

PAPER-14: ADVANCED FINANCIAL MANAGEMENT

Answer to PTP_Final_Syllabus 2012_June 2016_Set 1

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 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 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
	APPLICATION How you are expected to apply your knowledge	Illustrate	Use an example to describe or explain something
		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
	ANALYSIS How you are expected to analyse the detail of what you have learned	Solve	Find an answer to
		Tabulate	Arrange in a table
		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
	SYNTHESIS How you are expected to utilize the information gathered to reach an optimum conclusion by a process of reasoning	Prioritise	Place in order of priority or sequence for action
		Produce	Create or bring into existence
Discuss		Examine in detail by argument	
EVALUATION How you are expected to use your learning to evaluate, make decisions or recommendations	Interpret	Translate into intelligible or familiar terms	
	Decide	To solve or conclude	
	Advise	Counsel, inform or notify	
		Evaluate	Appraise or asses the value of
		Recommend	Propose a course of action

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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) Sec D: Describe the two possible situations of capital rationing. [2]

Answer (a):

- (i) Generally, Firms fix up maximum amount that can be invested in capital projects, during a given period of time, say a year. This budget ceiling imposed internally is called as Soft capital Rationing.
- (ii) There may be a market constraint on the amount of funds available for investment during a period. This inability to obtain funds from the market, due to external factors is called Hard capital rationing.

(b) RBI issued at 91 – day T – Bill at an yield of 6%. What is the Issue Price per ₹100? [2]

Answer (b):

$$\begin{aligned} \text{Let Issue Price} = SV. \text{ So, Yield } 6\% &= \frac{FV - SV}{SV} \times \frac{365 \text{ days}}{\text{Period in days}} \times 100 \\ &= \frac{100 - SV}{SV} \times \frac{365}{91} \times 100. \end{aligned}$$

On Solving , $SV = ₹98.53$

(c) You have ₹10,000 to investment in a stock portfolio. Your choices are Stock X with an expected return of 18% and Stock Y with an expected return of 11%. If your goal is to create a portfolio with an expected return of 16.5%, how much money will you invest in Stock X and in Stock Y? [2]

Answer (c):

We have $E_p = W_1E_1 + W_2E_2 + W_3E_3 + \dots + W_nE_n$

Let w_x & $1 - w_x$ be the ratio of investment in stock X and Stock Y

Therefore, $E [R_p] = 0.1650$ (Given) $= 0.18w_x + 0.11(1 - w_x)$; $w_x = 0.7857$

Thus, investment in X $= 0.7857 \times (\text{₹}10,000) = \text{₹}7,857$;

& investment in y $= (1 - 0.7857) \times (\text{₹}10,000) = \text{₹}2,143$

(d) You sold Hong Kong Dollar 1,00,00,000 value spot to your customer at ₹5.70 and covered yourself in London market on the same day, when the exchange rates were – US \$1 = HK \$ 7.5880 – 7.5920
Local Inter- Bank market rates for US \$ were – Spot US \$ = ₹42.70 – 42.85
Calculate Cover Rate. [2]

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Answer (d):

1. Computation of Buy rate for the Bank

Facts: The bank has sold HKD to its customer, therefore to cover itself, the bank would have bought HKD from London Market. Therefore, Bid rate is relevant rate for Banks opposite position is Ask Rate.

$$\begin{aligned}\text{₹/ HKD Ask Rate} &= \text{₹/US \$ [Ask Rate]} \times \text{US \$ /HK \$ [Ask Rate]} \\ \text{₹/ HKD Ask Rate} &= \text{₹/US \$ [Ask Rate]} \times 1 \div \text{HKD/US \$ [Ask Rate]} \\ \text{Therefore, ₹/HKD} &= ₹42.85/\text{US \$} \times 1 \div 7.5880 \\ &= \mathbf{₹5.6471 \text{ per HKD}}\end{aligned}$$

(e) State the trade credit.

[2]

Answer (e):

Trade credit refers to credit that a buyer firm gets from the suppliers of goods in the normal course of its operations. It is a dominant part of accounts payable. It appears as 'sundry creditors' on the Indian firms' balance sheet. Trade credit is a cheaper source of short term finance than the institutional agencies. It is because suppliers, having better information and control over buyer than the institutional agencies offer better terms in extending the trade credit.

