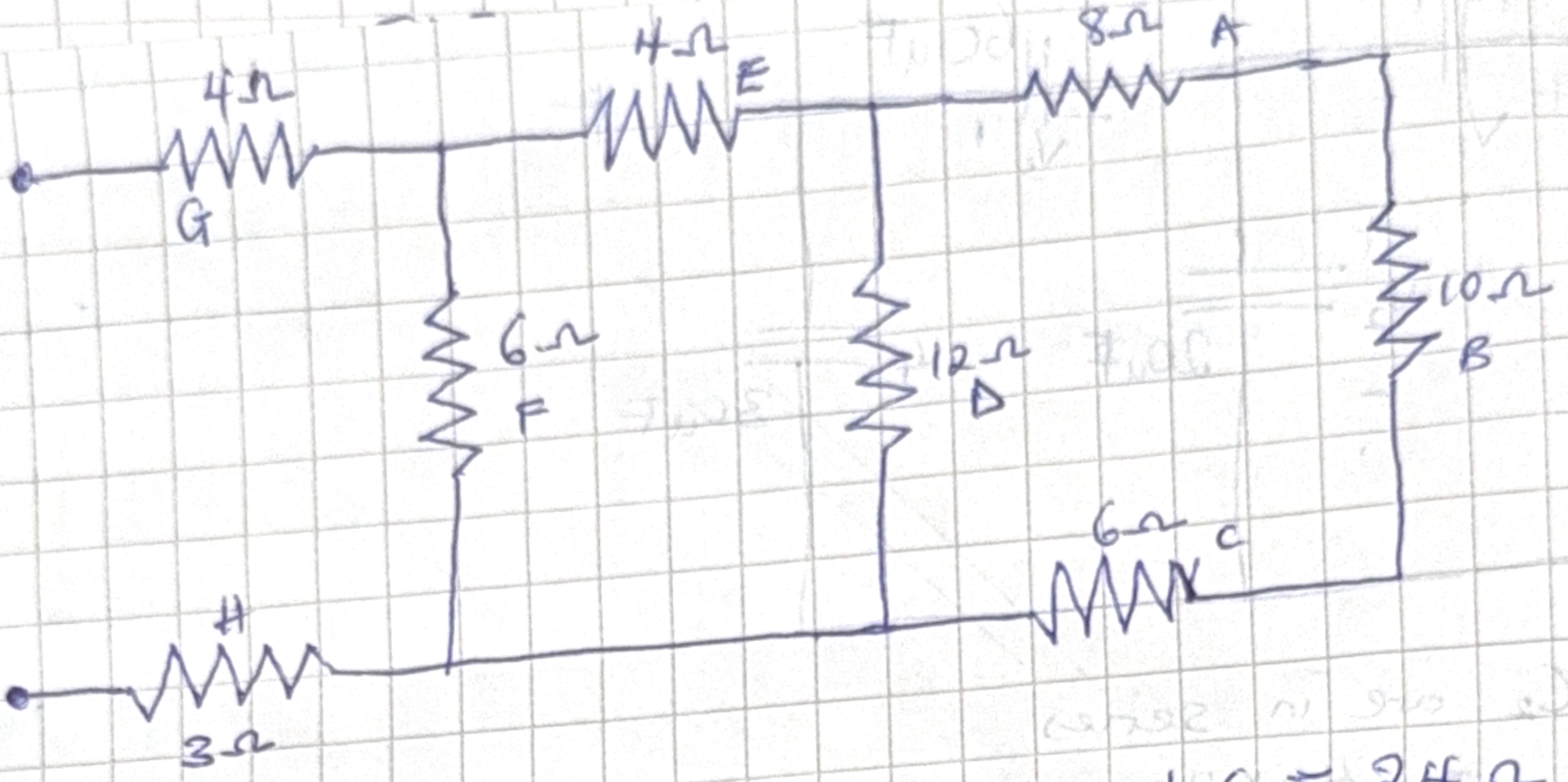
C_{eq} = C_{ab} and C_{cde} are in series



$\therefore \frac{60 \times 120}{60+120} = 40\mu F$

$\therefore C_{eq} = 40\mu F$

(3)



A, B & C are in series, $R_{ABC} = 8 + 10 + 6 = 24\Omega$

R_{ABC} and R_D are parallel, $R_{ABCD} = \frac{24 \times 12}{24 + 12} = 8\Omega$

$= R_{ABCD}$ and R_E are in series

$\therefore R_{ABCDE} = 8\Omega + 4\Omega = 12\Omega$

R_{ABCDE} and R_F are parallel

$\therefore R_{ABCDEF} = \frac{12 \times 6}{12 + 6} = \frac{72}{18} = 4\Omega$

R_{ABCDEF} and R_G and R_H are in series

$\therefore R_{eq} = 4\Omega + 4\Omega + 3\Omega = \underline{\underline{11\Omega}}$

(2) contd.

