

### Problem-05

Problem Name- Design a circuit for following output equation (using Pspice simulation) –

$$V_o = A \times V_1 - B \times V_2 + C \times V_3$$

Show the circuit design, require calculation and output waveshape for the input values  $V_1 = 0.4$ ,  $V_2 = 0.1$  and  $V_3 = 0.2$  volt DC supply.

Calculation:-

Given,

$$V_1 = 0.4 \text{ V}$$

$$V_2 = 0.1 \text{ V}$$

$$V_3 = 0.2 \text{ V}$$

$$\begin{aligned} V_0 &= 4V_1 - 7V_2 + 4V_3 \\ &= 4 \times 0.4 - 7 \times 0.1 + 4 \times 0.2 \\ &= 1.7 \text{ V} \end{aligned}$$

$$\begin{aligned} V_0 &= 4V_1 - 7V_2 + 4V_3 \\ &= - (7V_2 - 4V_1 - 4V_3) \\ &= - [7V_2 + \{-(4V_1 + 4V_3)\}] \end{aligned}$$

$$V_{01} = -(4V_1 + 4V_3)$$

$$V_0 = -[7V_2 + V_{01}]$$

For  $V_{01}$ , LCM 4

$$\text{Let } R_{f1} = 4 \text{ k}\Omega$$

$$R_7 = 7 \text{ k}\Omega$$

$$\therefore R_1 = 1 \text{ k}\Omega$$

$$R_5 = 1 \text{ k}\Omega$$

$$R_2 = 1 \text{ k}\Omega$$

For  $V_0$ , LCM 7

$$\text{Let } R_{f2} = 7 \text{ k}\Omega$$