(f) The October pepper future traded at 17.50, the October 18.00 call at 0.45 and the October 18.00 put at 0.58. Both are options on the October future. Find out whether any arbitrage opportunity exists. [2]

Answer (f):

$$\begin{aligned}\text{Cost of Future} &= ₹17.50 \\ \text{Cost of pepper} &= \text{Present value of Exercise Price} + \text{Value of call} - \text{Value of Put} \\ &= ₹0.45 - 0.58 + 18 = ₹17.87\end{aligned}$$

Conclusion: Since there is difference between Spot Price and Futures Price, Arbitrage opportunity exists.

(g) Calculate the NAV of Great Fund from the following data:

Size of the fund ₹200 Crores, Face Value ₹10/- per unit, Market Value of Investments ₹280 Crores Receivables ₹2 Crores, Accrued Income ₹2 Crores, Liabilities ₹1 Crores, Accrued Expenses ₹1 crore. [2]

Answer (g):

$$\text{NAV} = \frac{\text{Market Value of Investments} + \text{Receivables} + \text{Accrued Income} - \text{Liabilities} - \text{Accrued Expenses}}{\text{Number of units outstanding}}$$

$$= \frac{280 + 2 + 2 - 1 - 1}{200 / 10} = ₹14.10 \text{ per unit}$$

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(h) Explain Basis Risk. [2]

Answer to (h):

It is the risk to a hedger arising from uncertainty about the basis at a future time, i. e. the basis existing on the date of expiry. This can arise when the asset hedged and the asset underlying futures contracts are not the same (cross – hedge scenario).

(i) State the Accounting or Average rate of Return Method (ARR). [2]

Answer (i):

Average rate of Return Method (ARR): Accounting or average Rate of Return means the average annual yield on the project. In this method, profit After taxes (instead of CFAT) is used for evaluation.

$$ARR = \frac{\text{Average PAT p.a}}{\text{Net Initial Investment}}$$

$$\text{where, Average PAT p.a.} = \frac{\text{Total PAT during Project Life}}{\text{Number of Years}}$$

and Net Initial Investment = Initial Investment **less** Salvage value.

(j) Calculate expected return of a stock which returns 14% during worse times, 18% during times and 26% during good times, if the respective chances of worse, bad and good times are 20%, 35% and 45% respectively. [2]

Answer (j):

$$\begin{aligned} E[R_p] &= 0.20(0.14) + 0.35(0.18) + 0.45(0.26) \\ &= 0.2080 \text{ or } 20.8\% \end{aligned}$$

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

2. (a) Viswamitra Co. plans to issue CP of ₹1,00,000 at a price of ₹98,000. Compute Effective Interest Rate p.a. and Cost of Fund, if - (a) Maturity Period: 4 Months, (b) Expenses for Issue of CP are - (i) Brokerage - 0.10%, (ii) Rating Charges - 0.60% and (iii) Stamp Duty-0.15%.

[2+6]

Answer 2(a):

Approach I: Formula based Approach (assuming Issue Expenses on p. a. basis)

$$\begin{aligned} \text{(I) Effective Interest rate p. a.} &= \frac{FV-SV}{SV} \times \frac{12\text{months}}{\text{Period in mths}} \times 100 \\ &= \frac{1,00,000-98,000}{98,000} \times \frac{12\text{months}}{4\text{months}} \times 100 = \mathbf{6.12\%} \end{aligned}$$

(II) **Cost of Funds p. a.** = Interest 6.12% + Brokerage 0.10% + Rating charges 0.60% + Stamp Duty 0.15% = **6.97%**

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Approach II: Computation based on Effective Net Realisation, with two alternative assumptions

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Alternative 1: Brokerage, Rating Charges and Stamp Duty computed on **Issue Price (Value Exchanged)**

Alternative 2: Brokerage, Rating Charges and Stamp Duty computed on **Face Value (Value Redeemed)**

Particulars	Alt. 1	Alt. 2
A. Gross Proceeds (= Issue Price)	98,000	98,000
Brokerage (₹ 98,000 or ₹ 1,00,000, × 0.10%) × 4/12	33	33
Rating Charges (₹ 98,000 or ₹ 1,00,000, × 0.60%) × 4/12	196	200
Stamp Duty (₹ 98,000 or ₹ 1,00,000, × 0.15%) × 4/12	49	50
B. Total Issue Expenses	278	283
C. Net Proceeds (A - B)	97,722	97,717
D. Interest Expense = (Redemption ₹1,00,000 - Issue Price 98,000)	2,000	2,000
E. Total Cost of Funds (B + D)	2,278	2,283
F. Effective Cost of Funds p. a. $\frac{\text{Cost of Funds}}{\text{Net Proceeds}} \times \frac{12 \text{ Months}}{4 \text{ Months}}$	6.99%	7.01%

Note: In the above computation, it is assumed that the Issue Expenses pertain to 1 year. If these expenses are for 4 months, the computation of × 4/12 is not applicable.