IF $\underline{I} = 2A$

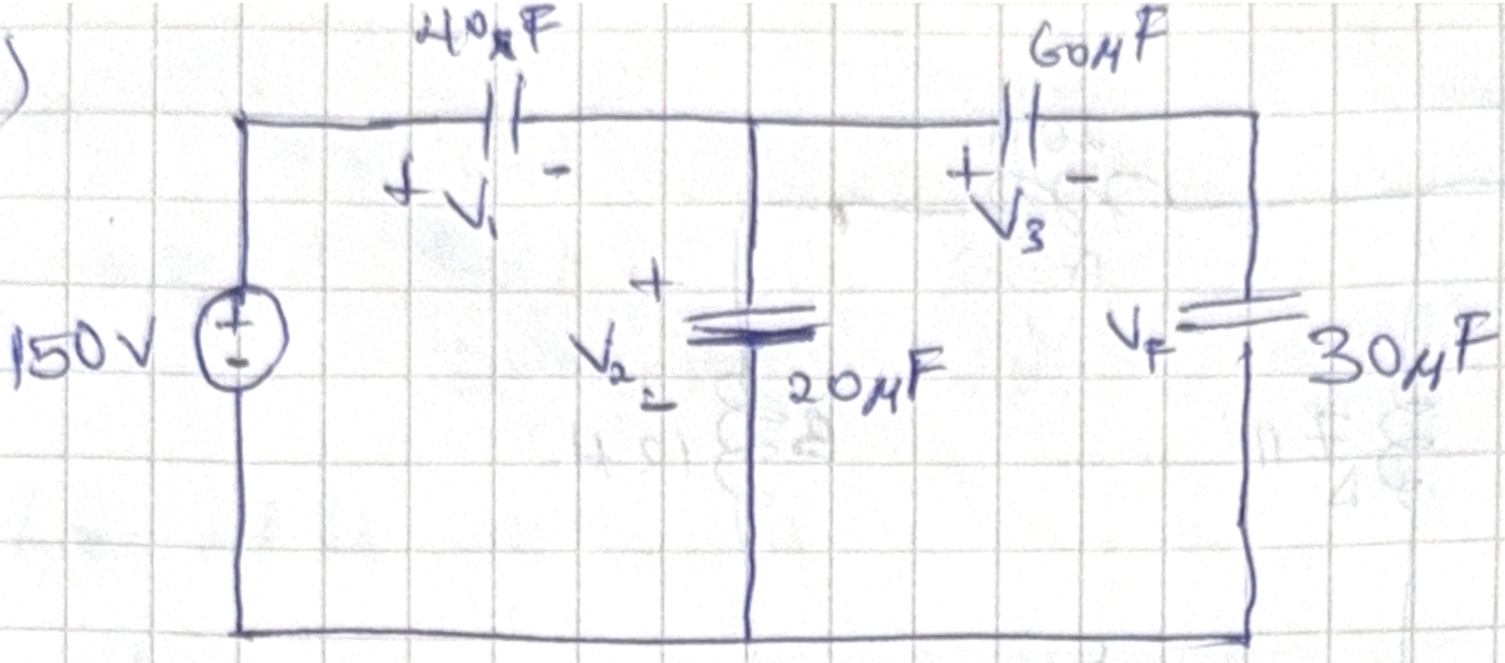
$V_x = 10 \times 2$

$= \underline{\underline{20V}}$

$V_o = 5 \times 2$

$= \underline{\underline{10V}}$

(5)



