Under Plan-A

Sales = $301,770
Operating costs = $266,545
Assets = $200,000
Tax rate = 35%
Debt = 25%($200,000)
= $50,000
Equity = 75%($200,000)
= $150,000
Interest rate on debt = 8.8%

Calculating the amount of interest expense:

$$\text{Interest expense} = 8.8\%(\$50,000) = \$4,400$$

Computing the TIE ratio under Plan-A:

$$\text{TIE ratio} = \frac{\text{EBIT}}{\text{Interest expense}} = \frac{(Sales - Operating\ costs)}{\$4,400} \quad [\text{Since EBIT} = \text{Sales - Operating costs}]$$

$$= \frac{(\$301,770 - \$266,545)}{\$4,400}$$

$$= \frac{\$35,225}{\$4,400}$$

$$= 8.00$$

Under Plan-A the value of TIE ratio comes to 8.00

Under Plan-B the TIE ratio should be kept at 4.00 to know the amount of debt employed in the capital structure.

Computing the ROE ratio under Plan-A:

$$ROE = \frac{\text{Net income}}{\text{Total equity}}$$

But Net income is obtained by deducting the interest expense and taxable amount from EBIT.

$$ROE = \frac{(\text{EBIT} - \text{Interest expense} - \text{Taxable amount})}{\text{Total equity}}$$

$$ROE = \frac{(\$35,225 - \$4,400 - \$10,789)}{\$150,000}$$

Taxable amount is calculated as

$$\text{Taxable amount} = 35\% \ (\$35,225 - \$4,400)$$
$$= \$10,789$$

$$ROE = \frac{\$20,036}{\$150,000}$$
$$= 0.1336 \text{ or } 13.36\%$$

Therefore, the **ROE under Plan-A is 13.36%**

Computing the TIE ratio under Plan-A:

Here, we know the amount of debt and equity. To know this let us calculate the value of interest expense using the TIE ratio 4.00

$$\text{TIE ratio} = \frac{\text{EBIT}}{\text{Interest expense}}$$

$$\text{TIE ratio} = \frac{(\text{Sales} - \text{Operating costs})}{\text{Interest expense}} \ [\text{Since EBIT} = \text{Sales} - \text{Operating costs}]$$

$$4.00 = \frac{(\$301,770 - \$266,545)}{\text{Interest expense}}$$

$$\textit{Interest expense} = \frac{\$35,225}{4.00}$$
$$= \$8,806.25$$

Therefore, the value of **interest expense comes to $8,806.25**

This value is 8.8% on Total debt.

If the value of interest expense is 8.8% on debt, then the value of total debt is calculated as

$$8.8\% = \$8,806.25$$
$$100\% = ?$$

$$\text{Total debt} = \frac{\$8,806.25 \times 100\%}{8.8\%}$$
$$= \$100,071$$

Therefore, the **total amount of debt is $100,071**

Calculating the total amount of equity under Plan-B:

$$\text{Total equity} = \textit{Total assets} - \textit{Total debt}$$
$$= \$200,000 - \$100,071$$
$$= \$99,929$$

Therefore, the value of **total equity comes to $99,929**

Computing the change in ROE:

$$\text{ROE} = \frac{(\text{EBIT- Interest expense - Taxable amount})}{\text{Total equity}}$$

$$\text{ROE} = \frac{(\$35{,}225 - \$8{,}806.25 - \$9{,}246.5)}{\$99{,}929}$$

Taxable amount is calculated as

$$\begin{aligned}\text{Taxable amount} &= 35\%\ (\$35{,}225 - \$8{,}806.25) \\ &= \$9{,}246.5\end{aligned}$$

$$\text{ROE} = \frac{\$17{,}172.25}{\$99{,}929}$$

$$= 0.1718 \text{ or } 17.18\%$$

Therefore, the value of ROE under Plan-B is 17.18%

Hence, the ROE change by [17.18% – 13.36% = 3.82%]
Therefore, the ROE changes by 3.82% with the change in the capital structure.