# Paper – 14 – ADVANCED FINANCIAL MANAGEMENT

The following table lists the learning objectives and the verbs that appear in the syllabus learning aims and examination questions:

| | Learning objectives | Verbs used | Definition |
|---|---|---|---|
| LEVEL C | KNOWLEDGE<br><br>What you are expected to know | List | Make a list of |
| | | State | Express, fully or clearly, the details/facts |
| | | Define | Give the exact meaning of |
| | COMPREHENSION<br><br>What you are expected to understand | Describe | Communicate the key features of |
| | | Distinguish | Highlight the differences between |
| | | Explain | Make clear or intelligible/ state the meaning or purpose of |
| | | Identity | Recognize, establish or select after consideration |
| | | Illustrate | Use an example to describe or explain something |
| | APPLICATION<br><br>How you are expected to apply your knowledge | Apply | Put to practical use |
| | | Calculate | Ascertain or reckon mathematically |
| | | Demonstrate | Prove with certainty or exhibit by practical means |
| | | Prepare | Make or get ready for use |
| | | Reconcile | Make or prove consistent/ compatible |
| | | Solve | Find an answer to |
| | | Tabulate | Arrange in a table |
| | ANALYSIS<br><br>How you are expected to analyse the detail of what you have learned | Analyse | Examine in detail the structure of |
| | | Categorise | Place into a defined class or division |
| | | Compare and contrast | Show the similarities and/or differences between |
| | | Construct | Build up or compile |
| | | Priorities | Place in order of priority or sequence for action |
| | | Produce | Create or bring into existence |
| | SYNTHESIS<br>How you are expected to utilize the information gathered to reach an optimum conclusion by a process of reasoning | Discuss | Examine in detail my argument |
| | | Interpret | Translate into intelligible or familiar terms |
| | | Decide | To solve or conclude |
| | EVALUATION<br>How you are expected to use your learning to evaluate, make decisions or recommendations | Advise | Counsel, inform or notify |
| | | Evaluate | Appraise or asses the value of |
| | | Recommend | Propose a course of action |

# Paper – 14 – ADVANCED FINANCIAL MANAGEMENT

**Time Allowed: 3 hours** **Full Marks: 100**

**This paper contains 5 questions. All questions are compulsory, subject to instruction provided against each question. All workings must form part of your answer.**
**Assumptions, if any, must be clearly indicated.**

**Question No. 1 (**Answer **all** questions. Each question carries **2 marks)**

**1. (a) A deep discount Bond issued at ₹2,500 will be redeemed at ₹1,00,000 after 25 years. Calculate the Post-tax yield for the investor, if Capital gain is taxed at 20% and indexation benefits of 6% annually is available. [2]**

**Answer:**

Capital Gain Tax on redeemable bond = 0.20 × 1,00,000 = ₹ 20,000
Indexation benefit = 0.06 (1,00,000 - 20,000 - 2,500) = ₹4,650
∴ Post Tax income = (1,00,000 - 20,000) + 4,650 = ₹ 84,650

Hence Post Tax Yield: $\sqrt[25]{\frac{84,650}{2,500}} - 1 = 15.13\%$

**(b) State the non-banking financial institution. [2]**

**Answer:**

**Non-banking financial institution:** Non-banking financial institutions are those institutions which act as mere purveyors of credit and they will not create credit, e.g., LIC, UTI, IDBI.

**(c) The Market Price of Stock of Atco Ltd. is ₹ 102 and its Alpha is – 1.3%. The realized return on the stock is 16% p.a. and the Risk-free rate of return is 7.02% p.a. Market Risk premium is 7% p.a. Calculate the required rate of return on the Stock of ATCO Ltd., if its co-variance with the market portfolio declines by 50%. [2]**

**Answer:**

| | |
|---|---|
| Market Return | = 7 + 7.02 = 14.02% |
| Required Return | = 7.02 + (14.02 – 7.02)β = 16 + 13 = 17.3% |

If covariance of stock with the market declines by 50%, its beta also declines by 50%.
Hence Net Beta = 50% of 1.47 = 0.735
∴ Required rate of return on stock of ATCO Ltd.: 7.02 + 0.735×7 = 12.165%.