2. (b) (i) You purchased 1000 units of the New Fund when the NAV was ₹20 per unit at the beginning of the year. You paid a front end load of 4%. The fund distributes a dividend of 12% during the year. The fund's expense ratio is 1.2%. What is your rate of return on the fund if you sell your shares at the end of the year? [3]

(b) (ii) List the features of 14 days Treasury Bills. [5]

Answer 2(b)(i):

NAV	= ₹20	
Purchase rate of Unit	= ₹20 × 1.04	= ₹20.80
Total purchase consideration	= ₹20,800	
Increase in value	= Nil	
Dividend	= 12% on ₹10,000	= ₹12,000 (assume FV = ₹10)
Expense	= 0.012 × 1,000 × 20	= ₹240
Rate of return	= 1,200 – 240/20,800	= 4.62%

(b) (ii):

14 Days T – Bills:

Investor: State Governments, Foreign, Central Banks and other Specialised Bodies with whom RBI has an, agreement are only allowed to invest in these TBs.

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Minimum Amount of Bid: Minimum Amount of ₹1,00,000 and in multiples of ₹ 1,00,000.

Form: Issued only in Book Entry Form.

Transfer: Not transferable.

Discount Rates: Discount Rates are set at quarterly intervals. The effective yield is equivalent to the interest rate on Ways and Means Advances chargeable to Central Government.

Re-discounted at 50 basis points higher than the Discount Rate. On re-discounting, the TBs are extinguished.

2. (c) (i) A mutual fund company offers a "safe" money market fund which provides a annualized return of 4.50%. The same company also offers an equity fund with an aggressive growth objective which historically has exhibited an expected return of 20%. and a standard deviation of 25%. What allocation should be placed in the money market fund if an investor desires an expected return of 15%? [3]

- (c) (ii) State Residuary Non- Banking Company (RNBC). Describe ceiling on raising of deposits by RNBC's. [2+3]

Answer 2(c)(i):

Let X represents the investment in the "safe" Money Market Fund and (1- X) represent the weight of investment in aggressive growth fund. Therefore we have:

$$X \times 0.045 + (1-X) \times 0.20 = 0.15$$

Solving we get,

$$X = \text{Investment in safe fund} = 32.26\%$$

Therefore, investment in aggressive fund = $1 - 0.3226 = 0.6774$ or 67.74%

(c)(ii):

Residuary Non-Banking Company is a class of NBFC which is a company and has as its principal business the receiving of deposits, under any scheme or arrangement or in any other manner and not being Investment, Asset Financing, Loan Company. These companies are required to maintain investments as per directions of RBI, in addition to liquid assets. The functioning of these companies is different from those of NBFCs in terms of method of mobilization of deposits and requirement of deployment of depositors' funds as per Directions. Besides, Prudential Norms Directions are applicable to these companies also.

Ceiling on raising of deposits by RNBCs:

It is true that there is no ceiling on raising of deposits by RNBCs but every RNBC has to ensure that the amounts deposited and investments made by the company are not less than the aggregate amount of liabilities to the depositors.

To secure the interest of depositor, such companies are required to invest in a portfolio comprising of highly liquid and secure instruments viz. Central/State Government securities, fixed deposits with scheduled commercial banks (SCB), Certificate of deposits of SCB/FIs, units of Mutual Funds, etc to the extent of 100 per cent of their deposit liability.

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2. (d) The following information is given to us:

Fund	σ	Average Return	Sharpe Ratio	Treynor Ratio
Portfolio ABC	18%	10%	0.222	6.67
Nifty Index	13%	12%	0.462	6.00
T-Bills	--	6%		

Compare and contrast the performance of portfolio ABC based on the above data and explain the conflict in result. [8]

Answer 2(d):

The Treynor measure assumes that the appropriate risk measure for a portfolio is its systematic risk, or beta.

Hence, the Treynor measure implicitly assumes that the portfolio being measured is fully diversified. The Sharpe measure is similar to the Treynor measure except that the excess return on a portfolio is divided by the standard deviation of the portfolio.

