FINAL EXAMINATION
GROUP III
(SYLLABUS 2012)

SUGGESTED ANSWERS TO QUESTIONS
JUNE 2015

Paper- 14: ADVANCED FINANCIAL MANAGEMENT

Time Allowed : 3 Hours   Full Marks : 100

The figures in the margin on the right side indicate full marks.
All workings must form part of your answer.
Wherever required, suitable assumptions may be made and clearly stated in the answer.
No present value table or other statistical table will be provided along with this question paper.

1. All sub-divisions are compulsory: 2 × 10=20

   (a) X purchased 182 days, Indian T-Bills of face value 35 lacs at an issue price of P. If the effective yield is 10% for the T-Bill, determine P.

   (b) You can earn a return of 15% by investing in equity shares on your own. You are considering a recently announced equity mutual fund scheme where the initial issue expense is 5%. You believe that the mutual fund scheme will earn 18%. At what recurring expenses (in percentage terms) will you be indifferent between investing on your own and investing through the mutual fund?

   (c) M Ltd. and N Ltd. have the following risk and return estimates:

R_M	R_N	σ_M	σ_N	(Correlation coefficient) = r_{MN}
22%	25%	18%	15%	0.5

   Calculate the proportion of investment in M Ltd. and N Ltd. to minimize the risk of the Portfolio.

   (d) Ram sold in July Nifty futures contract for ₹ 5,00,000 on July 15. For this he had paid an initial margin of ₹ 50,000 to his broker. Each Nifty contract is for the delivery of 250 Nifties. On July 25, the index was closed at 1900. How much profit/loss has Ram made?

   (e) The Power Tech Ltd. has to select either project A or project B. Both the projects are mutually exclusive. The expected profits are as follows:

	Profit if there is strong Demand	Profit/(Loss) if there is weak Demand
Option A (₹)	10,000	(2,500)
Option B (₹)	6,000	2,000
Probability of Demand	0.3	0.7

   Which project should be selected?

   (f) If the risk free rate of interest (R_f) is 12% and expected return as Market portfolio (R_m) is 18%, ascertain expected return of the portfolio, if portfolio betas are 0.10.

   (g) The following data in respect of three securities are available:

Security	σ(%)	Correlation with index
J	20	0.64
K	18	0.93
L	12	0.73

The standard deviation of market portfolio (BSE Sensex) is observed to be 18%.

What is the sensitivity of returns of each stock with respect to the market?

(h) The following particulars are furnished about Mutual Fund Scheme P:

Dividend Distributed	₹ 1.75
Capital Appreciation	₹ 2.97
Opening NAV	₹ 32.00
Beta	1.46

Ascertain Jensen's Alpha. (Given Government of India Bonds carry an interest of 6.84% and NIFTY has increased by 12.13%).

(i) A company is considering projects X and Y with the following information:

Project	Expected NPV (₹)	Standard Deviation
X	1,06,000	75,000
Y	2,40,000	1,35,000

(j) Nile Ltd. issues 12% debentures of face value ₹ 100 each and realized ₹ 90 per debenture. The debentures are redeemable after 12 years at a premium of 10%. The Company is paying tax of 35%. What will be the Cost of Debt?

Answer:

1. **(a)** Yield = $(F - P)/P \times 365/182$.

   $0.1P + 2.005P = 35,00,000 \times 2.005$

   i.e., $2.105P = 7019230$

   $P = 33,34,551$

   (b) Let Annual recurring expenses = A

   Return from Mutual Funds = $\dfrac{\text{Investors' Expectations}}{100 - \text{Issue Expenses}}$ + Annual recurring expenses

   $18\% = 15/(100 - 5)\% + A$

   $A = 2.21\%$

   The amount of recurring expenses for which the investors will be indifferent will be 2.21%