**(d) An Indian Company is planning to invest in the US. The rates of inflation are 8% in India and 3% in USA. If the spot rate is currently ₹60.50/$, what spot rate can you expect after 5 years, assuming the inflation rates will remain the same over 5 years? [2 ]**

**Answer:**

$F = S \times [(1 + r_A)^N / (1 + r_B)^n]$
or, $F(₹/\$) = 60.50 \times [1 + 0.08)^5 / (1+ 0.03)^5]$
$= 60.50 \times 1.267455 = ₹76.68$

**(e) SIDBI came out with an issue of Deep discount Bond. Each bond having a face value of ₹ 1,00,000 was issued at a deep discounted price of ₹ 5,000 with a maturity period of 25 years from the date of allotment. The corporate tax rate applicable is 20%. If the Indexed Cost of acquisition is 6%, calculate the Post-tax Yield to maturity of the bond. [2]**

**Answer:**

Post-tax redemption value:
Redemption Value – [Redemption Value – Indexed Cost of acquisition] × Tax rate
$₹ 1,00,000 – [1,00,000 – 5,000x (1.06)^{0.25}] \times 0.20$
$= 1,00,000 – [1,00,000 – 5,000x4.2919]x0.20 = ₹ 84,292$
Cost of acquisition × $(1+r)^{25}$ = Post tax redemption Value
$5000 (1+r)^{25} = 84292$ or $(1+r)^{25} = 16.8584$
$r = \sqrt[25]{16.8584} - 1$
$= 1.1196 – 1 = 0.1196$ i.e. 11.96%

**(f) From the following quotes of a bank, determine the rate at which Yen can be purchased with Rupees.**

| | |
|---|---|
| **₹/£ Sterling** | **75.31 – 33** |
| **£ Sterling/Dollar ($)** | **1.563 – 65** |
| **Dollar ($)/Yen (¥)** | **1.048/52 [per 100 Yen]** |

**[2]**

**Answer:**

Ask (₹/¥) = Ask (₹/£) x Ask (£/$) x Ask ($/¥)
= 75.33 x 1.565 x 1.052
= ₹124. 02

**(g) Distinguish between mutual funds and hedge funds. [2]**

**Answer:**

(I) Mutual Funds seek Relative Returns whereas Hedge Funds actively seek Absolute Returns.

(II) (b) In a bull market, hedge funds may not perform as well as mutual funds, but in a bear market - taken as a group or asset class – they do better than mutual funds because they hold short positions and hedges.

**(h) Spot (Euro/Pound) = 1.6543/1.6557**
**Spot (Pound/NZ $) = 0.2786/0.2800**
**Calculate the % Spread on the Euro/Pound rate.** **[2]**

**Answer:**

The % spread in Euro / Pound = [1.6557 -1.6543]/1.6543
= 0.085%

**(i) Madura Steel earns 12% on the equity. The growth rate of the dividends and earnings is 6%. The book value per share is ₹ 60. If the cost of equity is 14%. Ascertain the market price of the share of company, accounting to the Marakon Model of Valuation.** **[2]**

**Answer:**

As per Marakon Model of Valuation,
Formulae for computation of Market price =
Where,
r = return on equity = 12%
g = growth rate of dividend = 6%
k = Cost of Equity = 14%
Book Value = ₹ 60
$\therefore$ Market Value = $\frac{60(12-6)}{14-6}$ = ₹ 45.

**(j) The buy and sell value of two securities in stock exchange are as under:**

| Security | Buy Value (₹) | Sell Value (₹) |
|---|---|---|
| **L** | **5,00,000** | **2,00,000** |
| **M** | **3,00,000** | **7,00,000** |

**Calculate the Gross Exposure Margin.** **[2]**

**Answer:**

| Security | Buy Value (₹) | Sell Value (₹) | Buy Value – Sell Value (₹) |
|---|---|---|---|
| L | 5,00,000 | 2,00,000 | 3,00,000 |
| M | 3,00,000 | 7,00,000 | - 4,00,000 |

The Gross Exposure Margin: S (|300000| + |- 400000|) = ₹ 7,00,000.

**Question No. 2.** (Answer **any three** questions. Each question carries **8 marks**)

**2. (a) List the any eight functions of a Financial System. [8]**

**Answer:**

The following are the functions of a Financial System:

(i) Mobilise and allocate savings – linking the savers and investors to mobilize and allocate the savings efficiently and effectively.

(ii) Monitor corporate performance – apart from selection of projects to be funded, through an efficient financial system, the operators are motivated to monitor the performance of the investment.

(iii) Provide payment and settlement systems – for exchange of goods and services and transfer of economic resources through time and across geographic regions and industries. The clearing and settlement mechanism of the stock markets is done through depositories and clearing operations.

(iv) Optimum allocation of risk-bearing and reduction – by framing rules to reduce risk by laying down the rules governing the operation of the system. This si also achieved through holding of diversified portfolios.

(v) Disseminate price-related information – which acts as an important tool for taking economic and financial decisions and take an informed opinion about investment, disinvestment, reinvestment or holding of any particular asset.

(vi) Offer portfolio adjustment facility - which includes services of providing quick, cheap and reliable way of buying and selling a wide variety of financial assets.

(vii) Lower the cost of transactions – when operations are through and within the financial structure.

(viii) Promote the process of financial deepening and broadening – through a well-functional financial system. Financial deepening refers to an increase of financial assets as a percentage of GDP. Financial depth is an important measure of financial system development as it measures the size of the financial intermediary sector. Financial broadening refers to building an increasing number of varieties of participants and instruments.