C_F and C_3 are in series therefore:

$$C_{F3} = \frac{30 \times 60}{30+60} = 20\mu F$$

C_{F3} and C_2 are in parallel therefore:

$$20\mu F + 20\mu F = 40\mu F$$

C_{F23} and C_1 are in series

$$C_{eq} = \frac{40 \times 40}{40+40} = \frac{1600}{80}$$

$$= \underline{20\mu F}$$

$$Q = C_{eq} \times V$$

$$= 20\mu F \times 150 = 3000\mu C$$

$$V = \frac{Q}{C} \therefore V_1 = \frac{3000\mu C}{40\mu F}$$

$$= \underline{75V}$$

$$V_2 = \frac{3000\mu C}{20\mu F}$$

$$= \underline{150V}$$

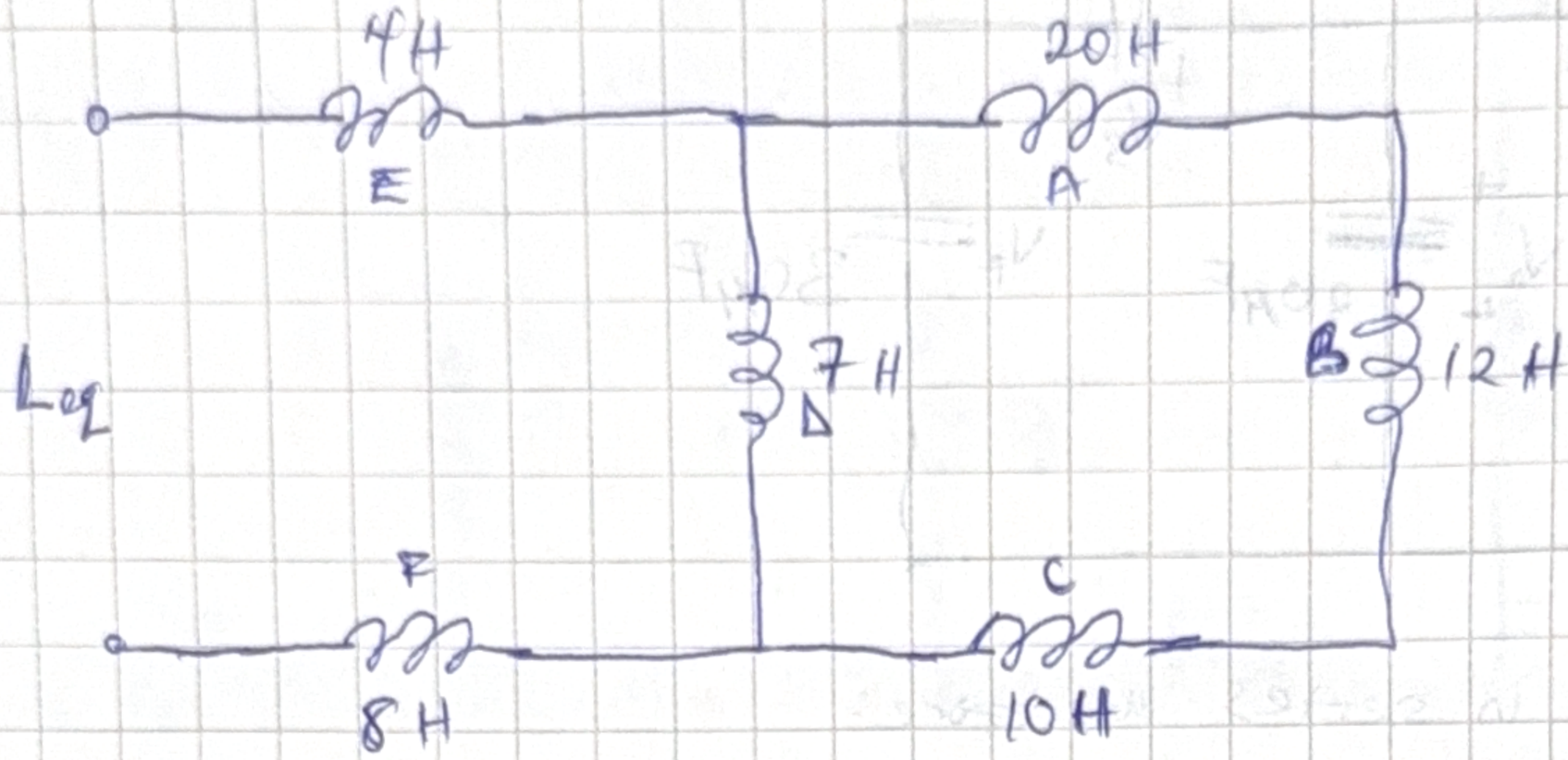
$$V_3 = \frac{3000\mu C}{60\mu F}$$

$$\underline{50V}$$

$$V_F = \frac{3000\mu C}{30\mu F}$$

$$\underline{100V}$$

(6)