For perfectly diversified portfolios (that is, those without any unsystematic or specific risk), the Treynor and Sharpe measures would give consistent results relative to the market index because the total variance of the portfolio would be the same as its systematic variance (beta). Any difference between the two measures relative to the markets would come directly from a difference in diversification.

In particular, Portfolio X outperformed the market if measured by the Treynor measure but did not perform as well as the market using the Sharpe measure. We can therefore say that Portfolio X has a large amount of unsystematic risk. (Because it has high σ and low β in comparison to market.)

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

3. (a) Rivera furnishes the following information about four stocks in the derivative markets -

- I. Shares of Arpit Limited is sold in the spot market for ₹827. A 3-Month Call on the same is being traded at ₹100 with an exercise price of ₹ 930.
- II. Kanakadurga Refineries Ltd's shares are traded at ₹ 475. 3-Month call on KRL's shares are available for ₹ 50 with an exercise price of ₹ 490.
- III. A 3-Month call on RPL is sold for ₹15 for an exercise price of ₹ 120. The spot price is ₹ 100.

If Risk Free Interest Rate is 8%, ascertain the value of Put in all the above cases.

What will be Rivera's course of action if the actual price of Put is as follows?

- ❖ Arpit Limited: ₹180 or ₹ 190
- ❖ Kanakadurga Refineries: ₹52 or ₹60
- ❖ RPL: ₹ 30 or ₹ 35

[4+6]

Answer 3(a):

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1. Computation of value of put (Theoretical value)

Stock	Exercise Price	Price of Call	Present Value of EP	Spot Price	Value of Put
(1)	(2)	(3)	(4) = (2) × e ^{-0.25×8%}	(5)	(6) = (3) + (4) - (5)
Arpit	₹930	₹ 100	930 × 0.98 = ₹ 911.40	₹ 827	₹ 184.40
Kanakadurga	₹ 490	₹ 50	490 × 0.98 = ₹ 480.20	₹ 475	₹ 55.20
RPL	₹ 120	₹ 15	120 × 0.98 = ₹ 117.60	₹ 100	₹ 32.60

2. Evaluation of Put options

Stock	Theoretical Value	Actual Price	Position	Action
(1)	(2)	(3)	(4)	(5)
Arpit	₹ 184.40	₹ 180	Undervalued	Buy Put Option, Buy Stock in Spot Market Write Put Option. Sell Stock in Spot Market.
	₹ 184.40	₹ 190	Overvalued	
Kanakadurga	₹ 55.20	₹ 52	Undervalued	Buy Put Option, Buy Stock in Spot Market Write Put Option. Sell Stock in Spot Market.
	₹ 55.20	₹ 60	Overvalued	
RPL	₹ 32.60	₹ 30	Undervalued	Buy Put Option, Buy Stock in Spot Market Write Put Option. Sell Stock in Spot Market.
	₹ 32.60	₹ 35	Overvalued	

3. (b) (i) Your Forex Dealer had entered into a Cross Currency deal and had sold US \$10,00,000 against Euro at US \$ 1 = Euro 1.4400 for spot delivery. However, later during the day, the market became volatile and the dealer in compliance with his management's guidelines had to square up the position when the quotations were -

Spot US \$1	INR 31.4300/4500
1 Month Margin	25/20
2 Months Margin	45/35
Spot US \$ 1	Euro 1.4400/4450
1 Month Forward	1.4425/4490
2 Months Forward	1.4460/4530

What will be the Gain or Loss in the transaction? [6]

- (b) (ii) Highlight the role of Financial Intermediaries in Swap Arrangements. [4]

Answer 3(b)(i):

Since the dealer has sold USD in the spot market and is required to square off the transaction, he will buy USD, by selling EURO in the spot market.

1. Computation of Euros Available after Sale of USD 10,00,000

Particulars	Value
Original Sales Transaction Value	USD 10,00,000
Relevant Rate [Given]	1.4400
Euros Obtained [USD Sold × Euro per USD = 10,00,000 × 1.4400]	Euro 14,40,000

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Relevant Rate for Buying Back USD = Spot Ask Rate per USD	Euro 1.4450
For Buying USD 10,00,000 the EURO outflow	Euro 14,45,000
Net Loss on the Transaction	Euro 5,000

$$\begin{aligned} \text{Bid INR/EUR} &= \text{Bid USD / EUR} \times \text{Bid INR / USD} = (1 \div \text{Ask EUR/USD}) \times (\text{Bid INR / USD}) \\ &= 1 \div 1.4450 \times (31.4500) = ₹ 21.7647 \text{ per EUR} \end{aligned}$$

Therefore, the Total Loss in the Transaction = Euros 5000 × ₹ 21.647 = ₹ 1,08,235.

