FINAL EXAMINATION
GROUP III
(SYLLABUS 2012)

SUGGESTED ANSWERS TO QUESTIONS
JUNE 2014

Paper- 14: ADVANCED FINANCIAL MANAGEMENT

Time Allowed: 3 Hours   Full Marks : 100

The figures in the margin on the right side indicate full marks.
Answer Question No. 1 which is compulsory.
From Section A: Answer any two questions.
From Section B: Answer any one question.
From Section C: Answer any one question.
From Section D: Answer any one question.

1. Answer all questions:

    (a) A mutual Fund had a Net Asset Value (NAV) of ₹72 at the beginning of the year. During the year, a sum of ₹6 was distributed as Dividend besides ₹ 4 as Capital Gain distributions. At the end of the year, NAV was ₹ 84.
    Calculate total return for the year.   **3**

    (b) What is meant by "Hard" and "Soft" infrastructure? Explain them in brief.   **3**

    (c)   (i) List down any two uses for SWAPS.   **3**
            (ii)A Call Option at a strike price of ₹ 280 is selling at a premium of ₹23. At what share price on maturity will it break-even for the buyer of the option?
            Will the writer of the option also break-even at the same price?   **2**

    (d) A firm has an equity beta of 1.5 and is currently financed by 20% debt and 80% equity.
    What will be the company's equity beta if the company changes its financing policy to 40 : 60 ratio of debt and equity respectively? Corporation tax rate is 34%.   **2**

    (e) The following two types of securities are available in the market for investment:

Security	Return %	Standard Deviation%
Gilt-edge Security	7	0
Equity	25	30

    Using the above two securities, if you are planning to invest ₹1,00,000 to construct a portfolio with a standard deviation of 24%, what is the return of such portfolio?   **2**

(f) A new project under consideration requires a capital outlay of ₹600 lakhs. The required fund can be raised either fully by Equity Shares of ₹100 each, or by Equity Shares of the value of ₹400 lakhs and by loan of ₹ 200 lakhs at 15% interest.

Assume tax rate of 40%.
Calculate the Profit before tax that would keep the Equity investors indifferent to two options. **2**

(g) MEGATRON LTD. paid a dividend of ₹2.60 during the last year and the growth rate in the dividends is expected to be 8%. The current market price of the stock is ₹30.00. The beta of the stock is 1.60 and the return on the market index is 13%. If the risk-free rate of return is 8%, by how much should the price of the stock be raised in percentage terms so that it is at equilibrium? **3**

Answer:

1. (a) Capital Appreciation = Closing NAV- Opening NAV = 84- 72 = ₹12.
   Return = [Cash Dividend +Capital Gain + Capital Appreciation] /Opening NAV
        =[6+4+12]/72 = 22/72 = 0.3056 = 30.56%.

(b) **"Hard"** infrastructure refers to the large physical networks necessary for the functioning of modern industrial nation.
   "Soft" infrastructure refers to all the institutions which are required to maintain the economic, health and cultural and social standards of a country, such as the financial system, the education system, the health care system, the system of government and law enforcement as well as emergency services.

(c) (i) **Interest rate swaps**, an essential tool for many types of investors, as well as corporate treasurers, risk managers and banks, have potential uses.
   These are:
   • Portfolio management: These swaps allow portfolio managers to add or subtract duration, adjust interest rate exposure and offset the risks posed by interest rate volatility. By increasing or decreasing interest rate exposure in various parts of the yield curve using swaps, managers can either ramp-up or neutralize their exposure to changes in the shape of the curve, and can also express views on credit spreads. Swaps can also act as substitutes for other, less liquid fixed income instruments.
   • Speculation: Because swaps require little capital up-front, they give fixed income traders a way to speculate on movements in interest rates while potentially avoiding the cost of long and short positions in Treasuries.
   • Corporate finance: Firms with floating rate liabilities, such loans linked to LIBOR, can enter into swaps where they pay fixed and receive floating, as noted earlier. Companies might also set up swaps to pay floating and receive fixed as a hedge against falling interest rates, or if floating rates more closely match their assets or income stream.
   • Risk management: Banks and other financial institutions are involved in a huge number of transactions involving loans, derivatives, contracts and other instruments. The bulk of fixed and floating interest rate exposure typically cancel each other out, but any remaining interest rate risk can be offset with interest rate swaps.
   • Rate-locks on bond issuance: When corporations decide to issue fixed rate bonds, they usually lock in the current interest rate by entering into swap contracts. That gives them time to go out and find investors for the bonds. Once they actually sell the bonds, they exit the swap contracts. If rates have gone up since the decisions to sell the bonds, the swap contracts would be worth more,

offsetting the increased financing cost.

(ii) To recover Call Option Premium of ₹ 23, the share price on the date of expiration should rise to [₹ 23 + ₹ 280] = ₹ 303.
The buyer of the Call Option would be at break-even if the share price (S_1) ends up at ₹ 303.
The Option writer shall also break-even at ₹ 303. This price is equal to ₹ 280 exercise price received from the buyer plus ₹ 23 Option Premium already received up front.

(d) When Debt- Equity ratio is 20 : 80
Asset Beta = Weighted Average Beta of Equity + Weighted Average Beta of Debt
β_A = [(β_E × Equity)/{Equity + Debt(1 – Tax)}] + [{β_D × Debt(1 – Tax)}/ {Equity + Debt(1 – Tax)}]
Here, $\beta_D = 0$
Hence, β_A = [(1.5 × 0.80)/{0.80 + 0.20 × (1- 0.34)}] +[{0 ×0.20 ×(1- 0.34)} / {0.80 + 0.20 ×(1- 0.34)}]
= [1.2/0.932] + 0 = 1.28755

When Debt- Equity Ratio is 40 : 60
Firm's Beta = [(β_E × Equity)/{Equity + Debt(1 – Tax)}] + [{β_D × Debt (1 – Tax)} /{Equity + Debt(1 – Tax)}] and $\beta_D = 0$.
So, 1.28755 = [(β_E × 0.60)/{0.60+0.40 × (1- 0.34)}] + 0
Or, β_E = [(1.28755 × 0.864)/0.60] + 0 = [1.1124432/0.60] = 1.8540572 = 1.854.

(e) We have the formula: $\sigma_P{}^2 = w^2{}_1\sigma_1{}^2 + w^2{}_2\sigma_2{}^2 + 2w^2{}_1 w^2{}_2\sigma_1\sigma_2$
Since, Standard Deviation of Gilt-edged security is 0 and its co-relation with the Equity is also 0.

The formula will reduce to: $\sigma_P{}^2 = w^2{}_2\sigma_2{}^2$; or, $\sigma_P = w_2\sigma_2$; or, 24% = $w_2 \times 30\%$;
Or, $w_2 = 24\%/30\% = 0.24/0.30 = 0.8$.

We also know, Return of portfolio [R_P] = $W_1R_1 + W_2R_2 = (1 – W_2) R_1 + W_2R_2$
=(1 – 0.8) × 7% + 0.8 × 25% = (0.2 × 0.07) + (0.8 × 0.25) = 0.214
Therefore, return in Rupees = 1,00,000 × 0.214 = ₹21,400.

