

QUIZ - 05

Section - 02

Solution

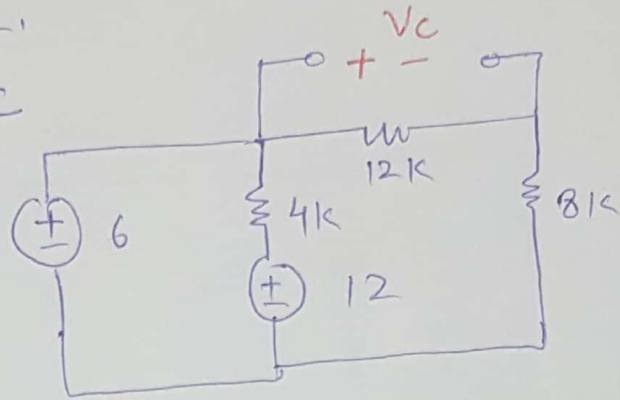
At $t=0^-$

Capacitor OC

$$V_0 = \frac{8}{20} \times 6 = 2.4V$$

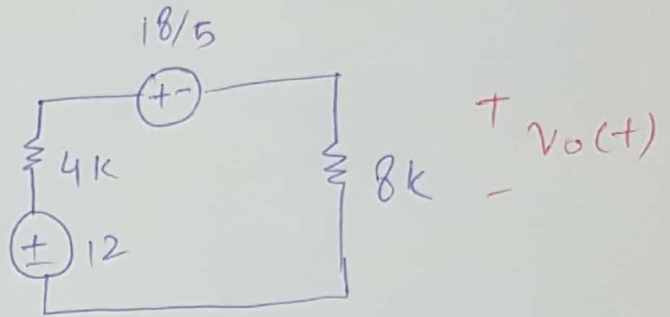
$$V_C = \frac{12k}{12k+8k} \times 6$$

$$V_C = \frac{18}{5} \text{ Volts} = 3.6V$$



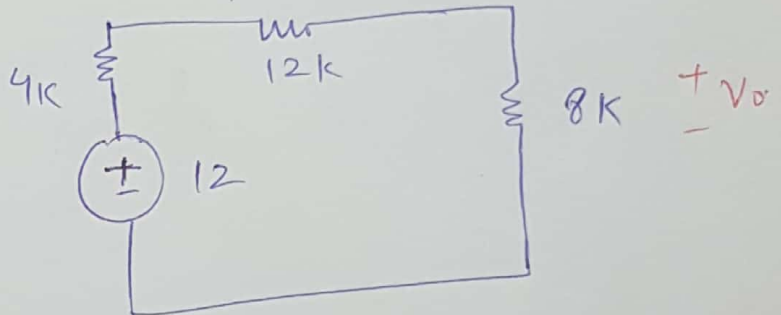
At $t=0^+$

$$V_0(0^+) = \frac{8}{12} \times (12 - 3.6) = 5.6V$$



At $t=\infty$

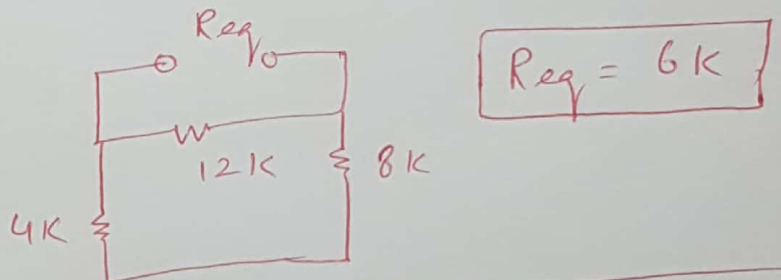
$$V_0(\infty) = \frac{8}{24} \times 12 = 4V$$



Time constant:

R_{eq} across capacitor;

$$\tau = R_{eq}C = 0.6 \text{ seconds}$$



$$R_{eq} = 6k$$

Overall;

$$V_0(t) = K_1 + K_2 e^{-t/\tau}$$

$$K_1 = 4, \quad K_2 = 5.6 - 4 = 1.6$$