**2. (b) (i) P. Co. has to make payment of ₹ 2 million on 16th April 2015. It has a surplus money today. i.e., 15th January 2015, and the company has to decided to invest in Certificate of Deposits (CD's) of a leading Nationalized Bank at 8.00% p.a. Calculate how much money is required to invest now. [5]**

**Answer:**

Certificates of Deposits are issued at discount and the discount amount is paid front end (i.e., at the time of issue). The formula for discount is given by [FV ₹ 1]

$D = 1 \times \frac{r}{100} \times \frac{n}{365}$ , where D – discount paid, r – rate of discounting, n – months/days

$D = 1 \times \frac{8}{100} \times \frac{91}{365}$ , where r = 8%, n =91 days [from 15.01.2015 to 15.04.2015]

Therefore D = ₹ 0.0199452.

Amount to be received on FV ₹ 1 → ₹ 1 + 0.0199452 = ₹ 1.0199452

If the amount to be received is ₹ 2 million, then

Amount to be invested = $\frac{2000000}{1.0199452}$ = ₹ 19,60,889.66

= ₹ 19,60,890 (rounded off).

**2. (b) (ii) Distinguish between banks and NBFCs. [3]**

**Answer:**

NBFCs lend and make investments and hence their activities are akin to that of banks; however there are a few differences as given below:

(i) NBFC cannot accept demand deposits;

(ii) NBFC do not form part of the payment and settlement system and cannot issue cheques drawn on itself;

(iii) Deposit insurance facility of Deposit Insurance and Credit Guarantee Corporation is not available to depositors of NBFCs, unlike in case of banks.

**2. (c) Kishore invested in a fund called Tiger on 7 February 2015 through the six month systematic investment plan, with each installment of ₹ 5000. The entry load for this plan is 1%, while the exit load is 2%, if redeemed within 24 months. The NAV during the six month period was:**

| Date | 07.02.15 | 28.02.15 | 07.03.15 | 07.04.15 | 08.05.15 | 07.06.15 | 07.07.15 |
|---|---|---|---|---|---|---|---|
| NAV (₹) | 21.49 | 17.33 | 18.60 | 20.13 | 21.51 | 15.98 | 16.63 |

**The fund declared a dividend of ₹ 4.50 per unit on 28.02.15, which was re-invested by the fund as per instruction of Kishore. Prepare a table to show the issue units each time Kishore invested and when dividend was re-invested. What is the invested amount and also arrive at the current value of the portfolio. Would Kishore make money if he decides to sell after six months? [8]**

**Answer:**

| Date | Investment | NAV | Sale Price* | Units | Cumulative Units | Cumulative Value |
|---|---|---|---|---|---|---|
| 07.02.15 | 5000 | 21.49 | 21.70 | 230.415 | 230.415 | 4951.62 |
| 28.02.15 | Dividend @ 4.50 | 17.33 | 17.33 | 59.831 | 290.246 | 5029.96 |
| 07.03.15 | 5000 | 18.60 | 18.79 | 266.099 | 556.345 | 10348.02 |
| 07.04.15 | 5000 | 20.13 | 20.33 | 245.942 | 802.287 | 16150.04 |
| 08.05.15 | 5000 | 21.51 | 21.73 | 230.097 | 1032.384 | 22206.58 |
| 07.06.15 | 5000 | 15.98 | 16.14 | 309.789 | 1342.173 | 21447.92 |
| 07.07.15 | 5000 | 16.63 | 16.80 | 297.619 | 1639.792 | 27269.74 |

*Sale Price = NAV (1+1%)

The current invested value = 6 × 5000 + Dividend received and reinvested

= 30000 + 4.50 × 230.415

= 30000 + 1036.87

= ₹ 31036.87

Kishore will not make money as the current value of his portfolio is less than his investment.

**2. (d) (i) A one day repo is entered into on January 10, 2015 on an 11.99% 2018 security, maturing on April 7, 2018. The face value of the transaction is ₹ 5 Crores. The price of the security is ₹ 115.00. Assume that RBI has lent securities in the first leg to PNB. If the repo rate is 6%, calculate the settlement amount on January 10, 2015. [Use 360 day convention] [4]**

**Answer:**

In the first leg RBI has lent securities and receives money from PNB
Stage – I
G Sec pays bi-annual coupons;
Interests are paid on April 7 & October 7.
G Sec Maturity on April 7, 2018;
Days elapsed from October 8, 2014 till January 10, 2015 = 24+30+31+9
= 94 days
Accrued Interest: 5 Crores × 0.1199 × 94/360 = ₹ 1565361
Transaction Value = ₹ 5 Crores × 115/100 = ₹ 57500000
Total Settlement amount = ₹ 59065361 = Money received by RBI from PNB.