(f) Proposal 1 : 6 lakh Equity shares of ₹100 each
Proposal 2 : 4 lakh Equity shares of ₹100 each and ₹200 lakhs Debt at 15%

At Indifference point:

[{EBIT × (1 – T)} / No. of Equity shares] = [{(EBIT – Interest) × (1 – T)}/ No. Equity shares]
Or, [{EBIT × (1 – 0.40)}/6 lakhs Shares] = [{(EBIT – 15% on ₹200 lakhs) × (1 – 0.40)}/4 lakhs Shares]
Or, [0.6 EBIT/6] = [{(EBIT – ₹30 lakhs) × 0.6}/4]
Or, [0.6 EBIT/6] = [(0.6 EBIT – 18)/4]; or, 1.2 EBIT = [1.8 EBIT – 54]
Or, EBIT = ₹90 lakhs. (which is profit before tax)

(g) Required rate of return: $R_F + \beta (R_M – R_F)$ = 8% + 1.6 × (13% - 8%) = 8% + 8% = 16%
Expected Rate of Return: [{D_0 (1 + g)/P_0} + g] = [{2.60 × (1+0.08)/30} + 0.08%
= [2.808/30] + 0.08 = 0.0936 + 0.08 = 0.1736 = 17.36%

At equilibrium, required rate of Return is equal to the Expected rate of return.
Thus, 0.16 = [{2.60 × (1 – 0.08)} /P_0] + 0.08;
Or, 0.16 = [2.808/P_0] + 0.08;   Or, [0.16 – 0.08] = [2.808/P_0];
Or, P_0 = 2.808/0.08 = ₹35.10

Hence , the price should be increased by = [35.10 - 30.00] = ₹5.10 or [5.10/30.00]×100 = 17% so that it is at equilibrium.

Section A
(Answer any two of the following)

2. **(a)** Following information is available regarding six portfolios:

Portfolio	Average annual return	Standard Deviation	Correlation with market
A	22.0	21.2	0.70
B	18.6	26.0	0.80
C	14.8	18.0	0.62
D	15.1	8.0	0.95
E	26.5	19.3	0.65
F	(-) 9.0	4.0	0.42
Market Risk	12.0	12.0	
Free Rate	9.0		

You are required to:

   (i) Rank these portfolios using Sharpe's method and Treynor's method; and
   (ii) Compare the ranking and explain the reasons behind the differences.

(b) Compare and contrast Commodity markets and Equity markets. **[(6+2)+4=12]**

Answer:

2. **(a)** (i)

Portfolio	Sharpe's Method $[(R_p - R_f) \div \sigma_p]$	Ranking	$\beta = P_{sm} \times (\sigma_s / \sigma_m)$	Treynor Method $[(R_p - R_f) \div \beta_p]$	Ranking
A	[(22-9)/21.2]=0.6132	3	0.70 x 21.2/12=1.237	[(22-9)/1.237]=10.509	2
B	[(18.6-9)/26]=0.3692	4	0.80 x 26/12=1.733	[(18.6-9)/1.733]=5.540	5
C	[(14.8-9)/18]=0.3222	5	0.62 x 18/12=0.930	[(14.8-9)/0.93]=6.237	4
D	[(15.1-9)/8]=0.7625	2	0.95 x 8/12=0.633	[(15.1-9)/0.633]=9.632	3
E	[(26.5-9)/19.3]=0.9067	1	0.65 x 19.3/12=1.045	[(26.5-9)/1.045]=16.746	1
F	[(-9-9)/4]=(-)4.5	6	0.42 x 4/12=0.140	(-9-9)/0.14=(-)128.571	6

   (ii) Comparison and Reasons for difference:

   • Sharpe index considers only the standard deviation and leaves market standard deviation and the correlation, whereas Treynor considers market standard deviation and correlation.
   • Greater correlation result in greater value of Beta. This would reduce the points in Treynor.
   • Owing to correlation effect, the portfolios B & D which ranked 4 and 2 in Sharpe are pushed to positions backwards in Treynor; and similarly, the portfolios A & C are to positions upwards in Treynor.

   (b) Comparison: Commodity vs. Equity Market:

Factors	Commodity markets	Equity markets

1.Percentage Returns	1. Gold gives 10 to 15 % returns on the conservative basis.	1. Returns in the range of 15 to 20 % on an annual basis.
2.Initial margins	2. Lower in the range of 4 - 5 - 6 %	2. Higher in the range of 25 to 40 %
3.Arbitrage Opportunities	3. Exists on 1 to 2 months contracts. There is a small difference in prices, but in case of commodities which are in large tonnage makes a huge difference.	3. Significant arbitrage opportunities exist.
4.Price Movements	3. Purely based on the supply and demand.	4. Based on the expectation of future performance.
5.Price Changes	5. On account of policy changes and changes in tariff and duties	5. On account of Corporate actions, Dividend announcements, Bonus shares, Stock splits, etc.
6.Future Predictability	6. Predictability of future prices is not in the control due to factors like failure of Monsoon and formation of El-ninos at Pacific.	6.Predictability of future performance is reasonably high, which is supplemented by the history of management performance.
7.Volatility	7. Lower volatility.	7. Higher volatility.
8.Securities Transaction Act (STA) Application	8.STA is not applicable to commodity futures trading.	8. STA is applicable to equity markets trading.

3. **Bright Mutual Fund sponsored an open-ended equity oriented scheme "Kautilya Opportunity Fund". There were two plans, viz. 'X'- Dividend Reinvestment Plan and 'Y' - Bonus Plan.**

At the time of Initial Public Offer on 01.04.2003, Mr. Ram and Mr. Hari invested ₹1,00,000 each and had chosen 'X' and 'Y' Plan respectively.
The history of the Fund is as follows:

Date	Dividend %	Bonus Ratio	Net Assets Value per unit (Face value ₹10)	
			Plan X	Plan Y
28.07.2007	20		30.70	31.40
31.03.2008	70	5:4	58.42	31.05
31.10.2011	40		42.18	25.02
15.03.2012	25		46.45	29.10
31.03.2012	-		42.18	20.05
24.03.2013	40	1:3	48.10	19.95
31.07.2013	-	1:4	53.75	22.98

On 31st July, both the investors redeemed all the balance units.
[Consider:

(1) Long-term Capital Gain is exempt from Income tax.
(2) Short-term Capital Gain is subject to 10% Income tax.
(3) Security Transaction Tax 0.2% only on sale/redemption of units.
(4) Ignore Education Cess.]

Required: Calculate Annual rate of return for each of the investors.   **[6+6 = 12]**

Answer:

3.

X- Dividend Reinvestment Plan – Mr. Ram

(a) Statement of Units, Value

Date	Dividend %	Investment	Rate	Units	Cum. Units	Value (₹)
(1)	(2)	(3) = Div X Cum. Units	(4)	(5)=(3)÷ (4)	(6)	(7) = (6) X ₹10
01.04.2003	Initial Offer	1,00,000	10.00	10,000.00	10,000.00	1,00,000
28.07.2007	0.20	20,000 [2x10,000]	30.70	651.47	10,651.47	1,06,515
31.03.2008	0.70	74,560 [7X10,651.47]	58.42	1,276.28	11,927.75	1,19,278
30.10.2011	0.40	47,711 [4x11,927.75]	42.18	1,131.13	13,058.88	1,30,589
15.03.2012	0.25	32,647 [2.5X13,058.88]	46.45	702.85	13,761.73	1,37,617
24.03.2013	0.40	55,047 [4x13,761.73]	48.10	1,144.43	14,906.16	1,49,062
31.07.2013	-	-	53.75		14,906.16	1,49,062

(b) Return on Investment

Particulars	₹
Redemption value 14,906.16 X 53.75	8,01,206.10
Less: Short term capital gain tax @ 10% =1,144.43 units (53.75-48.10) X 10%	646.00
	8,00,560.10
Less: Securities Transaction Tax @ 0.2% [0.2% X 8,01,206.10]	1,602.41
Redemption Value net of Taxes	7,98,957.69
Less: Investment	1,00,000.00
Net Return from Investment	6,98,957.69
Period of Investment [1/4/03 to 31/07/13] in months	124
Annual Average Return $$= \frac{[\text{Net Return} \times 12 \text{months} \times 100]}{\text{Purchase Price} \times \text{Period of Investment (months)}}$$ $$= \frac{[6,98,957.69 \times 12 \times 100]}{1,00,000 \times 124}$$	67.64%

- Short Term Capital Gains is only in respect of Investment made in 24/03/2013 where the period of holding is less than 1 year.