Inductance A, B and C are in series, therefore

$$L = 20 + 12 + 10$$
$$= 42\,H$$

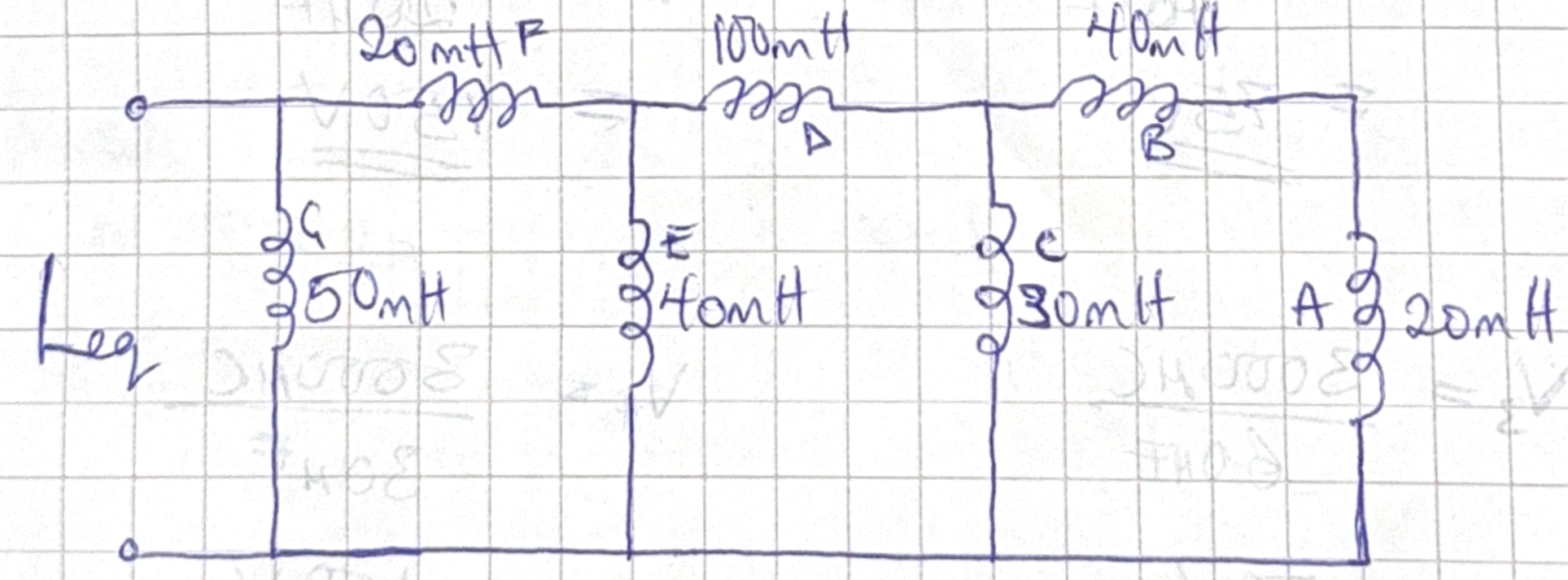
Inductance D and ABC are parallel - therefore

$$L_{ABCD} = \frac{42 \times 7}{42 + 7} = 6\,H$$

L_{ABCD}, L_E and L_H are in series, therefor

$$L_{eq} = 6H + 8H + 4H$$
$$= 18\,H$$

(7)



L_A & L_B are in series, therefore

$$L_{AB} = 20 + 40 = 60\,mH$$

L_{AB} & L_C are parallel

$\therefore L_{ABC} = \frac{30 \times 60}{30+60} = \frac{1800}{90} = 20mH$

L_{ABC} and L_D are in series

$\therefore L_{ABCD} = 20mH + 100mH$

$= 120mH$

L_{ABCD} and L_E are parallel

$\therefore L_{ABCDE} = \frac{120 \times 40}{40+120} = \frac{4800}{160} = 30mH$

L_{ABCDE} and L_F are in series

$L_{ABCDEF} = 30mH + 20mH$

$= 50mH$

L_{ABCDEF} and L_G are in parallel

$\therefore L_{eq} = \frac{50 \times 50}{50+50} = \frac{2500}{100} = 25mH$

(8) Electricity refers to the flow of electric charge (electrons) through conductors and the energy associated with this flow. It deals with the generation, transmission, distribution and use of electrical energy.

Electronics is the branch of physics and engineering that deals with the controlled flow of electron through devices like semiconductor, transistors, and integrated circuits to process information and control systems.

The major differences between both are that: