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Qy-5

Given total amount of investment = ₹ 80,000

investment in stock (S) and Bond (B)

	Expected return (R)	Standard Deviation (σ)
Stock (S)	15%	5%
Bond (B)	7.5%	0%

Given, Portfolio return (R) = 12%.

Now, let (1-x) be the amount investment in risk-free bond and rest x amount in stock

$$\Rightarrow x \times (.15) + (1-x) \times (0.075) = 0.12$$
$$0.15x + 0.075 - 0.075x = 0.12$$
$$0.15x - 0.075x = 0.12 - 0.075$$
$$0.075x = 0.045$$
$$x = \frac{0.045}{0.075}$$
$$x = 0.6$$
$$\therefore x = 60\%.$$

Hence, 40% of the amount should be invested in risk-free bond and 60% must be invested in stock.

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⇒ Investment amount in bonds = 40% of 80,000
= ₹ 32,000

⇒ Investment amount in shares = 60% of 80,000
= ₹ 48,000

Now, $R_p = R_f + (R_m - R_f) \times \frac{\sigma_p}{\sigma_m}$

Where, R_p = Return on portfolio
R_f = risk free return
R_m = return on stock
σ_m = risk in stock

$$0.12 = 0.075 + (0.15 - 0.075) \times \frac{\sigma_p}{0.05}$$

$$0.12 - 0.075 = 0.075 \times \frac{\sigma_p}{0.05}$$

$$\frac{0.045}{0.075} \times 0.05 = \sigma_p$$

$$\sigma_p = 0.03$$

$$\sigma_p = \boxed{3\%}$$

Hence, the risk involved in the portfolio = 3%