(b)(ii):

Swap Arrangements: Non-Financial Companies do not get in touch directly to arrange a swap. They each deal with a Financial Intermediary such a Bank or other Financial Institution.

Contracts: The Financial Institution has two separate contracts, one with either party. Generally, the parties to the Swap arrangement will not know that the Financial Institution has entered into an off-setting swap with the other beneficiary.

Risk of Default: If one of the beneficiaries Company defaults, the Financial Institution still has to honour its agreement with the other Company.

Compensation: Swaps are structured to ensure that the Financial Institution earns around 5% on a pair of off-setting transactions. The margin of 5 basis points is partly to compensate the Financial Institution for the risk that one of the two beneficiaries will default on the Swap Payments.

3 (c) A German firm buys a call on \$ 10,00,000 with a strike of DM 1.60 / \$. The interest opportunity cost is 6% p.a. and the maturity is 180 days.

- I. What is the break even maturity spot rate beyond which the firm makes a net gain?
- II. Suppose the 6 month Forward Rate at the time option was bought was DM 1.62 / \$. What is the range of maturity spot rate for which the option would prove to better than the forward cover? For what range of values would the forward cover be better? [4+6]

Answer 3(c):

I. Break Even Maturity Spot Rate beyond which the Firm makes a net gain –

Particulars	Amount
1. Value \$ 10,00,000 at Strike price = DM 1.60 / \$ × 10,00,000	DM 16,00,000
2. Amount of Premium Payable = 10,00,000 × 0.03	DM 30,000
3. Interest Opportunity cost @ 6% for 180 days on Premium (DM 30,000 × 6% × 6/12)	DM 900
4. Total Cash Outflow	DM 16,30,900
5. Break even Spot rate is the rate at which the Net Gain is Zero, (Total Outflow per Dollar = Spot Rate of DM/\$) i.e. DM 16,30,900 ÷ \$ 10,00,000	DM 1.6309 / \$

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II. Range of Values for Which Forward Cover is better –

1. Forward Rate for 6 month = DM 1.62 / \$.
2. If the maturity Spot Price is more than the Strike Price, then the cost is Strike Price + Option Premium with cost of funds.

Maturity spot rate	Cost under options	Cost under forward
1.5800	$1.6109 = 1.5800 + 0.0309$	1.62
1.5890	$1.6199 = 1.5890 + 0.0309$	1.62
1.5891	$1.6200 = 1.5891 + 0.0309$	1.62
1.5892	$1.6201 = 1.5892 + 0.0309$	1.62
1.5900	$1.6209 = 1.5900 + 0.0309$	1.62
1.6000	$1.6309 = 1.6000 + 0.0309$	1.62
1.6100	1.6309 (remain constant)	1.62
1.6200	1.6309(remain constant)	1.62

Conclusion: Hence the option proves to be beneficial so long as the maturity spot rate is less than 1.5891.

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

4. (a)

- I. If beta (β) is 1.50; R_f (risk-free returns) is 6.00%; and R_m (market return) is 12.00%, what should be the return on the share (R_j) with the beta as given above?
- II. If the alpha value is + 1.5, 1, 0 (zero), or -2.40, what would be the corresponding actual returns from the stock in (i)?
- III. What investment action would you suggest for each of the four different situations in (II). [2+4+2]

Answer 4. (a):

The given can be detailed as under:

- I. If beta (β) is 1.50; $R_f = 6.00\%$; and $R_m = 12.00\%$,
 $E(R_j)$ as per CAPM = $R_f + \beta(R_m - R_f) = 6 + 1.5 \times (12-6) = 15\%$
- II. Alpha = Actual return - Expected or Required return as per CAPM

Therefore, if Alpha = +1.5, since $E(R_j) = 15\%$, Actual return = 16.5%
if Alpha = +1.0, since $E(R_j) = 15\%$, Actual return = 16%
if Alpha = + 0, since $E(R_j) = 15\%$, Actual return = 15%
if Alpha = -2.4, since $E(R_j) = 15\%$, Actual return = 12.6%
- III. Whenever Alpha is positive we retain the stock and when it turns negative we sell the stock. And when it gives the desired return we are indifferent.