**2. (d) (ii) A mutual fund has a net asset value (NAV) of ₹ 50 at the beginning of the year. During the year a sum of ₹ 4 was distributed as income (dividend) besides ₹ 3 as capital gains distribution. At the end of the year NAV was ₹ 55, calculate total return for the year. Suppose the aforesaid Mutual Fund in the next year gives a dividend of ₹ 5 as income distribution and no capital gains distribution and NAV at the end of second year is ₹ 50. Ascertain the return for the second year. [2+2]**

**Answer:**

$$\text{Total Return} = \frac{\text{Change in NAV} + \text{Distributions (Dividend / Capital)}}{\text{NAV at the beginning of the period}}$$

$$\text{Return} = \frac{(55 - 50) + 4 + 3}{50} = 0.24 = 24\%$$

$$\text{Total Return II year} = \frac{\text{Change in NAV} + \text{Distributions (Dividend / Capital)}}{\text{NAV at the beginning of the period}}$$

$$\text{Return} = \frac{(55 - 55) + 0 + 5}{50} = 0.0 = 0\%$$

**Question No. 3.** (Answer **any two** questions. Each question carries **10 marks**)

**3. (a) The Equity Share of VCC Ltd is quoted at ₹ 210. A 3-month Call Option is available at a Premium of ₹ 6 per Share and a 3 – month Put Option is available at a Premium of ₹ 5 per Share. Ascertain the net pay-off to the Option Holder of a Call Option and a Put Option given that –**

**(I) Strike Price in both cases is ₹ 220 and**

**(II) The Share Price on the exercise day is ₹ 200, ₹ 210, ₹ 230 and ₹ 240. [5+5]**

**Answer:**

**1. Pay-off Table for Call Option**

| Spot Price on Expiry Date ($SP_E$) | Position | Action | Value of Option (if Exercised) | Premium | Net Pay Off |
|---|---|---|---|---|---|
| ₹ 200 | Out of Money | Lapse | NIL | ₹ 6 | (₹ 6) |
| ₹ 210 | Out of Money | Lapse | NIL | ₹ 6 | (₹ 6) |
| ₹ 220 | At the Money | Lapse | NIL | ₹ 6 | (₹ 6) |
| ₹ 230 | In the Money | Exercise | ₹ 10 | ₹ 6 | ₹ 4 |
| ₹ 240 | In the Money | Exercise | ₹ 20 | ₹ 6 | ₹ 14 |

**2. Pay-off Table for Put Option**

| Spot Price on Expiry Date ($SP_E$) | Position | Action | Value of Option (if Exercised) | Premium | Net Pay Off |
|---|---|---|---|---|---|
| ₹ 200 | In the Money | Exercise | ₹ 20 | ₹ 5 | ₹ 15 |
| ₹ 210 | In the Money | Exercise | ₹ 10 | ₹ 5 | ₹ 5 |
| ₹ 220 | At the Money | Lapse | NIL | ₹ 5 | (₹ 5) |
| ₹ 230 | Out of Money | Lapse | NIL | ₹ 5 | (₹ 5) |
| ₹ 240 | Out of Money | Lapse | NIL | ₹ 5 | (₹ 5) |

**3. (b) Soundarya Polycarbons Ltd has the following information about LDPE and HDPE Granules (Raw Material used for manufacturing Plastic Films, Polyfilms and Plastic Sheets)-**

| Stock Item | LDPE Granules | HDPE Granules |
|---|---|---|
| **Current market Price i.e., Spot Price [$S_0$]** | **₹ 75 per kg** | **₹ 85 per kg** |
| **Carrying Cost** | **4% p.a. [continuous compounding]** | **₹ 100 per Quintal per quarter (payable after 2 months)** |
| **3-Month's Futures Contract Rate (500 Kgs)** | **₹ 39,000** | **₹ 44,500** |