- Securities Transaction Tax is not to be considered for computation of Short term Capital Gains and hence deducted from the net amount to ascertain the Cash Flows.

Y - Bonus Plan - Mr. Hari

(a) Statement of Units, Bonus and Value per unit

Date	Bonus Ratio	Units	Cum. Units	NAV per unit
(1)	(2)	(3)	(4)	(5)
01.04.2003	Initial Issue	10,000	10,000	10
31.03.2008	5:4	12,500 [10,000 x 5 ÷ 4]	22,500	31.05
31.03.2012	1:3	7,500 [22,500 x 1 ÷ 3]	30,000	20.05
24.03.2013	1:4	7,500 [30,000 x 1 ÷ 4]	37,500	19.95

(b) Return on Investment

Particulars	₹
Redemption value 37,500 X 22.98	8,61,750.00
Less: Short term capital gain tax @ 10% = 7,500 X (22.98 - 0) X 10% (See Note (a) below)	17,235.00
	8,44,515.00
Less: Securities Transaction Tax @ 0.2%	1,723.50
Net of tax	8,42,791.50
Less: Investment	1,00,000.00
Net gain	7,42,791.50
Annual Average Return $$= \frac{[\text{Net Return} \times 12 \text{months} \times 100]}{\text{Purchase Price} \times \text{Period of Investment (months)}}$$ $$\frac{742791.50 \times 12 \times 100}{100000 \times 124}$$	71.88%

Note:
(i) For Income tax purposes, Cost of Acquisition of Bonus Shares is considered as NIL.
(ii) Short Term Capital Gains is only in respect of Bonus issued on 24/03/2013 as the period of holding is less than 1 year.

For calculating Short term capital gain for Y Bonus Plan – Cost of Acquisition of bonus Shares is considered as NIL.

4. (a) What are the pre-requisites for an efficient money market? What are its benefits?

(b) State and explain the key reasons for investment in Infrastructure in India.

[(4+2)+6=12]

Answer:

4. (a) Pre-requisites for an efficient money market are:

    (i)   Economic system: Institutional development, relative political stability and a reasonably well developed banking and financial system.

    (ii) Integrity: Transactions in money market are concluded over telephone followed by written confirmation from the contracting parties. Hence, integrity is a basic necessity. Thus, banks and other players in the market may have to be licensed and effectively supervised by the regulators.

    (iii) Short-term funds: The market should be able to provide an investment outlet for any temporarily surplus funds that may be available. Thus, there must be effective demand and supply of short-term monies the demand for which arises from short-term liquidity requirements and supply of which arises from idle cash available for temporary investment.

    (iv) Clearing mechanism: Efficient clearing and settlement systems. Electronic Fund Transfer (EFT), Depository System, Delivery versus payment, High value inter-bank payment system etc. are essential pre-requisites for ensuring a risk-free and transparent payment and settlement system.

    (v) Regulation: Government and Central Bank intervention to moderate liquidity profile.

    (vi) Apex body: An empowered Central Bank to ensure credibility in the system and to supervise the players in the market.

    (vii) Instruments: The market should have varied instruments with distinctive maturity and risk profiles to serve the needs of the players in the market. Multiple instruments add strength and depth to the market.

    (viii) Integration: Market should be integrated with the rest of the markets in the financial system to ensure perfect equilibrium. The funds should move from one segment of the market to another for exploiting arbitrage opportunities.

    Benefits of an efficient money market may be as follows:

- Provides a stable source of funds to Banks.
- Encourages development of non-bank entities.
- Facilitates Government market borrowing.
- Makes effective monetary policy actions.
- Helps in pricing different floating interest products.

(b) Key reasons for investment in Infrastructure in India are as follows:

- Infrastructure as the major growth driver: The booming Indian economy combined with the high population growth rate is creating tremendous pressure to modernize, sustain and accelerate investment in the country's infrastructure. This has become more prominent over the past few decades since the investment backing has exceeded billions.

- Private capital requirements: The basis of economic activity is infrastructure. India could have grown faster had the investment in infrastructure been commensurate with economic activity. Construction activity has a direct impact on output and all economic sectors benefit from comprehensive infrastructure.

- Immense regional disparities: Inter-state disparity in per capita income among Indian states has been rising over the last couple of decades. In addition, the inter-state disparities in economic and social infrastructure facilities too have remained at alarmingly high levels. Hence, investment in infrastructure is required in order to boost interstate level of development.

- Managing institutional risks: The big infrastructure opportunities are not without inherent risks like macro-economic risks associated with emerging markets like India, low degree of liquidity in markets and unsatisfactory transparency of market players and the market itself. Therefore, these risks need to be managed competently for Indian infrastructure to flourish.

Section B
(Answer any one of the following)

5. (a) What is 'Follow-on Public Offer (FPO)' with reference to Capital market?

   (b) Define 'Exchange Rate Risk'. How is 'Value-at-Risk' (VaR) method used by a firm for measuring the Exchange Rate Risk in management decisions?

   (c) How would you measure the potential loss amount due to Market Risk?

   (d) Identify and explain the factors on which the Options' prices commonly depend.
   [5 ×4=20]

Answer:

5.(a) Follow-on Public Offer (often but incorrectly called 'Secondary offering') is an offer of sale of securities by a listed company.

Follow-on offering can be either of two types (or a mixture of both): Dilutive and Non-dilutive. A secondary offering is an offering of securities by a shareholder of the company (as opposed to the company itself, which is a primary offering). Follow-on offering is preceded by release of prospectus similar to IPO.

In the case of Dilutive Offering, the company's Board of Directors agrees to increase the share float for the purpose of selling more equity in the company. This new inflow of cash might be used to pay off some debt or used for needed company expansion. When new shares are created and then sold by the company, the number of shares outstanding increases and this causes dilution of earnings on a per share basis. Usually the gain of cash inflow from the sale is strategic and is considered positive for the longer-term goals of the company and its shareholders. Some owners of the stock however may not view the event as favorably over a more short-term valuation horizon.

The Non-dilutive type of follow-on offering is when privately held shares are offered for sale by company directors or other insiders (such as Venture Capitalists) who may be looking to diversify their holdings. Because no new shares are created, the offer is not dilutive to existing shareholders, but the proceeds from the sale do not benefit the company in any way. Usually however, the increase in available shares allows more institutions to take non-trivial positions in the company. A non-dilutive offering is also called a secondary offering.
Follow-on Public offering is different from Initial Public Offering.

(b) Exchange Rate Risk:

A common definition of this of this term relates to the effect of unexpected exchange rate changes on the value of the firm. In particular, it is defined as the possible direct loss. (as a result of an un-hedged exposure) or indirect loss in the firm's cash flows,

assets and liabilities, net profit and, in turn, its stock market value from an exchange rate move.

At present, a widely used method is the value-at-risk (VaR) model. Broadly, value-at-risk is defined as the maximum loss for a given exposure over a given time horizon with z% confidence.

The VaR methodology can be used to measure a variety of types of risk, helping firms in their risk management. However, the VaR does not define what happens to the exposure for the (100 -Z) % point of confidence, i.e. the worst case scenario.
Since the VaR model does not define the maximum loss with 100% confidence, firms often set operational limits, such as nominal amounts or stop loss orders, in addition to VaR limits, to reach the highest possible coverage.

VaR calculation depends on three parameters: (i) The holding period. The typical holding period is 1 day. (ii) The confidence level at which the estimate is planned to be made. The usual confidence levels are 99% and 95%. (iii) The unit of currency to be used for the denomination of the VaR.