   (c) (i) Basic Values of Factors for Determination of Portfolio Risk

Standard Deviation of Security M	σ_M	18
Standard Deviation of Security N	σ_N	15
Correlation co-efficient of Securities M and N	r_{MN}	0.5
Weight of Security M	W_M	a
Weight of Security N	W_N	1 - a

   (ii) Computation of Investment in Security M(W_M) = :

   Proportion of Investment in M Ltd., $W_M = \dfrac{\sigma_N^2 - Cov_{MN}}{\sigma_M^2 + \sigma_N^2 - 2Cov_{MN}}$

   Proportion of Investment in N Ltd., $W_N = 1 - W_M$

   - Computation of Covariance
     $Cov_{MN} = r_{MN} \times \sigma_M \times \sigma_N$
     $= 0.50 \times 18 \times 15$
     $= 135$

- Proportion of investment in M Ltd.
  $W_M = [\sigma_N^2 - Cov_{MN}] \div [\sigma_N^2 + \sigma_N^2 - 2Cov_{MN}]$
  $W_M = [15^2 - (135)] \div [18^2 + 15^2 - 2 \times (135)]$
  $W_M = [225 - 135] \div [324 + 225 - 270] = 90/279 = 0.3226$

- Proportion of investment in N Ltd.
  $W_N = 1 - 0.3226 = 0.6774$

(d) (i) Sale Price per NIFTY Future
= Contract Amount ÷ Lot size
= ₹ 5,00,000 ÷ 250
= ₹ 2,000

(ii) Futures Price as on July 25
= ₹ 1,900

(iii) Loss on Sale of Futures Contract
= (2,000 – 1,900) × 250
= ₹ 25,000

(e) Project with higher EV of Profit would be selected

Probability	Project A		Project B	
	Profit	EV	Profit	EV
0.3	10000	3000	6000	1800
0.7	(2500)	(1750)	2000	1400
1.0		1250		3200

Project B Should be selected

(f) Under Capital Asset Pricing Model
$R_P - R_f + (\beta \times (R_m - R_f))$
Hence, $R_f = 12\%$
(Risk free Rate of Interest)
Portfolio Beta 0.10
R_M = Expected Return on market portfolio = 18%
Expected Return = 12% + 0.10 (18% - 12%) = 12.6%

(g) Sensitivity of return

Security	J	K	L
σ (%)	20	18	12
Correlation to Market Portfolio	0.64	0.93	0.73
Beta Sensitivity = σ × r / σ_m	0.71	0.93	0.49

(h) Total Return = Dividend distributed + Capital Appreciation ₹ 1.75 + ₹ 2.97 = ₹ 4.72

Actual Return = Total Return ÷ Opening NAV = ₹ 4.72 ÷ ₹ 32.00 = 14.75%

Expected Return under CAPM = $R_F + \beta_P \times (R_M - R_F)$ = 6.84 + 1.46 (12.13 – 6.84) = 14.56%

Jensen's Alpha = Actual return – Expected return = 14.75 – 14.57 = 0.18%

(i) Co-efficient of variation = std dev/mean;

C.V. x = 75,000 ÷ 1,06,000 = 0.71;

C.V. y = 1,35,000 ÷ 2,40,000 = 0.5626

Project X has higher CV, and hence is riskier. Therefore project Y should be accepted.

(j) Cost of Debt (K_d) = {12(1-0.35) + (110–90)/12}/(110 + 90)/2

= 7.8 + 1.67 = 9.47%

2. **Answer any three sub-divisions from (a) to (d):** 8×3=24
   (a) The following particulars relates to Gilt Fund Scheme:

