# PORTFOLIO MANAGEMENT CLASS 4

# CLASS WORK COVERAGE

To streamline our learning process, I've categorized the questions we'll tackle in class into four distinct groups:

1. ***Classic:*** *These questions are exactly as presented in your book, providing a familiar foundation.*
2. ***Transformed:*** *Here, we've converted book questions into multiple-choice format to enhance your analytical skills.*
3. ***Adapted:*** *These are similar to book questions but with altered numbers or names, presented as multiple-choice questions for varied practice.*
4. ***Original:*** *These are entirely new questions not found in your book, designed to challenge and expand your understanding.*

*This structure will help us navigate through a range of problems, ensuring a comprehensive grasp of the material. Looking forward to our next session!*

| Q. No. | Type | Book | Page No. | Q No. |
|---|---|---|---|---|
| Case Study 1 | ***Transformed*** | CW Q BOOK | 49 | 13 |

# CASE STUDY 1

An investor has decided to invest to invest ₹ 1,00,000 in the shares of two companies, namely, ABC and XYZ. The projections of returns from the shares of the two companies along with their probabilities are as follows:

| Probability | ABC(%) | XYZ(%) |
|---|---|---|
| 20 | 12 | 16 |
| 25 | 14 | 10 |
| 25 | -7 | 28 |
| 30 | 28 | -2 |

**Question 1:**

**What is the expected return from share ABC?**

**A.** 12.10%

**B.** 12.55%

**C.** 11.50%

**D.** 10.50%

**Question 2:**

**What is the expected return from share XYZ?**

**A.** 10.5%

**B.** 11.2%

**C.** 12.1%

**D.** 12.0%

**Question 3:**

**What is the standard deviation of return for share ABC?**

**A.** 10.98%

**B.** 11.27%

**C.** 12.95%

**D.** 13.75%

**Question 4:**

**What is the standard deviation of return for share XYZ?**

**A.** 10.98%

**B.** 12.95%

**C.** 13.75%

**D.** 11.27%

**Question 5:**

**What is the return and risk of a portfolio consisting of equal proportions of shares ABC and XYZ?**

**A.** Return = 12.550%, Risk = 1.56%

**B.** Return = 12.325%, Risk = 1.25%

**C.** Return = 12.105%, Risk = 1.56%

**D.** Return = 12.300%, Risk = 1.25%

**Question 6:**

**What is the proportion of each share (ABC and XYZ) required to formulate a minimum risk portfolio?**

**A.** ABC = 46%, XYZ = 54%

**B.** ABC = 54%, XYZ = 46%

**C.** ABC = 50%, XYZ = 50%

**D.** ABC = 40%, XYZ = 60%

# ANSWER

**Question 1:**

B is correct.

**Question 2:**

C is correct.

**Question 3:**

C is correct.

**Question 4:**

D is correct.

**Question 5:**

B is correct.

**Question 6:**

A is correct.

**Explanation:**

**i.**

| Probability | ABC (%) | XYZ (%) | 1X2 (%) | 1X3 (%) |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 0.20 | 12 | 16 | 2.40 | 3.2 |
| 0.25 | 14 | 10 | 3.50 | 2.5 |
| 0.25 | -7 | 28 | -1.75 | 7.0 |
| 0.30 | 28 | -2 | 8.40 | -0.6 |
| **Average return** | | | **12.55** | **12.1** |

Hence the expected return from ABC = 12.55% and XYZ is 12.1%

| Probability | $(ABC - \overline{ABC})$ | $(ABC - \overline{ABC})^2$ | 1X3 | $(XYZ - \overline{XYZ})$ | $(XYZ - \overline{XYZ})^2$ | (1)X(6) |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | |
| 0.20 | -0.55 | 0.3025 | 0.06 | 3.9 | 15.21 | 3.04 |
| 0.25 | 1.45 | 2.1025 | 0.53 | -2.1 | 4.41 | 1.10 |
| 0.25 | -19.55 | 382.2025 | 95.55 | 15.9 | 252.81 | 63.20 |
| 0.30 | 15.45 | 238.7025 | 71.61 | -14.1 | 198.81 | 59.64 |
| | | | **167.75** | | | **126.98** |

$\sigma^2_{ABC} = 167.75(\%)^2 ; \sigma_{ABC} = 12.95\%$

$\sigma^2_{XYZ} = 126.98(\%)^2 ; \sigma_{XYZ} = 11.27\%$

**ii. In order to find risk of portfolio of two shares, the covariance between the two is necessary here.**

| Probability | $(ABC - \overline{ABC})$ | $(XYZ - \overline{XYZ})$ | 2X3 | 1X4 |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 0.20 | -0.55 | 3.9 | -2.145 | -0.429 |
| 0.25 | 1.45 | -2.1 | -3.045 | -0.761 |
| 0.25 | -19.55 | 15.9 | -310.845 | -77.71 |
| 0.30 | 15.45 | -14.1 | -217.845 | -65.35 |
| | | | | **-144.25** |

$\sigma^2_p = (0.5^2 \times 167.75) + (0.5^2 \times 126.98) + 2 \times (-144.25) \times 0.5 \times 0.5$

$\sigma^2_p = 41.9375 + 31.745 - 72.125$

$\sigma^2_p = 1.5575 \text{ or } 1.56(\%)$

$\sigma_p = \sqrt{1.56} = 1.25\%$

$E(R_p) = (0.5 \times 12.55) + (0.5 \times 12.1) = 12.325\%$

Hence, the return is 12.325% with the risk of 1.25% for the portfolio. Thus the portfolio results in the reduction of risk by the combination of two shares.

**iii. For constructing the minimum risk portfolio the condition to be satisfied is**

$$X_{ABC} = \frac{\sigma_X^2 - r_{AX}\sigma_A\sigma_X}{\sigma_A^2 + \sigma_X^2 - 2r_{AX}\sigma_A\sigma_X} \text{ or } = \frac{\sigma_X^2 - Cov.AX}{\sigma_A^2 + \sigma_X^2 - 2Cov._{AX}}$$

$\sigma_X$ = Std. Deviation of XYZ

$\sigma_A$ = Std. Deviation of ABC

$r_{AX}$= Coefficient of Correlation between XYZ and ABC

$Cov._{AX}$ = Covariance between XYZ and ABC.

Therefore,

$$\% \text{ ABC} = \frac{126.98 - (-144.25)}{126.98 + 167.75 - [2 \times (-144.25)]} = \frac{271.23}{583.23} = 0.46 \text{ or } 46\%$$

% ABC = 46%, XYZ = 54%

(1 – 0.46) =0.54