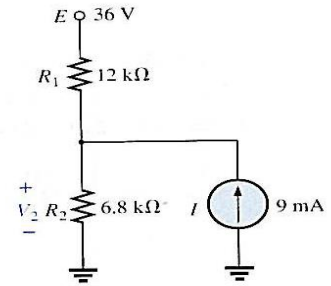Q- Using superposition, find the voltage V_2 across the resistor R_2.

Superposition:

In any circuit containing multiple independent sources, the current or voltage at any point in the circuit may be calculated as the algebraic sum of the individual contributions of each source acting alone."

If the current source will not be there then the potential difference across R_2 will be due to the current caused by E and given by

$$V_{21} = I_2 R_2 = \frac{E R_2}{R_1 + R_2} = \frac{36*6.8*10^3}{(12*10^3 + 6.8*10^3)} = 13.02\ V$$

Now if the source E is not there then the current I = 9 mA will be distributed to both resistors (may be considered parallel) and hence the potential difference across them v_2 due to this current source will be.

$$V_{22} = \frac{I*R_1 R_2}{R_1 + R_2} = \frac{9*10^{-3}*12*10^3*6.8*10^3}{(12*10^3 + 6.8*10^3)} = 39.06\ V$$

Hence the total voltage across will be

$V_2 = V_{21} + V_{22} = 13.02 + 39.06 = 52.08$ V