For a 99% confidence level, the VaR can calculated as: $VaR = (-) V_P (M_P + 2.33 S_P)$

Where, V_P is the initial value (in currency units) of the foreign exchange position ; M_P is the mean of the currency return on the firm's total foreign exchange position, which is a weighted average of the individual foreign exchange positions. S_P is the standard deviation of currency return on the firms total foreign exchange position, which is the weighted transformation of the variance-covariance matrix of individual foreign exchange position.

(c) Measuring the potential loss amount due to Market Risk : As with other forms of risk, the potential loss amount due to market risk may be measured in a number of ways. Traditionally, one method is to use Value-at-risk. For short-term risk management practice, use of VaR is well established.

However, it contains a number of limiting assumptions that constrain its accuracy. The first assumption is that the composition of the portfolio measured remains unchanged over the specified period. Over short-term horizons, this limiting assumption is often regarded as reasonable. However, over the longer term horizons, many of the positions in the portfolio may have been changed. The value-at-risk of the unchanged portfolio is no longer relevant.

The Variance - Covariance and Historical Simulation approach for calculating value-at-risk also assumes that historical correlations are stable and will not change in the future or breakdown under times of market stress.

In addition, care has to be taken regarding the intervening cash flow, embedded options, changes in floating interest rates of the financial positions in the portfolio. They cannot be ignored if their impact is large.

(d) Option price = intrinsic value + time value
Intrinsic value: The intrinsic value of an option is the difference between the actual price of the underlying security and the strike price of the option. The intrinsic value of an option reflects the effective financial advantage which would result from the immediate exercise of that option.

The time value: It is determined by the remaining lifespan of the option, the volatility

and the cost of refinancing the underlying asset (interest rates).

● Stock price - Consider a call option. If you want to own an option that gives you the right to buy stock. The higher the stock price the more a call option is worth. Similarly, the lower the stock price, the more a put option is worth.

● Strike Price – The price at which the call owner may buy, and the put owner may sell, stock. Thus, calls increase in value as the strike price moves lower. And puts increase in value as the strike price increases

● Type of option (there are only two types) – An option's value depends on whether it is a put or a call.

● Time before expiration arrives – The more time, the more an option is worth. As the option owner, you want the stock to undergo a favorable move. The more time, the greater the possibility of that favorable move occurring.

● Interest rates – This is a minor factor in the price of an option. As interest rates rise, call options increase in value. When investors buy calls instead of stock, they have extra cash (not used to buy stock) and that cash can earn interest. When rates are higher, they earn more interest, and thus, are willing to pay more to own call options.

● Dividends – When a stock goes ex-dividend (trades without the stockholder receiving that dividend), the stock price declines by the amount of that dividend. Thus, call are worth less, and puts are worth more, as the dividend increases.

● Volatility – Volatility is a measure of how much the stock prices varies from day to day. In other words, it's a measure of how much the stock price is likely to change over time. Volatile stocks undergo larger and more frequent price changes than non-volatile stocks. Because the option owner is hoping for a big price change, the value of an option on a volatile stock is much greater than the option on a less volatile stock. A small change in the volatility estimate can have a significant impact on the price of an option.

6. (a) **PQR LTD. is considering a project in U.S.A., which will involve an initial investment of US $ 1,40,00,000. The project will have 5 years of life. Current spot exchange rate is ₹60.30 per US $. The risk-free rate in USA is 7% and the same in India is 8%. Cash inflows from the project are as follows:**

Years	1	2	3	4	5
Cash inflows (US $)	18,00,000	24,00,000	30,00,000	50,00,000	60,00,000

Calculate the NPV of the Project using foreign currency approach. Required rate of return on the Project is 15%.
[Given: PV factors for 13.93% (for 5 Years) are 0.878, 0.770, 0.676, 0.594, 0.521]

(b) **A portfolio manager owns three stocks:**

Stock	Shares owned	Stock price (₹)	Beta
1	1 lakh	400	1.1
2	2 lakhs	300	1.2
3	3 lakhs	100	1.3

The spot Nifty Index Price is at ₹1350 and Futures price is ₹1352. Use stock Index Futures to:
(i) decrease the portfolio beta to 0.8; and
(ii) increase the portfolio beta to 1.5.

Assume the index factor is 100. Find out the number of contracts to be bought or sold of Stock Index Futures.

(c) Write short notes on any two of the following:
  (i) Forward Interest Rate Arrangement.
  (ii) Criticism of the Purchasing Power Parity (PPP) Theory
  (iii) Features of Global Depository Receipt (GDR).   **[5+5+(5+5) = 20]**

Answer:

6. (a) Computation of Discount rate:

Note: It is assumed that the required rate of return of 15% (Risk adjusted rate) is for rupee inflows.
[1 + Risk adjusted rate] = (1 + Risk-free rate) × (1 + Risk premium for the project)
So, [1 + 15 %] = (1 +8 %) × (1 + Risk premium);
Or, (1 + Risk premium) = [1.15 /1.08] ; Or, Risk premium = **6.48** %

Therefore, Risk adjusted discount rate for US dollar flows is:

[1 + Risk adjusted discount rate] = [1 + US $ Risk-free rate] × [1 + Project risk premium]
                                  = [1+ 7 %] x [1 + 6.48 %] = [1.07 x 1.0648] = 1.1393
So, Risk adjusted discount rate = [1.1393 - 1]   = 0.1393 = **13.93 %.**

(b) Computation of Existing Portfolio Beta:

Security	Market value of Security (₹ In Lakhs)		Proportion	Beta of the Security	Weighted Beta
1	1 × 400	= 400	4/13	1.1	4/13×1.1=0.34
2	2 ×300	=600	6/13	1.2	6/13×1.2 = 0.55
3	3 × 100	= 300	3/13	1.3	3/13×1.3 = 0.30
Total		1,300			1.19

Value per Futures Contract = Index Price per unit × Lot size per Futures contract
= ₹ 1,352×100 = ₹ 1,35,200.

(i)   Activity to reduce portfolio beta to **0.8** :

Object: Reduce portfolio beta ;   Activity : Sell Index Futures;
Beta of existing portfolio = β_E= 1.19;   Desired Beta of new portfolio = β_N = 0.8
Contract size = 100 units.   Value per Futures Contract in Nifty = V_F = ₹ 1,35,200.

Value of the portfolio = V_P = ₹ 1,300 lakhs.

No. of Futures Contract to be sold
= Portfolio Value × [Beta of the portfolio - Desired value of Beta] / Value of Futures contract
= V_P × [(β_E - β_N) / V_F] = ₹ 1,300 lakhs × [(1.19-0.80)/₹ 1,35,200]
= ₹ 1,300 lakhs × [(0.39)/ ₹ 1.352 lakhs] = 1,300 × 0.2884615 = 374. 998 = **375 Contracts.**

(ii)   Activity to increase portfolio beta to **1.5** :

Object: Increase portfolio beta;   Activity : Buy Index Futures.
Beta of existing portfolio = (β_E =1.19;   Desired beta of new portfolio = β_N = 1.5

No. of Futures Contract to be bought

= V_P × [(β_E - β_N)/ V_F] = ₹ 1300 lakhs × [(1.50 - 1.19) / ₹ 1,35,200]
= 1,300 lakhs ×[0.31 / ₹ 1.352 lakhs]
= 1,300 × 0.2292899 = 298.0769 = 298 Contracts.

Note: Alternative presentation [give before/remains same.