**Risk Free Interest Rate is at 12% p.a. Advise Soundary Polycarbons on the course of action to be taken? [10]**

**Answer:**

**Evaluation of Futures Contract Option for LDPE Granules**

| Particulars | LDPE Granules | HDPE Granules |
|---|---|---|
| Spot Price [$S_x$] | ₹ 75 per kg | ₹ 85 per kg |
| Storage Costs [rate] [c] | 4% or 0.04 | (payable after 2 months) ₹ 100 per Quintal (i.e., 100 kgs) per quarter or ₹ 1 per kg. |
| Tenor/Time Period [t] in Years | 3 Months or 0.25 Year | 2 Months or 0.1667 Year |
| Risk Free Interest Rte [r] | 12% or 0.12 | 12% or 0.12 |
| Present Value of Storage Costs [$C_p$] $C_F \times e^{-rt}$ or $C_F \div e^{rt}$ | --- | = ₹ 1 × $e^{-0.12\times0.16667}$ = ₹ 1× $e^{-0.02}$ = ₹ 1 × 0.9802 = ₹ 0.9802 |
| Adjusted Current Spot Price of HDPE Granules $S_{Adj.}$ | --- | [Spot Price ₹ 85 + Present Value of Storage Costs $C_p$ ₹ 0.9802] = ₹ 85.9802 |
| Theoretical Forward Price [$TFP_x$] per kg $TFP_x = S_x \times e^{(r+c)\times t}$ | = ₹ 75 × $e^{(0.12+0.04)\times0.25}$ = ₹ 75 × $e^{(0.16\times0.25)}$ = ₹ 75 × $e^{0.04}$ =₹ 75×1.0408=₹ 78.06 | = ₹ 85.9802 × $e^{0.12\times0.25}$ = ₹ 85.9802 × $e^{0.03}$ = 85.9802 × 1.0305 = ₹ 85.9802 |
| $TFP_x$ per lot size of 500 kg | (500 Kgs × ₹ 78.06 per kg) = ₹ 39,030 | (500 Kgs × ₹ 88.6026 per kg) = ₹ 44,301.30 |
| 3-Months Futures Contract Rate [$AFP_x$] | ₹ 39,000 | ₹ 44,500 |
| $TFP_x$ Vs. $AFP_x$ | $AFP_x$ is Lower | $AFP_x$ is Higher |
| Valuation in Futures Market | Undervalued | Overvalued |
| Recommended Action | Buy Future. Sell Spot. | Buy Spot. Sell Future. |

**3. (c) (i) Suppose a dealer quotes All in cost for a Generic Swap at 8% against six month LIBOR flat. If the national principal amount of swap is ₹ 5,00,000.**

**(I) Calculate Semi-Annual Fixed Payment.**

**(II) Find the first Floating Rate Payment for (I) above if the six month period from the effective date of Swap to the settlement date comprises 181 days and that the corresponding LIBOR was 6% on the effective date of swap.**

**(III) In (II) above, if settlement is on 'Net' basis, how much the fixed rate payer would pay to the floating rate payer?**

**Generic swap is based on 30/360 days basis. [1½+2+1½]**

**Answer:**

**(I) Computation of Semi Annual Fixed Rate Payment**

Semi-Annual Fixed Rate Payment = P × (N ÷ 360) × R

= 5,00,000 × (180 ÷ 360) × 0.08

= 5,00,000 × 0.5 × 0.08 = ₹ 20,000

**(II) Computation of Floating Rate Payment**

Floating Rate Payment = P × ($N_t$ ÷ 360) × LIBOR

Where $N_t$ = Period from the effective date of SWAP to the date of Settlement

= 5,00,000 × (181 ÷ 360) × 0.06

= 5,00,000 × (0.5027) × 0.06

= ₹ 15,083

**(III) Computation of Net Amount**

Net Amount to be paid by the person Requiring Fixed Rate Payment = Fixed Rate Payment Less Floating Rating Payment = ₹ 20,000 – ₹ 15,083 = ₹ 4,917.

**3. (c) (ii) Describe the difficulties in applying the arm's length pricing. [5]**

**Answer:**

The arm's length principle, although survives upon the international consensus, does not necessarily mean that it is perfect. There are difficulties in applying this principle in a number of situations.

- The most serious problem is the need to find transactions between independent parties which can be said to be exact compared to the controlled transaction.
- It is important to appreciate that in an MNE system, a group first identifies the goal and then goes on to create the associated enterprise and finally, the transactions entered into. This procedure obviously does not apply to independent enterprises. due to these facts, there may be transactions within an MNE group which may not be between independent enterprises.
- Further, the reductionist approach of splitting an MNE group into its component parts before evaluating transfer pricing may mean that the benefits of economics of scale, or integration between the parties, is not appropriately allocated between the MNE group.
- The application of the arm's length principle also imposes a burden on business, as it may require the MNE to do things that it would otherwise not do (i.e., searching for comparable transactions, documenting transactions in detail, etc.).
- Arm's length principle involves a lot of cost to the group.

**Question No. 4.** (Answer **any two** questions. Each question carries **8 marks**)

**4. (a) The following is the information pertaining to stocks of two companies Sonar Ltd. and Safari Ltd.:**

| Expected Return (%) | | Probability |
|---|---|---|
| Sonar Ltd. | Safari Ltd. | |
| -5 | 5 | 0.05 |
| 12 | 15 | 0.55 |
| 15 | 18 | 0.35 |
| 20 | 20 | 0.05 |

**A portfolio is constructed by allocating the funds between Sonar Ltd. and Safari Ltd. in the ratio of 2 : 3. Calculate the portfolio return and risk. [4+4]**

**Answer:**

**Expected return of Sonar Ltd.,**
= -5 × 0.05 + 12 × 0.55 + 15 × 0.35 + 20 × 0.05 = 12.6%

**Expected return of Safari Ltd.**
= 5 × 0.05 + 15 × 0.55 + 18 × 0.35 + 20 × 0. 05 = 15.8%

Proportion of 2 : 3, means that we would invest 40% in Sonar and 60% in Safari
**Portfolio return** = 0.4 × 12.6 + 0.6 × 15.8 = 14.52%