	Particulars	
1.	Investment in Shares (at cost)	
	IT and ITES Companies	₹ 20 Crores
	Infrastructure Companies	₹ 22 Crores
	FMCG	₹ 15 Crores
	Automotive	₹ 20 Crores
	Banking/Financial Services	₹ 8 Crores
2.	Cash and other Assets in Hand (even throughout the fund period)	₹ 4 Crores
3.	Investment in Fixed Income Bearing Bonds	
	Listed Bonds [10,000 10% Bonds of ₹ 10,000 each]	₹ 10 Crores
	Unlisted Bonds	₹ 10 Crores
4.	Expenses payable as on closure date	₹ 2 Crores
5.	Market Expectation on Listed Bonds	9%
6.	No. of Units Outstanding	₹ 4 Crores

The particulars relating to sectoral index are as follows:

Sector	Index on the date of purchase	Index on the valuation date
IT and ITES	1800	2800
Infrastructure	1400	2500
FMCG	1600	2500
Automotive	2000	3000
Banking/Financial Services	1500	2200

The Fund has incurred the following expenses:

Management Advisory Fees	₹ 260 Lakh
Administration Expenses	₹ 300 Lakh
Publicity and Documentation	₹ 100 Lakh
Total	₹ 660 Lakh

The period under consideration is 2 years. The Fund has distributed ₹ 1.5 per unit as annual cash dividend. Compute the annualised net return (%) and the expense ratio of the Fund. 8

Answer:

2. **(a) (i) Net Asset Value of the Fund**

Particulars	₹ in Crore
1. Market Value of Shares in -	
(a) IT and ITES [Cost ₹ 20 × Closing Sector Index 2800 ÷ Opening Sector Index 1800]	31.11
(b) Infrastructure [Cost ₹ 22 × Closing Sector Index 2500 ÷ Opening Sector Index 1400]	39.29
(c) FMCG [Cost ₹ 15 × Closing Sector Index 2500 ÷ Opening Sector Index 1600]	23.44
(d) Automotive [Cost ₹ 20 × Closing Sector Index 3000 ÷ Opening Sector Index 2000]	30.00
(e) Banking [Cost ₹ 8 × Closing Sector Index 2200 ÷ Opening Sector Index 1500]	11.73
2. Market Value of Investment in Listed Bonds [Face Value ₹ 10 Crores × Interest on Face Value 10% ÷ Market Expectation 9%]	11.11

3.	Cost of Investment in Unlisted Bonds	10.00
4.	Cash and Other Assets	4.00
Total Assets of the Fund		160.68
Less: Outstanding Expenses		2.00
Net Asset Value of the Fund		158.68

Note: It is assumed that Cash and other Assets existed from the beginning of the period at the same values.

(ii) Net Asset Value per Unit

NAV per Unit = Net Asset Value of the Fund ÷ No. of the Outstanding

= ₹ 158.68 Crores ÷ 4 Crore Units

= ₹ 39.67

(iii) Annualized Return on Fund

(a) Computation of Opening NAV

	Particulars	₹ in Crore
1.	Investment in Shares (at Cost)	
	• IT and ITES companies	20.00
	• Infrastructure Companies	22.00
	• FMCG	15.00
	• Automotive	20.00
	• Banking / Financial Services	8.00
2.	Investment in Fixed Income Bearing Bonds	
	• Listed Bonds [10,000 10% Bonds of ₹ 10,000 each]	10.00
	• Unlisted Bonds	10.00
	Net Asset Value	105.00

Note: Cash and Other Assets are not included because they arise out of investments made in the beginning.

(b) Computation of Opening NAV per Unit

NAV per Unit = Net Asset Value of the Fund ÷ No. of Units Outstanding

= ₹ 105.00 Crores ÷ 4.00 Crore Units

= ₹ 26.25

(c) Computation of Returns per Unit

- Capital Appreciation = Closing NAV per Unit – Opening NAV per Unit

  = ₹ 39.67 – ₹ 26.25 = ₹ 13.42

- Cash Dividend = ₹ 1.5 × 2 Years – ₹ 3

- Returns = [Cash Dividend + Capital Appreciation] ÷ Opening NAV

  = [₹ 3.00 + ₹ 13.42] ÷ ₹ 26.25 = ₹ 16.42 ÷ ₹ 26.25 = 62.55%

- Return p.a. = Total Return/ Period = 62.55% ÷ 2 Years = 31.28%

(iv) Expense Ratio

(a) Total Expense = Management Advisory Fee ₹ 2.60 Cr. + Administration Exp. ₹ 3.00 Cr. + Publicity and Documentation ₹ 1.00 Cr.