Computation of NET Present Value (NPV) :

Particulars	Year	PV factor for 13.93% [Given]	Cash flows [US $ in lacs]	Discounted Cash Flow [US $ in lacs]
Annual cash Inflows	1	0.878	18.00	15.80
	2	0.770	24.00	18.48
	3	0.676	30.00	20.28
	4	0.594	50.00	29.70
	5	0.521	60.00	31.26
Present value of cash flows				115.52
Less: Initial investment				(-) 140.00
Net Present Value (NPV)				(-) 24.48
NPV in ₹ Lacs				**(-) 1,476.14**

Calculation:

US $ 24.48 in Lacs × Spot rate ₹60.30 per US $ = **₹1,476.144 in lacs**.

(c) (i) Forward Interest Rate Arrangement: These are contracts entered into between two parties, whereby one party will pay/charge interest at a fixed rate on the amount borrowed / lent. Forward interest rate agreements will freeze today, for the interest payable / receivable on a loan or deposit to be made at a later point in time.

Example: On 01.06. 2014, A Ltd. enters into a Forward rate agreement with Mumbai Bank for borrowing loan of ₹ 1,000 crores at 10 % p.a. in September 2015.

This arrangement helps a borrower in eliminating risks associated with borrowing or investing funds. Adverse movements in the interest rates will not affect or alter the interest receipt or liability of the investor or borrower.

Forward interest rate arrangements can be entered into for -
I. an existing loan - for making interest payments at agreed rates from a future period; or
II. a prospective loan - to be taken at a later point in time.

From a given set of data on interest rates applicable for bonds with different maturity periods, one can compute Forward interest rates from interest rates on securities with different maturity periods. Forward rates are the rates of interest implied for a specific period in time in the future. These rates are implied from the prevailing interest rates for instruments with different maturity periods.

Mathematically, Forward Interest Rate = $[R_2 T_2 - R_1 T_1] / [T_2 - T_1]$; where R_2 = Rate of interest for the longer time period; R_1 = Rate of interest for the shorter time period; T_2 = Longer time period; and T_1 = Shorter time period.

(ii) Criticism of the Purchasing Power Parity (PPP) Theory - these are as follows:

- Limitations of the Price Index: PPP theory uses the price index in order to measure the changes in the equilibrium rate of exchange. However, price indices suffer from various limitations and thus theory too.

- Neglecting the demand and supply approach: PPPtheory fails to explain the demand for as well as the supply of foreign exchange. The theory proves to be unsatisfactory due to the negligence, because in actual practice the exchange rate is determined according to the market forces such as the demand for and supply of foreign currency.

- Unrealistic approach: Use of price indices is unrealistic in the sense that the quality of goods and services included in the indices differs from nation to nation. Thus, any comparison without due significance for the quality proves to be unrealistic.

- Unrealistic assumptions: Absence of the element of transport cost in the PPP theory. Theory wrongly assumes that there is an absence of any barriers to the international trade.

- Neglecting the impact of international capital flows: PPP theory neglects impact of international capital flows on the foreign exchange market.

- Contrast to the practical approach: PPP theory is in contrast to the practical approach, because rate of exchange between any two currencies based on the domestic price ratios is a very rare occurrence.

(iii) Features of Global Depository Receipts (GDRs); Most GDRs are denominated in US $, while a few are denominated in Euro and Pound Sterling. The Depository Receipts issued in the USA are called American Depository Receipts (ADRs), which anyway are denominated in US dollars and outside of USA, these are called GDRs. The mechanics of GDR issue may be described with the help of the following diagram:

Company issues ⟶► Ordinary shares

⬇

Kept with Custodian/ Depository banks

⬇

Against which GDRs are issued

⬇

to Foreign Investors
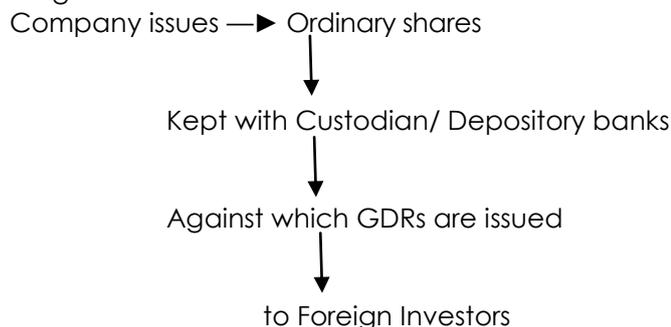
- Holders of GDRs participate in the economic benefits of being ordinary shareholders, though they do not have voting rights.
- GDRs are settled through CEDEL & Euro-clear international book entry systems.
- GDRs are listed on the Luxemburg stock exchange.
- Trading takes place between professional market makers on an OTC (over the counter) basis.
- The instruments are freely traded.

- GDRs are marketed globally without being confined to borders of any market or country as it can be traded in more than one currency.
- Investors earn fixed income by way of dividends which are paid in issuer currency converted into dollars by depository and paid to investors and hence, exchange risk is with investor.
- As far as the case of liquidation of GDRs is concerned, an investor may get the GDRs cancelled at any time after a cooling off period of 45 days. A non-resident holder of GDRs may ask the overseas bank (depository) to redeem (cancel) the GDRs In that case overseas depository bank shall request the domestic custodian bank to cancel the GDR and to get the corresponding underlying shares released in favour of non-resident investor. The price of the ordinary shares of the issuing company prevailing in the Bombay stock exchange or the National stock exchange on the date of the advice of redemption shall be taken as the cost of acquisition of the underlying ordinary share.

Alternative Answer:

Features of GDRs are:

- Underlying shares: Each GDR may represent one or more underlying shares, which are physically held by the custodians appointed by the Depository Bank.
- Entry in Company's books: In the Company's books, the Depository Bank's name appears as the holder of the shares.
- Returns: Depository gets the dividends from the Company (in local currency) and distributes them to the holders of the Depository Receipts after converting into dollars at the going rate of exchange.
- Negotiable: GDRs are exchangeable with the underlying share either at any time, or after the lapse of a particular period of time, generally 45 days.
- Globally marketed: GDRs are marketed globally without being confined to borders of any market or country as it can be traded in more than one country.
- Settlement: GDRs are settled through CEDEL & Euro-Clear International Book Entry Systems.

Section C
(Answer any one of the following)

7. **(a) Mr. QURESHI owns a portfolio with the following characteristics:**

	Security A	Security B	Risk-free Security
Factor 1 Sensitivity	0.80	1.50	0
Factor 2 Sensitivity	0.60	1.20	0
Expected Return	20%	25%	15%

It is assumed that security returns are generated by a two-factor model:
(i) If Mr. QURESHI has ₹ 1,00,000 to invest and sells short ₹50,000 of Security B and purchases ₹ 1,50,000 of Security A, what is the sensitivity of Mr. QURESHI portfolio of the two factors?
(ii) If Mr. QURESHI borrows ₹1,00,000 at the risk-free rate and invests the amount he borrows along with the original amount of ₹ 1,00,000 in Security A and B in the same proportion as described in part (i), what is the sensitivity of the portfolio to the two factors?
(iii) What is the expected return premium of Factor 2?

(b) What, according to you, are the weaknesses of Technical Analysis as applicable to stocks, indices, commodities, futures or any tradable instrument?