**Calculation of Portfolio risk**

| Probability | Portfolio return | Deviation |
|---|---|---|
| 0.05 | 0.4 × – 5 + 0.6 × 5 = 1 | -13.52 |
| 0.55 | 0.4 × 12 + 0.6 × 15 = 13.8 | -0.72 |
| 0.35 | 0.4 × 15 + 0.6 × 18 = 16.8 | 2.28 |
| 0.05 | 0.4 × 20 + 0.6 × 20 = 20 | 5.48 |

**Portfolio risk** = $[(0.05(-13.52)^2 + 0.55 \times (0.72)^2 + 0.35\ (2.28)^2 + 0.05 \times (5.48)^2)]^{1/2}$ = 3.57%.

**4. (b) The following are different state of economy, the probability of occurrence of that state and the expected rate of return from Security A and B in these different states.**

| State | Probability | Rate of Return | |
|---|---|---|---|
| | | Security A | Security B |
| **Recession** | **0.20** | **-0.15** | **0.20** |
| **Normal** | **0.50** | **0.20** | **0.30** |
| **Boom** | **0.30** | **0.60** | **0.40** |

**Find out the expected returns and the standard deviations for these two securities. Suppose, an investor has ₹ 20,000 to invest, and he invests ₹ 15,000 in security A and balance in Security B, calculate the expected return and the standard deviation of the portfolio. [2+2+4]**

**Answer:**

We know that $E(x) = \sum_{i=1}^{n} XiPi$ Where Xi represents return under a particular scenario with probability Pi.

∴ The expected return for Security A would be = 0.2 × (-0.15)+ 0.5×0.2 + 0.3×0.6 = 25%

∴ The expected return for Security B would be = 0.2 × 0.2+ 0.5×0.3 + 0.3×0.4 = 31%

The standard deviation would be calculated as

$\sigma_A = \sqrt{0.2(-0.15-0.25)^2 + 0.5(0.2-0.25)^2 + 0.3(0.60-0.25)^2}$ = 26.46%

$\sigma_B = \sqrt{0.2(0.2-0.31)^2 + 0.5(0.30-0.31)^2 + 0.3(0.40-0.31)^2}$ = 7%

If an investor invests 15000 out of 20000 in security A & 5000 in security B then his investment is in the ratio 0.75 : 0.25.

Therefore, his return = 0.75 × 0.25 + 0.25 × 0.31 = 26.5%

| State | Rate of Return | | | | |
|---|---|---|---|---|---|
| | Proportion A | Security A | Proportion B | Security B | Expected Return |
| Recession | 0.75 | -0.15 | 0.25 | 0.20 | -0.0625 |
| Normal | 0.75 | 0.20 | 0.25 | 0.30 | 0.2250 |
| Boom | 0.75 | 0.60 | 0.25 | 0.40 | 0.5500 |

The standard deviation would be calculated as

$\sigma_A = \sqrt{0.2(-0.0625-0.265)^2 + 0.5(0.225-0.265)^2 + 0.3(0.550-0.265)^2}$ = 21.595%

**4. (c) Following is data regarding six securities:**

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| **Return (%)** | **8** | **8** | **12** | **4** | **9** | **8** |
| **Risk (%) Standard Deviation** | **4** | **5** | **12** | **4** | **5** | **6** |

**(I) Which of these securities will be selected?**

**(II) Assuming perfect correlation, analyze, whether it is preferable to invest 75% in Security A and 25% in Security C. [2+6]**

**Answer:**

**(I)** Using the risk-return tradeoff, an investor preferring highest return of 12% would prefer security C. A person willing to take a low risk would prefer Security A to security D, as the former gives a higher return for the risk taken. Similarly, a person willing to take a moderate risk would prefer security E to security B or security F. (**Note:** E gives better return with lower risk than F.)

**(II)**

| Security | Proportion | Exp. Return | σ |
|---|---|---|---|
| A | 0.75 | 8% | 4% |
| C | 0.25 | 12% | 12% |

Also given ρ= 1.00

The expected value of return for investment of 75% A and 25% C would be

= 0.75 × 0.08 + 0.25 × 0.12 = 9%

And for standard deviation $\sigma_p = \left[\sum_{j=1}^{n} X_i X_j \rho_{ij} \sigma_i \sigma_j\right]^{\frac{1}{2}}$

Substituting we have

$\sigma_p = [(0.75)\times(0.75)\times(0.04)^2+(0.25)\times(0.25)\times(0.12)^2+2\times(0.75)\times(0.25)\times1.0\times0.04\times0.12]^{1/2}$

$= [0.036]^{1/2}=6\%$

Looking at the table we see that for a 6% risk we get a maximum of 8% return from security F. However, to earn 9%, we need to take a risk of only 5% by investing in security E. thus it is not advisable to invest in the proportion given.