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4. (b) (i) Using the CAPM, show that the ratio of the risk premiums on two assets is equal to the ratio of their betas. [3]

(b) (ii) Mr. X owns a portfolio with the following characteristics:

	Security A	Security B	Risk free security
Factor 1 sensitivity	0.50	1.50	0
Factor 2 sensitivity	0.80	1.40	0
Expected Return	15%	20%	10%

It is assumed that security returns are generated by a two factor model.

- I. In what combination one should invest in A and B, that the overall portfolio is insensitive to changes in factor 2?
- II. In what combination one should invest in A, B and risk free asset so that the overall portfolio has a sensitivity of 1 to factor 1, and be insensitive to changes in factor 2? [2+3]

Answer 4(b)(i):

Let two stocks be A & B.

Risk Premium stock A $E[R_A] - R_f$

Risk Premium stock B $E[R_B] - R_f$

Now, under CAPM, Reward to Risk Ratio is same for all stocks.

Therefore, $(E[R_A] - R_f)/\beta_A = (E[R_B] - R_f)/\beta_B$

i. e. $RP_A/\beta_A = RP_B/\beta_B$;

i. e. $\beta_B/\beta_A = RP_B/RP_A$

4(b)(ii)

- I. For overall portfolio to be insensitive to changes in factor 2, we must have weighted average of risk factors equal to zero i.e. Invest W_A in security A and $(1 - W_A)$ in security B, such that $W_A \times 0.8 + (1 - W_A) \times 1.4 = 0$
i.e. $0.6 \times W_A = 1.4$
Therefore $W_A = 2.33$ and $W_B = -1.33$

- II. For overall portfolio to meet the required condition we must satisfy the following equations:

$$W_A \times 0.5 + W_B \times 1.5 = 1$$

$$W_A \times 0.8 + W_B \times 1.4 = 0$$

Solving gives us $W_A = -2.80$ and $W_B = 1.60$

However total investment weight = 1

i. e. $W_A + W_B + W_{Rf} = 1$

Therefore, $W_{Rf} = 2.2$

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4. (c) (i) P Ltd. has Standard Deviation of 20%. Q Ltd. has Standard Deviation of 28%. The correlation coefficient between the return of P Ltd. and Q Ltd. is 0.50. Suggest:
- Is investing in P Ltd better than investing in Q Ltd. purely in terms of total risk?
 - If you invest 30% in P Ltd. and 70% in Q Ltd. what is portfolio risk?
 - What happens to the portfolio risk if correlation is perfectly positive?
 - What happens to the portfolio risk if correlation is perfectly negative? [1+2+1+1]

(c) (ii) Stock A has a beta of 1.2. The expected return on the market is 12% and the risk-free rate is 3%.

- What is the expected return on stock A?
- How much of that return is compensation for risk? [1+2]

Answer 4(c)(i):

- Yes. P Ltd. Carries lower risk.
- The risk of this portfolio = $\sigma_p = \left[\sum_{j=1}^n x_i x_j \rho_{ij} \sigma_i \sigma_j \right]^{1/2}$
Substituting we have $\sigma_p = [(0.3)^2 \times (0.2)^2 + (0.7)^2 \times (0.28)^2 + 2 \times 0.3 \times 0.7 \times 0.5 \times 0.2 \times 0.28]^{1/2} = 23.19\%$
- If the correlation is perfectly positive the risk of the portfolio increases, as one stock does not provide a hedge for the other. It increases to 25.6%.
- If the correlation is perfectly negative the risk of the portfolio decreases, as one stock provide a hedge for the other. It decreases to 13.6%

(c) (ii):

- $E [R_d] = 0.03 + 1.2(0.12 - 0.03) = 0.138 = 13.8\%$
- The CAPM formula basically says that expected return on a security equals some risk free amount that compensates us purely for giving up our money for a year, even if we are assured of getting it back, plus some amount of compensation per unit of risk we take on, times the number of units of risk. Thus, the 3% risk free rate is the non- risk compensation and the 10.8% remaining is compensation for risk.

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

5. (a) The MN Company Limited has decided to increase its productive capacity to meet an anticipated increase in demand for its products. The extent of this increase in capacity is still to be determined and a management meeting has called to decide which of the following two mutually exclusive proposals - I and II should be undertaken.