= ₹ 6.6 Crores

(b) Average Value of Portfolio = (Opening Net Asset Value + Closing Net Asset Value) ÷ 2

= (₹105 Crores + ₹158.68 Creores) ÷ 2

= ₹263.68 Crores ÷ 2

= ₹ 131.84 Crores

(c) Expense Ratio = Total Expenses ÷ Average Value of Portfolio

= (₹ 6.6 Crores ÷ ₹ 131.84 Creores) × 100

= 5.01%

(d) Expense Per Unit = Total Expenses ÷ No. of Units

= ₹ 6.6 Crores ÷ 4.00 Crores = ₹ 1.65

(b) (I) PS Fund invests exclusively in Public sector undertakings, yielded ₹ 4.85 per unit for the year. The opening NAV was ₹ 26.85. The Fund has a risk factor of 3.50%. Ascertain the Sharpe Ratio and compare the fund performance with market performance if: **4**

(i) Risk Free Return is 6%, if return on sensex is 16% with a standard deviation of 3.75%.

(ii) Risk Free Return is 5%, return on sensex is 18% with a standard deviation of 4%.

(II) Classify the following items under the appropriate category – Whether Money Market (MM) or Capital Market (CM):

(i) RBI and Government are participants

(ii) Regulated by SEBI

(iii) Tenor of instruments is usually less than a year

(iv) Treasury Bills

(v) Commercial Papers

(vi) Zero Coupon Bonds

(vii) Equity Shares

(viii) Debentures **4**

Answer:

(b) (I) Sharpe Ratio = $(R_P - R_f) \div \sigma_P$

Where R_P = Return on portfolio

R_f = Risk free Return

σ_P = Standard Deviation of portfolio

Particulars	Case I	Case II
Risk free return R_f	6%	5%
Market Return (R_M)	16%	18%
Standard Deviation of market return (σ_m)	3.75%	4.00%
Sharpe Ratio for PS Fund {($R_P - R_F$) ÷ σ_P} (A)	18.06% - 6% ÷ 3.50 =3.45	18.06% - 5% ÷ 3.50% = 3.73
Sharpe Ratio for Market Return {($R_m - R_F$) ÷ σ_m} (B)	16% - 6% ÷ 3.75% = 2.67	18% - 5% ÷ 4% = 3.25
Sharpe Ratio is higher for	PS Fund	PS Fund

Inference / Evaluation	PS Fund has outperformed market's performance	PS Fund has outperformed market's performance

Return on PS Fund = yield ₹ 4.85 ÷ Opening NAV ₹ 26.85 = 18.06%

(II)

Sl. No.	Item Description	Market
A	RBI and Govt. are participants	Money
B	Regulated by SEBI	Capital
C	Tenor of instruments is usually less than a year	Money
D	Treasury Bills	Money
E	Commercial Papers	Money
F	Zero Coupon Bonds	Capital
G	Equity Shares	Capital
H	Debentures	Capital

(c) (I) A Petrochemical Plant needs to process 20,000 barrels of oil in three months' time. To hedge against the rising price the plants needs to go long on the futures contract of crude oil. The spot price of crude oil is ₹ 2,925 per barrel, while futures contract expiring three months from now is selling for ₹ 3,300 per barrel. By going long on the futures the petrochemical plant can lock in the procurement at ₹ 3,300 per barrel. Assuming the size of one futures contract of 100 barrels, the firm buys 200 futures to cover its exposure of 20,000 barrels.