**Question No. 5.** (Answer **any two** questions. Each question carries **10 marks**)

**5. (a) Beta Ltd. is considering the acquisition of a personal computer costing ₹ 50,000. The effective life of the computer is expected to be five years. The company plans to acquire the same either by borrowing ₹ 50,000 from its bankers at 15% interest per annum or by lease. The company wishes to know the lease rentals to be paid annually which will match the loan option. The following further information is provided to you:**

**(I) The principal amount of the loan will be paid in five annual equal installments.**
**(II) Interest, lease rentals principal repayment are to be paid on the last day of each year.**
**(III) The full cost of the computer will be written off over the effective life of computer on a straight-line basis and the same will be allowed for tax purposes.**
**(IV) The company's effective tax rate is 40% and the after tax cost of capital is 9%.**
**(V) The computer will be sold for ₹ 1,700 at the end of the 5th year. The commission on such sales is 9% on the sale value and the same will be paid.**

**You are required: To compute the annual lease rental payable by Beta Ltd. which will result in indifference to the loan option. The relevant discount factors are as follows:**

| Year | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Discount Factor | 0.92 | 0.84 | 0.77 | 0.71 | 0.65 |

**[10]**

**Answer:**

**Computation of PVCO under Loan Option**

| Particulars | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Payment of Principal | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Payment of Interest (Net Tax) 15% (1–0.4) | 4,500 | 3,600 | 2,700 | 1,800 | 900 |
| (-)Tax Savings on Depreciation $\left[\frac{₹50,000}{5\text{years}} \times 40\%\right]$ | (4,000) | (4,000) | (4,000) | (4,000) | (4,000) |
| (-) Terminal Value | | | | | (928) |
| Sale Price ₹ 1,700 | | | | | |
| (-) Commission 9% (₹ 153) | | | | | |
| Net Sale Price ₹ 1,547 | | | | | |
| (-) C/G Tax (₹ 619) | | | | | |
| ₹ 928 | | | | | |
| Net Outflows | 10,500 | 9,600 | 8,700 | 7,800 | 5,972 |
| PVF | 0.92 | 0.84 | 0.77 | 0.71 | 0.65 |
| PVCO | 9,660 | 8,064 | 6,699 | 5,538 | 3,882 |

Total PVCO = 33,843
Let the Annual Lease Rent that matches the loan option C.O. be x.

**PVCO under Lease option**

| Particulars | Time | PVF | Amount (₹) | PV (₹) |
|---|---|---|---|---|
| Lease rent (Net of Tax) [x ( - 0.4)] | 1-5 | 3.89 | 0.6x | 2.334x |
| PVCO | | | | 2.334x |

2.334x = ₹ 33,843 = ₹ 14,500
Annual lease rent that matches the loan option = ₹ 14,500.

**5. (b) The following is the capital structure of a Company:**

| Source of Capital | Book Value (₹) | Market Value (₹) |
|---|---|---|
| **Equity Shares @ ₹ 100 each** | **80,00,000** | **1,60,00,000** |
| **9% Cumulative Preference Shares @ ₹ 100 each** | **20,00,000** | **24,00,000** |
| **11% Debentures** | **60,00,000** | **66,00,000** |
| **Retained Earnings** | **40,00,000** | **--** |
| | **2,00,00,000** | **2,50,00,000** |

**The current market price of the company's equity share is ₹ 200. For the last year the company had paid equity dividend at 25% and its dividend is likely to grow 5% every year. The corporate tax rate is 30% and shareholders personal income tax rate is 20%. You are required to calculate:**

**(I) Cost of Capital for each source of capital.**
**(II) Weighted Average Cost of Capital on the basis of Book Value Weights.**
**(III) Weighted Average Cost of Capital on the basis of market Value Weights. [4+3+3]**

**Answer:**

**(I) Calculation of Cost of Capital for each source of capital:**

1. Cost of Equity Capital:
$K_e = \frac{D_0(1+g)}{P_0} + g = \frac{₹25(1+0.05)}{₹200} + 5\% = \frac{₹26.25}{₹200} + 5\% = 13.125 + 5\% = 18.125\%$.
2. Cost of Preference Capital or $K_p = \frac{₹9}{₹120} = 7.5\%$.
3. Cost of Debentures: $K_d$ (After Tax) $= \frac{I(1-t)}{NP} = \frac{₹11(1-0.3)}{₹110} = 7\%$.
4. Cost of Retained Earnings: $K_r = K_e (1 – tp) = 18.125\% (1 – 0.2) = 14.5\%$.