On the basis of the information given below you are required to:

- evaluate the profitability (ignoring taxation) of each of the proposals and
- on the assumption of a cost of capital of 8% advise the management of the matters to be taken into consideration when deciding between Proposal I and Proposal II.

Answer to PTP_Final_Syllabus 2012_June 2016_Set 1

Capital Expenditure	I (₹)	II (₹)
Building	50,000	1,00,000
Plant	2,00,000	3,00,000
Installation	10,000	15,000
Working Capital	50,000	65,000
Annual pre - depreciation profits (Note a)	70,000	95,000
Other relevant income/expenditure:		
Sales promotion (Note b)	-----	15,000
Plant Scrap Value	10,000	15,000
Building Disposable value (Note c)	30,000	60,000

Note:

- ❖ The investment life is 10 years.
- ❖ An exceptional amount of expenditure on sales promotion of ₹15, 000 will require to be spent in year 2 on proposal II. This has not been taken into account in calculating pre - depreciation profits.
- ❖ It is not the intention to dispose of the building in ten years' time; however, it is company policy to take a notional figure into account for project evaluation purposes.

The present value of ₹1 due	1 year hence at 8%	= 0.926
	2	= 0.857
	3	= 0.794
	4	= 0.735
	5	= 0.681
	6	= 0.630
	7	= 0.583
	8	= 0.540
	9	= 0.500
	10	= 0.463
	11	= 0.429

[10]

Answer 5(a):

Statement showing Evaluation of Proposal – I

Particulars	Time	PVF	Amount	Present Value
Cash Outflows:				
Building	0	1	50,000	50,000
Plant	0	1	2,00,000	2,00,000
Installation	0	1	10,000	10,000
Working Capital	0	1	50,000	50,000
P.V.C.O. (A)				3,10,000
Cash Inflows:				
Pre Depreciation Profit	1-10	6.71	70,000	4,69,700
<u>Terminal Value:</u>				
Plant	10	0.463	10,000	4,630

Answer to PTP_Final_Syllabus 2012_June 2016_Set 1

Working Capital	10	0.463	50,000	23,150
Building	10	0.463	30,000	13,890
P.V.C.I. (B)				
N.P.V. (B) - (A)				
				5,11,370
				2,01,370

Statement showing Evaluation of Proposal – II

Particulars	Time	PVF	Amount	Present Value
Cash Outflows:				
Building	0	1	1,00,000	1,00,000
Plant	0	1	3,00,000	3,00,000
Installation	0	1	15,000	15,000
Working Capital	0	1	65,000	65,000
P.V.C.O. (A)				4,80,000
Cash Inflows:				
Pre. Depreciation Profit	1	0.926	95,000	87,970
	2	0.857	80,000	68,560
	3-10	4.927	95,000	4,68,065
<u>Terminal Value:</u>				
Plant	10	0.463	15,000	
Working Capital	10	0.463	65,000	
			80,000	37,040
Building	10	0.463	60,000	27,780
P. V. C. I. (B)				6,89,415
N. P. V. (B) – (A)				2,09,415

Advise: Since the NPV of Proposal II is greater. Proposal II accepted.

5. (b) (i) ABC Ltd. wishes to raise additional finance of ₹20 lakhs for meeting its investment plans. The company has ₹4,00,000 in the form of retained earnings available for investment purposes. The following are the further details:

- ❖ Debt Equity Ratio 25 : 75
- ❖ Cost of Debt at the rate of 10% (before tax) upto ₹2,00,000 and 13% (before tax) beyond that.
- ❖ Earnings per share, ₹12.
- ❖ Dividend Payout: 50% of earnings.
- ❖ Expected Growth Rate in dividend 10%.
- ❖ Current Market Price per share, ₹60.
- ❖ Company's Tax Rate is 30% and shareholder's personal tax rate is 20%.

Required:

- (I) Calculate the Post Tax Average Cost of Additional Debt.
- (II) Calculate the Cost of Retained Earnings and Cost of Equity.
- (III) Calculate the Overall Weighted Average (After Tax) Cost of Additional Finance.

