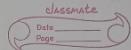


8/1/2025

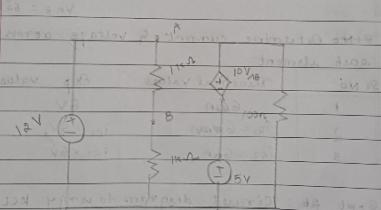
(Expt 5)



Expt no. 1 with VCCS
Verification of KCL and KVL for circuits
with dependent sources.

Aim : To verify the KCL & KVL for electrical
circuits with AC dependent sources using
LT Spice software tool.

Expt 2a : Circuit diagram to verify KCL
and KVL with voltage controlled voltage
sources (VCCS)



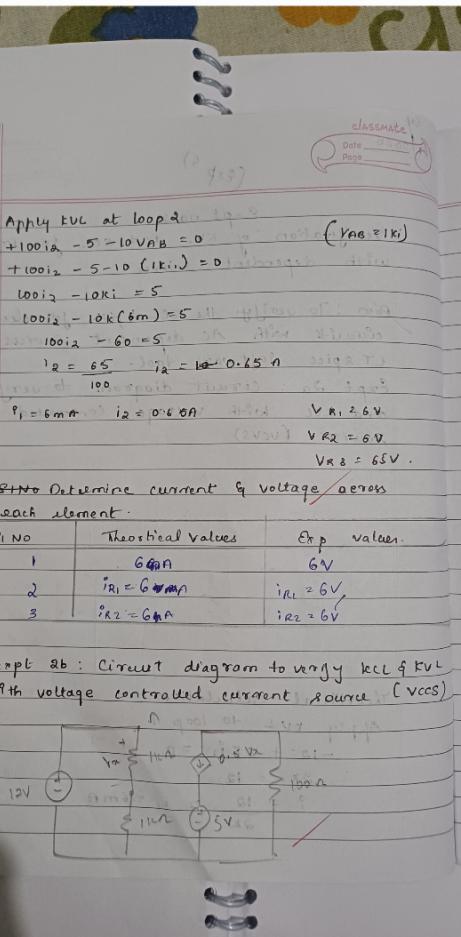
Theoretical calculation

Apply KVL to loop 1

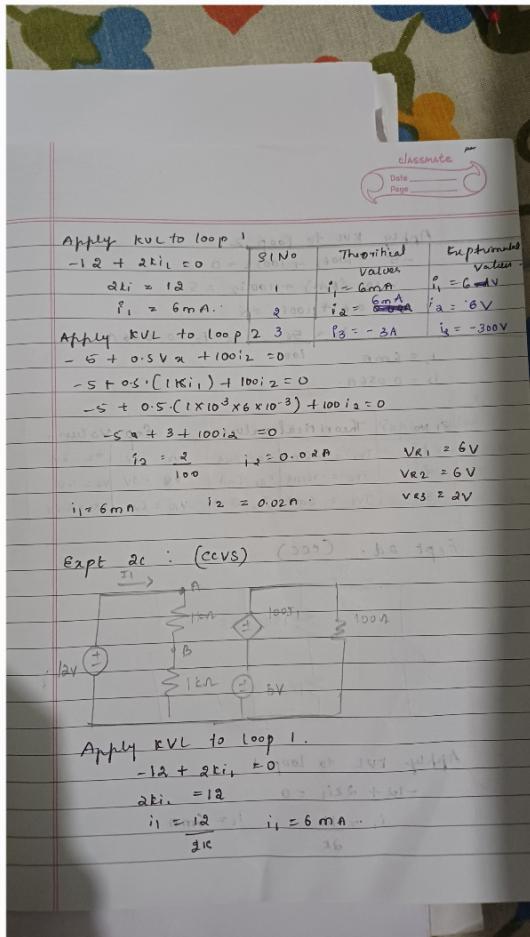
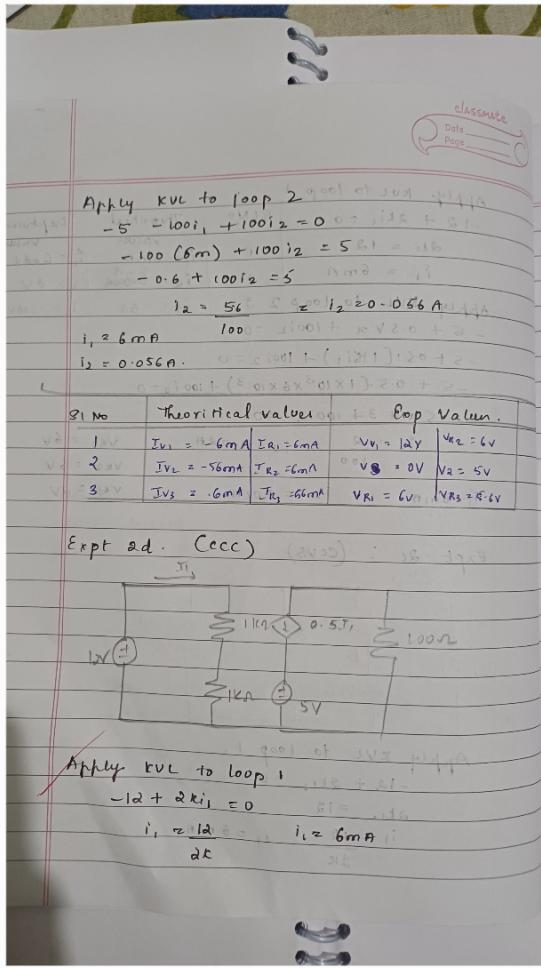
$$-12 + 2ki = 0$$

$$2ki = 12$$

$$i = \frac{12}{2k} = i_1 = 6mA$$



Expt 2b : Circuit diagram to verify KCL & KVL
with voltage controlled current source (VCCS)



Apply KVL to loop 2

$$-5 + 0.5i_1 + 100i_2 = 0$$

$$-5 + 0.5(6m) + 100i_3 = 0$$

$$100i_2 = +2.997$$

$$i_2 = 0.299A$$

$$i_2 = 3A$$

$$i_1 = \underline{6mA} \quad i_2 = \underline{3A}$$

| S/N | Theoretical value | | Exp't. Value | |
|-----|-------------------|----------------|----------------|--------------------------------|
| 1 | $I_{V1} = -6mA$ | $I_{R2} = 6mA$ | $V_{R1} = 12V$ | $V_{F1} = -300mV$ |
| 2 | $I_{V2} = 3mA$ | $I_{R1} = 6mA$ | $V_{V2} = 0V$ | $V_{R1} = 6V$ |
| 3 | $I_{V2} = 6mA$ | $I_{R2} = 6mA$ | $V_{V2} = 5V$ | $V_{R2} = 6V$ $V_{R3} = mV$ |

9 | 10
2 | 2