(c) Distinguish between Security Market Line and Capital Market Line, in relation to portfolio management. **[10+3+3=16]**

Answer:

7. **(a)** Sale of Security B and investment in Security A

Security	Portfolio Value (Weights)	Sensitivity (Factor 1)	Product (Factor 1)	Sensitivity (Factor 2)	Product (Factor 2)
A (Invested)	1,50,000	0.80	1,20,000	0.60	90,000
B (Sold)	(50,000)	1.50	(75,000)	1.20	(60,000)
Total	1,00,000		45,000		30,000

Portfolio Sensitivity (Product ÷ Weights) for:
(i) Factor 1 = 45,000 ÷ 1,00,000 = **0.45**
(ii) Factor 2 = 30,000 ÷ 1,00,000 = **0.30**

Borrowing at Risk Free Return, Investment in Security A and B

Security	Portfolio Value (Weights)	Sensitivity (Factor 1)	Product (Factor 1)	Sensitivity (Factor 2)	Product (Factor 2)
A (Invested)	3,00,000	0.80	2,40,000	0.60	1,80,000
B (Invested)	(1,00,000)	1.50	(1,50,000)	1.20	(1,20,000)
Risk free (sold)	(1,00,000)	0.00	Nil	0.00	Nil
Total	1,00,000		90,000		60,000

Portfolio Sensitivity (Product ÷ Weights) for:
(i) Factor 1 = 90,000 ÷ 1,00,000 = **0.90**
(ii) Factor 2 = 60,000 ÷ 1,00,000 = **0.60**

[It is assumed that Portfolio Sensitivity = Weighted Average Sensitivity of individual Security comprising the portfolio.]

(iii) Return Premium of Factor 2

Since the security returns are generated by a two factor model, it is assumed that the model is linear equation of two variables.

Where,

$$R_S = R_F + ß_{F1} (X) + ß_{F2} (Y)$$

Where, R_S = Return of the Security S
R_F = Risk free Return
$ß_{F1}$ = Factor 1 Sensitivity
$ß_{F2}$ = Factor 2 Sensitivity
X = Return Premium for Factor 1
Y = Return Premium for Factor 2

Therefore,

R_A = 20% = 15% + 0.8X + 0.6Y $\longrightarrow$ 0.8 X + 0.6 Y = 5
R_B = 25% = 15% + 1.5 X + 1.2 Y $\longrightarrow$ 1.5 X + 1.2 Y = 10

Expected premium for Factor 2 is to be determined, which corresponds to value of Y.

Substituting value for X in the second equation, we get —
Y= 0.625 ÷ 0.075 = 8.3333;

Therefore, Expected Return Premium for factor 2 is 8.33%

Alternative Answer:

(i) Mr. Qureshi's position in the two securities are + 1.50 in Security A and (-) 0.50 in Security B. Hence, the portfolio sensitivities to the two factors are —

Factor 1 = [1.50 × 0.80] + [(-) 0.50 × 1.50] = 1.2 + (-)0.75 = **0.45**
Factor 2 = [1.50 × 0.60] + [[(-)0.50 × 1.20] = 0.90 + (-)0.60 = **0.30.**

(ii) Mr. Qureshi's current position—
Security A: ₹3, 00,000 / ₹ 1,00,000 = 3
Security B: (-) ₹ 1,00,000 / ₹ 1,00,000 = (-) 1
Risk-Free Asset : (-) 1,00,000 / ₹ 1,00,000 = (-) 1
Factor 1 =[3.00 × 0.80] + [(-) 1×1.50] + [(-) 1 x 0] = 2.40 -1.50 = **0.90**
Factor 2 =[3.00 × 0.60] + [(-)1 × 1.20] + [(-)1 × 0] = 1.80 - 1.20 = **0.60.**

(iii) The portfolio created in part (ii) is a pure Factor 2 portfolio.
Expected Return on the Portfolio in part (ii) is :
R_P = [3 × 0.20] + [(-)1 x 0.25] + [(-)1 × 0.15] = 0.60 - 0.25 - 0.15 = 0.20 or 20 %
Therefore, Expected Return Premium = 20% - 15% = **5%.**

(b) Technical Analysis, as applicable to stocks, indices, commodities, futures or any tradable instrument, refers to the forecasting future financial price movements where the price is influenced by the forces of supply and demand. Its weaknesses may be summed up as follows:

(i) Analyst bias: It is subjective and our personal bias can reflect in the analysis. It is important to be aware of these biases when analysing a chart. If the analyst is a perpetual bull, then a bullish bias will overshadow the analysis. On the other hand, if the analyst is a disgruntled eternal bear, then the analysis will probably have a bearish tilt.

(ii) Different interpretation: Even though there are standards, many times two technicians will look at the same chart and point two different scenarios or see different patterns. Both will have to come up with logical support and resistance levels as well as key to justify their position. Technical analysis is more like an art than a science, somewhat like economics.

(iii) Too late: By the time trend is identified, a substantial portion of the move has already taken place. After such a large move, the reward to risk ratio is not great. Lateness is a particular criticism of Dow theory.

(iv) Always another level: Even after a new trend has been identified, there is always another 'important' level close at hand. Technicians have been accused of sitting on the fence and never taking an unqualified stance. Even if they are bullish, there is always some indicator or some level that will qualify their opinion.

(v) Trader's remorse: Not all technical signals and patterns work. For instance: A sell signal is given when the neckline of a head and shoulders pattern is broken. Even though this a rule, it is not steadfast and can be subjected to other factors such as volume and momentum.

(c) Security Market Line vs. Capital Market Line:

Aspect	Capital Market Line	Security Market Line

Risk considered	CML uses Standard Deviation, i.e. Total risk across the x-axis	SML uses Beta or Systematic risk across the X - axis, (i.e. that part of total risk which is common to the whole of market).
Nature of Portfolios	It uses only efficient portfolios, i.e. one which is a perfect replication of the Market Portfolio in terms of risks and rewards.	It uses both efficient and non-efficient portfolios.
Combination	Every point on the CML is a proportional combination between Risk-free rate of return and Market return.	It graphs all portfolios and securities which are on or off the CML.

Alternative Answer:
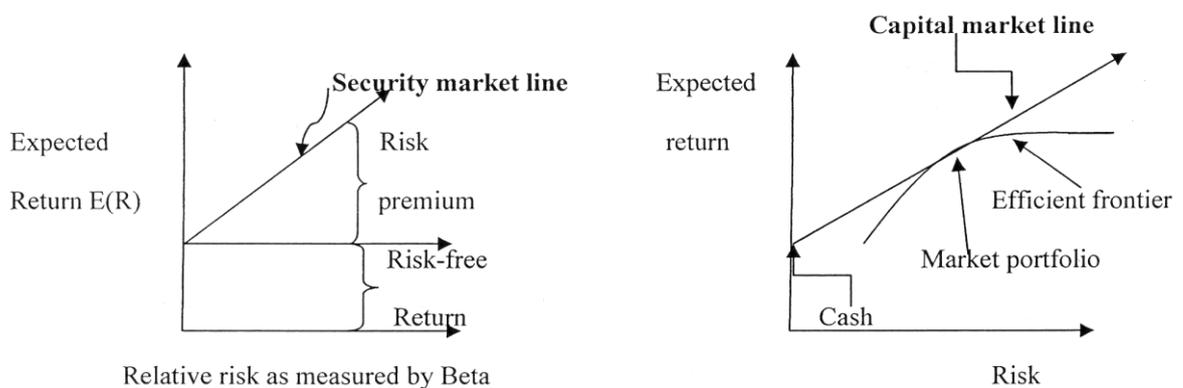
Security Market Line is a graphical representation of CAPM, which indicates the rate of return required to compensate at a given level of risk.

Capital Market Line is a straight line and valid for only portfolios having either market portfolio or market portfolio and risk-free rate investment. Risk is denoted by σ_m i.e. risk measurement of portfolio.

8. (a)The historical rates of return on the stock of SMOOTH-TECH LTD. and the Market return are given below:

Year	Smooth-tech Return %	Market Return %
2008	12	15
2009	9	13
2010	(-)11	14
2011	8	(-)9
2012	11	12
2013	4	9

You are required to:
 (i) Determine the Equation for the Characteristic line of the Stock of SMOOTH-TECH LTD., and
 (ii) Interpret the Slope and the intercept of the characteristic line.