[1+1+3]

Answer to PTP_Final_Syllabus 2012_June 2016_Set 1

(b) (ii) 'Fixed Costs are unrelated to output and irrelevant for decision making purpose in all circumstances'.- Justify. [5]

Answer 5 (b) (i):

Pattern of Raising Capital	=	0.25 × ₹20,00,000
Debt	=	₹5,00,000
Equity	=	₹15,00,000

Equity Funds:

Retained Earning	=	₹4,00,000
equity (additional)	=	₹11,00,000
Total	=	₹15,00,000

Debt Funds:

10% Debt	=	₹2,00,000
13% Debt	=	<u>₹3,00,000</u>
Total	=	<u>₹5,00,000</u>

$$(i) K_d = \frac{\text{Total Interest}(1-t)}{\text{Total debt}} = \frac{[20,000 + 39,000](1-0.3)}{5,00,000} = 8.26\%$$

$$(ii) K_e = \frac{D_1}{P_0} + g = \frac{12 \times 50\% + 10\%}{60} = 10\% + 10\% = 20\%$$

$$K_{re} = K_e (1 - t) = 20\% (1 - 0.2) = 16\%$$

(iii) Weighted Average Cost of capital

Source	Amount	Weights	After tax cost	WACC
Equity Capital	11,00,000	0.55	20.00%	11.00%
Retained earning	4,00,000	0.20	16.00%	3.20%
Debt	5,00,000	0.25	8.26%	2.065%
Total	20,00,000	1.00		16.265%

(b) (ii):

Fixed Costs are unrelated to output and are generally irrelevant for decision making purpose. However, in the following circumstances, Fixed Costs become relevant for decision-making:

1. When Fixed Costs are specifically incurred for any contract,
2. When Fixed Costs are incremental in nature,
3. When the fixed portion of Semi-Variable Cost increases due to change in level of activity consequent to acceptance of a contract,
4. When Fixed Costs are avoidable or discretionary,
5. When Fixed Costs are such that one cost is incurred in lieu of another (the difference in costs will be relevant for decision-making).

Answer to PTP_Final_Syllabus 2012_June 2016_Set 1

5. (c) The director of finance for a farm cooperative is concerned about the yield per acre he can expect this year's corn crop. The probability distribution of the yields for the current weather conditions is:

Yield kg per acre	Probability
120	0.18
140	0.26
160	0.44
180	0.12

He would like to see a simulation of the yields he might expect over the next 10 years for weather conditions similar to those he is now experiencing.

- (i) Simulate the average yield he might expect per acre during the next 10 years using the following random numbers: 20, 72, 34, 54, 30, 22, 48, 74, 76, 02.
- (ii) He is also interested in the effect of market price fluctuations on the co-operatives farm revenue. He makes this estimate of per kg. prices for corn.

Price per kg (₹)	Probability
2.00	0.05
2.10	0.15
2.20	0.30
2.30	0.25
2.40	0.15
2.50	0.10

Simulate the revenues he might expect to observe over the next 10 years using the following random numbers for SP per kg: 82, 95, 18, 96, 20, 84, 56, 11, 52, 03. [10]

Answer 5 (c):

If the numbers 0-99 are allocated in proportion to the probabilities associated with each category of yield per acre, then various kinds of yields can be sampled using random number table

Yields in kg per acre	Probability	Cumulative Probability	Random Numbers assigned
120	0.18	0.18	00-17
140	0.26	0.44	18-43
160	0.44	0.88	44-87
180	0.12	1.00	88-99

- (i) Let us simulate the yield per acre for the next 10 years based on the given 10 random numbers.

Year	Random Number	Simulated Yield
1	20	140
2	72	160
3	34	140
4	54	160
5	30	140
6	22	140
7	48	160
8	74	160
9	76	160
10	02	120
	Total	1480

The average yield is $1480/10 = 148$ kg/acre.

Answer to PTP_Final_Syllabus 2012_June 2016_Set 1

- (ii) Let us now simulate the price he might expect in the next 10 years based on the random numbers given:

Price per kg.	Probability	Cumulative Probability	Random Numbers assigned
2.00	0.05	0.05	00-04
2.10	0.15	0.20	05-19
2.20	0.30	0.50	20-49
2.30	0.25	0.75	50-74
2.40	0.15	0.90	75-89
2.50	0.10	1.00-	90-99

This simulated prices are developed using the random numbers given for next 10 ten years.

Year	Random Number	Simulated Price Per Kg	Simulated yield	Revenue per acre
1	82	2.40	140	336
2	95	2.50	160	400
3	18	2.10	140	294
4	96	2.50	160	400
5	20	2.20	140	308
6	84	2.40	140	336
7	56	2.30	160	368
8	11	2.10	160	336
9	52	2.30	160	368
10	03	2.00	120	240
			Total	3.386