**(II) Computation of Weighted Average Cost of Capital: (on the basis of Book Value Weights)**

| Source (1) | Amount (₹) (2) | Weights (3) | Cost of Capital % (4) | WACC (%) (5) = (3)×(4) |
|---|---|---|---|---|
| Equity Capital | 80,00,000 | 0.4 | 18.125 | 7.25 |
| Preference Capital | 20,00,000 | 0.1 | 7.5 | 0.75 |
| Debentures | 60,00,000 | 0.3 | 7 | 2.10 |
| Retained Earnings | 40,00,000 | 0.2 | 14.5 | 2.90 |
| | 2,00,00,000 | 1.00 | | 13.00 |

Hence, WACC on the basis of Book Value Weights = 13.00%

**(III) Computation of Weighted Average Cost of Capital (on the basis of market Value Weights)**

| Source (1) | Amount (₹) (2) | Weights (3) | Cost of Capital % (4) | WACC (%) (5)=(3)×(4) |
|---|---|---|---|---|
| Equity Capital | 1,06,66,667 | 0.4267 | 18.125 | 7.73 |
| Preference Capital | 24,00,000 | 0.0960 | 7.5 | 0.72 |
| Debentures | 66,00,000 | 0.2640 | 7 | 1.85 |
| Retained Earnings | 53,33,333 | 0.2133 | 14.5 | 3.09 |
| | 2,50,00,000 | 1.0000 | | 13.39 |

Hence, WACC on the basis of Market Value Weights = 13.39%.

**5. (c) The ZEB Ltd. needs ₹ 5,00,000 for construction of a new plant. The following three financial plans are feasible:**

**(I) The company may issue 50,000 equity shares at ₹ 10 per share.**

**(II) The company may issue 25,000 equity shares at ₹ 10 per share and 2,500 debentures of ₹ 100 denomination bearing 8% rate of interest.**

**(III) The company may issue 25,000 equity shares at ₹ 10 per share and 2,500 preference shares at ₹ 100 per share bearing 8% rate of dividend.**

**If the company's earnings before interest and taxes are ₹ 10,000, ₹ 20,000, ₹ 40,000, ₹ 60,000 and ₹ 1,00,000, what are the earnings per share under each of the three financial plans? Which alternative would you recommend and why? Assume corporate tax rate to be 50%. [10]**

**Answer:**

**(I) Statement Showing Computation of EPS (When only Equity Shares are issued)**

**Amount in (₹)**

| Particulars | I | II | III | IV | V |
|---|---|---|---|---|---|
| EBIT | 10,000 | 20,000 | 40,000 | 60,000 | 1,00,000 |
| Less: Interest | --- | --- | --- | --- | --- |
| EBT | 10,000 | 20,000 | 40,000 | 60,000 | 1,00,000 |
| Less: Tax @ 50% | (5,000) | (10,000) | (20,000) | (30,000) | (50,000) |
| EAT = EAE | 5,000 | 10,000 | 20,000 | 30,000 | 50,000 |
| No. of Equity Shares | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| EPS | 0.10 | 0.20 | 0.40 | 0.60 | 1.0 |

**(ii) Statement Showing Computation of EPS (When both Equity & Debentures are issued)**

**Amount in (₹)**

| Particulars | I | II | III | IV | V |
|---|---|---|---|---|---|
| EBIT | 10,000 | 20,000 | 40,000 | 60,000 | 1,00,000 |
| Less: Interest | (20,000) | (20,000) | (20,000) | (20,000) | (20,000) |
| EBT | (10,000) | 0 | 20,000 | 40,000 | 80,000 |
| Less: Tax @ 50% | --- | 0 | (10,000) | (20,000) | (40,000) |
| Add: Tax savings 50% | 5,000 | --- | --- | --- | --- |
| EAT = EAE | (5,000) | 0 | 10,000 | 20,000 | 40,000 |
| No. of Equity Shares | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| EPS | (0.2) | 0 | 0.40 | 0.80 | 1.60 |

**(iii) Statement Showing Computation of EPS (When both Equity and preference shares are issued)**

**Amount in (₹)**

| Particulars | I | II | III | IV | V |
|---|---|---|---|---|---|
| EBIT = EBT | 10,000 | 20,000 | 40,000 | 60,000 | 1,00,000 |
| Less: Tax @ 50% | (5,000) | (10,000) | (20,000) | (30,000) | (50,000) |
| EAT | 5,000 | 10,000 | 20,000 | 30,000 | 50,000 |
| Less: Preference Dividend | (20,000) | (20,000) | (20,000) | (20,000) | (20,000) |
| EAE | (15,000) | (10,000) | --- | 10,000 | 30,000 |
| No. of Equity Shares | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| EPS | (0.60) | (0.40) | 0 | 0.40 | 1.20 |

**Advise:** If the expected EBIT is ₹ 10,000 or ₹ 20,000 than plan I is best. If the expected EBIT is ₹ 40,000 than either of plan I or plan II can be chosen. And if the expected EBIT is ₹ 60,000 or ₹ 1,00,000 plan II is the best.