(b) The total market value of the equity share of DHARAM CO. is ₹60,00,000 and the total value of the debt is ₹40,00,000. The treasurer estimates that the beta of the stocks is

currently 1.5 and that the expected risk premium on the market is 12 per cent. The treasury bill rate is 10 per cent.

Required:
(i) What is the beta of the company's existing portfolio of assets?
(ii) Estimate the company's cost of capital and the discount rate for an expansion of the company's present business.   **[(8+2)+(3+3)=16]**

Answer:

8. (a)(i)

Smooth-tech (Y)	Market (X)	XY	X^2
12	15	180	225
9	13	117	169
(-)11	14	(-) 154	196
8	(-) 9	(-) 72	81
11	12	132	144
4	9	36	81
$\sum$Y = 33	$\sum$X= 54	$\sum$XY= 239	$\sum$X^2 = 896

$\bar{Y} = 5.5;\ \bar{X} = 9.$

$\text{Beta} = [\sum XY - n\,\bar{X}\,\bar{Y}]/[\sum X^2 - n(\bar{X})^2] = [239 - 6(9)\,(5.5)]/[896 - 6(9)^2]$

$= [239 - 297]/[896 - 486] = (-)\ 58/410 = (-)\ 0.1415 = (-)\ 0.14$

$\alpha = \bar{Y} - \beta(\bar{X}) = 5.50 - [(-)\ 0.14 \times (9)] = 5.50 + 1.27 = 6.77$

Therefore, Equation **Y = 6.77 – 0.14 X**

Alternative Answer:

Computation of Beta of Stock:

Period	R$_M$	R$_S$	$D_M = (R_M - \overline{R_M})$	$D_S = (R_S - \overline{R_S})$	D$_M$^{2}	D$_S$^{2}	D$_M$ x D$_S$
2008	15	12	6	6.5	36	42.25	39
2009	13	9	4	3.5	16	12.25	14
2010	14	-11	5	-16.5	25	272.25	-82.5
2011	-9	8	-18	2.5	324	6.25	-45.0
2012	12	11	3	5.5	9	30.25	16.5
2013	9	4	0	-1.5	0	2.25	0
N=6	$\sum$R$_M$ = 54	$\sum$R$_S$ = 33			410	365.5	-58

	Market	Smooth-tech
Mean	$\overline{R_M} = \dfrac{\sum R_M}{N} = \dfrac{54}{6} = 9$	$\overline{R_S} = \dfrac{\sum R_S}{N} = \dfrac{33}{6} = 5.5$
Variance	$\sigma_M^2 = \dfrac{\sum D_M^2}{N} = \dfrac{410}{6} = 68.33$	$\sigma_S^2 = \dfrac{\sum D_S^2}{N} = \dfrac{365.5}{6} = 60.92$
S.D.	$\sigma_M = \sqrt{68.33} = 8.27$	$\sigma_S = \sqrt{60.92} = 7.81$

Covariance: Cov M, S = $\dfrac{\Sigma\left[D_M \times D_S\right]}{N} = \dfrac{-58}{6} = -9.67$

Correlation: $\rho_{MS} = \dfrac{Cov_{MS}}{\sigma_M \times \sigma_S} = \dfrac{-9.67}{8.27 \times 7.81} = \dfrac{-9.67}{64.59} = -0.15$

$\beta_S = \dfrac{Cov_{MS}}{\sigma_M^2} = \dfrac{-9.67}{68.33} = -0.1415$

Computation of Characteristic Line for Stock Smooth–tech (S):

Particulars	Value
$Y = \overline{R_S}$	5.5
β	- 0.1415
$X = \overline{R_M}$ (Expected Return on Market Index)	9

Characteristic line for stock Smooth –tech (S) = Y = α+ βx
5.5 = a + (- 0.1415) x 9
a = 5.5 + 1.27
a = 6.77

∴Characteristics line for Stock Smooth-tech (S) = 6.77 + (-0.14)R_M.
$$= 6.77 - 0.14\ R_M$$

(ii) Interpretation of the slop: If the return of market is increased by 1 , we predict the return on the stock of Smooth-tech will decrease by 0.14.

Interpretation of the intercept: If the return on the market is 0 (zero), then we predict the return on the stock of Smooth-tech is 6.77%.

(b) Total value of the company = Value of Debt + Value of Equity = D + E
= 40,00,000 + 60,00,000 = ₹ 1,00,00,000

Beta of Debt = β_D = 0 (zero), since the company's debt capital is risk-less.

Also, Tax = 0(zero), because of no information given.

β_A = [{β_E × Equity} + {β_D x Debt (1 - Tax)}] / [Equity + Debt × (1 - Tax)]
= [{1.5 × ₹ 60 lakhs} + {0 × ₹ 40 lakhs}] / [₹ 100 lakhs] = **0.9 + 0 = 0.9**

Estimation of Company's cost of capital:

Cost of capital = K_E = R_F + [β_A x Risk Premium] = 10 % + (0.9 × 12 %) = 10 + 10.8 = 20.8 Discount rate for an expansion of the company's present business: In case of expansion plan, 20.8 % can be used as discount factor.

In case of Diversification Plan, a different discount factor would be used depending upon its risk profile.

Section D

(Answer any one of the following)

9. (a) What is Risk Adjusted Discount Rate (RADR)? Explain its advantages and disadvantages.

(b) What are the major characteristic differences between Capital Asset Pricing Model (CAPM) and Behavioral Asset Pricing Model (BAPM)?

(c) A company is considering two mutually exclusive projects X and Y. Project X costs ₹3,00,000 and Project Y ₹3,60,000. You have been given below the NPV and probability distribution for each project:

Project X		Project Y	
NPV Estimate (₹)	Probability	NPV Estimate (₹)	Probability
30,000	0.1	30,000	0.2
60,000	0.4	60,000	0.3
1,20,000	0.4	1,20,000	0.3
1,50,000	0.1	1,50,000	0.2

Required:
  (i) Compute the expected Net Present Value (NPV) of Projects X and Y.
  (ii) Compute the risk attached to each project i.e. Standard Deviation of each probability distribution.
  (iii) Which Project do you consider more risky?
  (iv) Compute the Profitability Index of each Project.   [(2+3)+5+(4+2+2+2)=20]

Answer:

9. (a) Risk Adjusted Discount Rate (RADR) is similar to the NPV. It is defined as the present value of expected or mean value of future cash flow distributions discounted at a discount rate, k, which includes a risk premium for the riskiness of the cash flows from the project.

   RADR = Risk free rate + Risk premium.

   Advantages:
   (i) It is simple and can be easily understood;
   (ii) It has a great deal of intuitive appeal for risk-averse businessmen; and
   (iii) It incorporates an attitude towards uncertainty.

   Disadvantages:
   (i) There is no easy way of deriving a risk-adjusted discount rate;
   (ii) It does not make any risk adjusted in the numerator for the cash flows that are forecast over the future years; and
   (iii) It is based on the assumption that investors are risk-averse.

(b) CAPM vs. BAPM:

	Characteristics of CAPM	Characteristics of BAPM
Model premise	Presence of Markowitz-based information to traders who have specific mean-variance preferences and do not commit cognitive errors.	Market interaction informed traders and noise traders, who do not have mean-variance preferences and do commit cognitive errors.

Expected returns	Determined by standard betas; measures of systematic risk are determined with respect to the market portfolio.	Determined by behavioral betas, measures of risk with respect to the mean-variance- efficient portfolio. This portfolio differs from the Markowitz market portfolio and depends on the preferences of the noise traders (e.g. whether growth or value stocks are currently favoured).
Beta	Standard betas are difficult to determine because selecting an approximate proxy for the market portfolio is difficult.	Behavioral betas are difficult to determine because the preferences of the noise traders can change over time.
Supply and demand for stock	Determined by standard beta, which is utilitarian in nature	Determined by the behavioral beta, which is both utilitarian and value-expressive.