Find out the price that would be payable under two scenarios of rise in price to ₹ 3,600 or fall in price to ₹ 2,700 per barrel after three months. **4**

(II) What are the differences between Merchant Banks and Commercial Banks? **4**

Answer:

(c) (I) **Figures [in ₹/barrel]**

Price after 3 months	2700	3600
Actual purchase price	2925	2925
Gain/loss on futures		
Bought futures at	3300	3300
Sold futures at	2700	3600
Profit/loss on futures	-600	+300
Effective Price (₹/barrel)	3300	3300

Here we observe that the loss in the physical position is offset by the gain in the futures position and vice versa. This results in effective price equal to the price of futures at the time of setting up the hedge.

(II) The differences between merchant banks and commercial banks are:

(1) Commercial banks do banking business i.e., accept deposits and use deposits for giving loan but merchant bank work as consultancy type business i.e., helps in issue of management in issue of shares etc.

(2) The nature of loan given by commercial bank is debt related but loan given by

merchant bank is equity related.

(3) Commercial bank does not take any risk of client but merchant bank takes risk of client.

(4) Commercial bank acts as a financer but merchant bank acts as a financial advisor.

(5) Commercial banks are regulated by the Banking Regulation Act 1949 and are under the control of RBI whereas merchant banks are governed by rules and regulations framed by SEBI.

(6) Commercial banks do mass banking with general public but merchant bank deals with a class of selected clients.

(d) (I) **A Fund made an issue of 20 Lakh units of 10 each on January 01, 2014. No entry load was charged. It made the following investments:**

Particulars	₹
1,00,000 equity shares of ₹ 100 each @ ₹ 160	160 Lakhs
7% Government Securities	16 Lakhs
9% Debentures (Unlisted)	10 Lakhs
10% Debentures (Listed)	10 Lakhs

During the year operating expenses were ₹ 10 Lakhs and in addition to interest dividend of ₹ 24 Lakhs was received.

You are required to calculate net cash balance and NAV per unit at the end of the year. **4**

(II) **How would you manage risk in infrastructure projects?** **4**

Answer:

(D) (I) **Calculation of net cash balance at the end**

Particulars	₹
Cash Balance opening (200 lakh – 196 lakh)	4,00,000
Dividend Received	24,00,000
Interest on 7% Govt. Securities	1,12,000
Interest on 9% Debenture	90,000
Interest on 10% Debenture	1,00,000
	31,02,000
Less: Operating Expenses	10,00,000
Net Cash Balance at the end	21,02,000

Calculation of NAV	₹
Cash	21,02,000
1,00,000 equity shares of ₹100 each	160,00,000
7% Govt. Securities	16,00,000
9% Debentures (Unlisted)	10,00,000
10% Debentures (Listed)	10,00,000
Total Assets	2,17,02,000
No. of Units	20,00,000

$$NAV = \frac{\text{Total Assets}}{\text{No. of Units}} = 2,17,02,000 / 20,00,000 = ₹10.851$$

(II) The raising of debt and equity capital needed to fulfill the financing needs of infrastructure in developing countries continues to remain a challenge. Over the last couple of decades there has been a growing interest in using risk mitigation instruments to facilitate mobilization of private capital to finance public and private infrastructure projects. Risk Mitigation instruments are financial instruments that transfer certain defined risks from project financiers (lenders and equity investors) to creditworthy third parties (guarantors and investors) that have a better capacity to deal with such risks. These instruments are extremely helpful for the governments of developing countries that have low credit ratings or insufficient track record in the eyes of the private investors to be able to attract private capital. For India, risk management is crucial as this has been a major roadblock in attracting the required private investment in the infrastructure sector.