(c) (i) Project X:

NPV Estimate (₹)	Probability	NPV × Probability (₹)	Deviation from Expected NPV i.e. ₹ 90,000	Square of the Deviation (₹)	Square of the Deviation × Probability (₹)
30,000	0.1	3,000	(-) 60,000	36,00,000,000	3,60,000,000
60,000	0.4	24,000	(-) 30,000	9,00,000,000	3,60,000,000
1,20,000	0.4	48,000	30,000	9,00,000,000	3,60,000,000
1,50,000	0.1	15,000	60,000	36,00,000,000	3,60,000,000
Expected NPV		90,000			14,40,000,000

Project Y:

NPV Estimate (₹)	Probability	NPV × Probability (₹)	Deviation from Expected NPV i.e. ₹ 90,000	Square ofthe Deviation (₹)	Square ofthe Deviation × Probability (₹)
30,000	0.2	6,000	(-) 60,000	36,00,000,000	7,20,000,000
60,000	0.3	18,000	(-) 30,000	9,00,000,000	2,70,000,000
1,20,000	0.3	36,000	30,000	9,00,000,000	2,70,000,000
1,50,000	0.2	30,000	60,000	36,00,000,000	7,20,000,000
Expected NPV		90,000			19,80,000,000

(ii) The expected Net Present Value (NPV) of Projects X and Y is ₹ **90,000 each.**

Standard Deviation = $\sqrt{\text{Square of the Deviation} \times Pr\text{obability}}$

In case of Project X: Standard deviation = √(14,40,000,000) = ₹ 37,947
In case of Project Y: Standard deviation = √ (19,80,000,000) = ₹ 44,497

(iii) Co-efficient of variation = Standard deviation / Expected NPV
In case of Project X: Co-efficient of variation = ₹ 37,947 / ₹ 90,000 = **0.42**
In case of Project Y: Co-efficient of variation = ₹ 44,497 / ₹ 90,000 = **0.50**
Project Y is riskier since it has a higher Co-efficient of variation.

(iv) Profitability Index = (Discounted cash inflow/Discounted cash outflow)
In case of Project X: Profitability Index = (₹ 90,000 + ₹ 3,00,000)/₹ 3,00,000 = **1.30**
In case of Project Y: Profitability Index = (₹ 90,000 + ₹3,60,000)/₹ 3,60,000 = **1.25**

10. (a) An Indian exporter has sold handicraft items to an American business house. The exporter will be receiving US dollar 1 lakh in 90 days. Premium for a dollar put option with a strike price of ₹58.00 and a 90 days settlement is ₹ 1. The exporter anticipates the spot rate after days to be ₹56.50.

   (i) Should the exporter hedge its account receivable in the option market?
   (ii) If the exporter is anticipating a spot rate to be ₹57.50 or ₹58.50 after 90 days, how would it effect the exporter's decision?

(b) State and explain the characteristic features of Financial Lease and Operating Lease.

(c) Given below are the Market Value of Equity and their Unlevered Beta in respect of 4 SBUs of a company:

SBUs	Market Value of Equity (₹ in crore)	Unlevered Beta
A	100	1.00
B	100	1.10
C	150	1.50
D	150	2.00

The company has ₹ 50 crores of Outstanding Debt.
Required:
   (i) Estimate the Beta for the company as a whole. Is this Beta going to be equal to the Beta estimated by regressing past returns of the company against a market index? Give suitable reasons for your answer.
   (ii) If the Treasury Bond rate is 8%, estimate the cost of Equity of the company. Which cost of Equity would you use to value the SBU "D"? The average market risk premium is 7%. **[(2+3)+5+(7+3)=20]**

Answer:

10. (a)

Option	Put
Strike price	₹ 58 per US $
Premium	₹ 1 per US $
Settlement (expiration) rate	₹ 56.50

Benefit from Put Option = Max[(Strike rate - Expiration rate), 0] - Premium
   = Max[(₹ 58 per US $ - ₹ 56.50 per US $), 0] – ₹ 1 per US $
   = ₹(1.50 – ₹ 1) per US $ = ₹**0.50 per US $.**

As there is benefit in owning the Put, so the exporter should hedge using the Put Option. Here, if the exporter remains un-hedged, it will receive:

= [₹ 56.50 per US $ x US $ 1,00,000] = ₹ **56,50,000.**

But with hedging using Put Option, the exporter receives at the end of 90 days
= [(₹ 58 × US $ 1,00,000) - (₹ 1 × US $ 1,00,000)] = ₹**57,00,000.**

For Settlement price of ₹ 57.50 per US $, benefit from Put Option:

= Max[(₹ 58 per US $ - ₹ 57.50 per US $), 0] – ₹ 1 per US $ = (-) ₹0.50 per US $.

For Settlement price of ₹ 58.50 per US $, benefit from Put Option:

= Max[(₹ 58 per US $ - ₹ 58.50 per US $), 0] – ₹ 1 per US $
= 0 – ₹ 1 per US $
= (-) ₹ 1 per US S.

So, for anticipated price of ₹ 57.50 per US $ or ₹ 58.50 per US $, the exporter will not be hedging through a Put Option as he does not have positive benefit.

(b) Characteristic features of Financial Lease and Operating Lease:

Aspects	Financial Lease	Operating Lease
Lease term	Ranges from intermediate to long-term arrangement.	Significantly less than the economic life of the equipment.
Cancellation	During primary lease period, the lease cannot be cancelled.	It can be cancelled by the lessee prior to the expiration date.
Amortization of cost	The lease is more or less fully amortized during the primary lease period.	The lease rental is generally not sufficient to fully amortize the cost of the asset.
Maintenance & taxes	The costs of maintenance, taxes, insurance are to be incurred by the lessee, unless the contract provides otherwise.	The costs of maintenance, taxes and insurance are the responsibility of the lessor.
Risk of obsolescence	The lessee is required to take the risk of the obsolescence.	The lessee is protected against the risk of obsolescence.
Interest of the asset	The lessor is only the financier and is not interested in the assets.	Lessor has the option to recover the cost of asset from another party, on cancellation of the lease by leasing out the asset.

(c) Computation of Company Beta:

SBU	Market value (₹ in crores)	Weight	Unlevered Beta	Product Beta
A	100	0.20	1.00	0.20
B	100	0.20	1.10	0.22
C	150	0.30	1.50	0.45
D	150	0.30	2.00	0.60
Total	**500**	**1.00**		**1.47**

Beta measures the volatility of the company's stock returns against a broad-based market portfolio. In the above case, the beta is calculated for four SBUs and not a broad-based market portfolio. Hence, beta calculations will not be the same, as such.

Beta of the levered firm B(L) = Beta of Unlevered firm B(U) × [(Equity + Debt) / Equity]
= 1.47 × [(500+ 50) / 500] = **1.617**

Market Index relationship : This levered beta of 1.617 will be equal to the beta estimated by regressing returns on the company's stock against a market index. The reasons are as under:
- The beta of a security is a measure of return for the systematic risk of that security, relative to the market, i.e. its Systematic risk.

- A portfolio generally consists of a well-diversified set of securities.
- The systematic risk cannot be diversified away, and hence, the beta of a portfolio is the value-weighted beta of the securities constituting the portfolio.
- The beta of a portfolio depicts the systematic risk (i.e. Non-Diversifiable Risk) of the portfolio itself.

Cost of Equity for the company = [(Return of risk-free securities) + (Market Risk Premium × Beta)]

$$= 8\% + (7 \% \times 1.617)= 0.19319 = \textbf{19.32\%}$$

Cost of Equity for SBU "D" = 8 % + (7 % × 2.00) = 22 %.

For valuing the SBU "D", K_E of 22 % would be used.