3. Answer any two sub-divisions from (a) to (c):   10×2=20

  (a) (I) Given the following information:

BSE Index	25,000
Value of Portfolio	₹ 50,50,000
Risk Free Interest rate	9% p.a.
Dividend Yield on Index	6% p.a.
Beta of Portfolio	2.00

Assuming that a futures contract on the BSE Index @ 50 units per contract with 4 months maturity is used to hedge the value of the portfolio over the next 3 months. Based on the information calculate the price of a future contract and the gain per contract on short futures position if Index turns out to be 22,500 in 3 months.   6

  (II) Explain the advantages of the Book Building Process.   4

Answer:

3. **(a) (I)** Tenor / time period (t) in years = 4 months or 0.3333 years.

(i) Risk free interest rate (r) = 9% or 0.09

Price of future contract

$$(TFP_x) = S_x \times e(r - y) \times t$$
$$= ₹ 25000 \times e^{(0.09 - 0.06) \times 0.3333}$$
$$= ₹ 25000 \times e^{0.03 \times 0.3333}$$
$$= ₹ 25000 \times e^{0.01} = ₹ 25000 \times 1.010$$
$$= ₹ 25250$$

Therefore, price of futures contract is ₹ 25,250.

Gain on short Future Position

No. of contracts to be entered into Portfolio Value ₹ 5050000

4 month's future price per unit of BSE index ₹ 25250

No. of units per BSE Index future contract 50

Value per BSE Index future contract (50 units × 25250 Per Unit) = 12,62,500

No. of contract to be entered (5050000 × 2.00 ÷ 1262500 = 8 Contracts

Contract sale price per unit	₹ 25,250
Less: Index Position in 3 months	₹ 22,500
Gain per unit of BSE Index Future	₹ 2,750

No. of unit per contract 50

Gain per contract ₹ 2,750 × 50 units = ₹ 1,37,500

(II) Advantages of Book Building

(a) The book building process helps in discovery of price & demand.
(b) The costs of the public issue are much reduced.
(c) The time taken for the completion of the entire process is much less than that in the normal public issue.
(d) In book building, the demand for the share is known before the issue closes. In fact, if there is not much demand, the issue may be deferred.
(e) It inspires investor's confidence leading to a large investor universe.
(f) Issuers can choose investors by quality.
(g) The issue price is market determined..

(b) (I) The following two-way quotes appear in the foreign exchange market -

	Spot Rate	1 month forward
₹/US$	₹ 56/₹ 56.25	₹ 57 / ₹ 57.50

Required:

(1) How many US Dollars should a firm sell to get ₹ 30 Lakhs after two months?

(2) How many Rupees is the firm required to pay to obtain US $ 2,40,000 in the Spot market?

(3) Assume the firm has US $ 69,000 Current Account's earning interest. ROI on Rupee investment is 10% p.a. should the firm encash the US $ now 2 months later? **6**

(II) Explain any two limitations of Credit Rating. **4**

Answer:

(b) (I) (i) US dollors for ₹ 30 Lakhs in the forward market:

Action = Sell foreign currency in forward market
Relevant Rate = Forward Bid Rate = ₹ 56.25
US$ required to get ₹ 30,00,000 = ₹ 30,00,000 ÷ ₹ 57.00 = 52,631.58

(ii) ₹ required to obtain US$ 2,40,000 in the spot market

Action = Buy foreign currency in spot market.
Relevant Rate = Spot Ask Rate = ₹ 56.25
Rupees required to obtain $ 2,40,000 = US$ 2,40,000 × 56.25 = ₹ 1,35,00,000

(iii) Evaluation of investment in rupees

Forward premium (or Bid Rates)

$$= \frac{Forward\,Rate\,₹57 - Spot\,Rate\,₹56}{Spot\,Rate\,₹56} \times \frac{12\,months}{2\,months} \times 100 = 10.71\%$$

Annualized Forward Premium for Bid Rates (10.71%) is greater than the Annual Return on investment in Rupees (10%). Therefore, the firm should not encash its US$ balance now. It should sell the US$ in the forward market and encash them two months later.

(II) Credit rating is a very important indicator for prudence but it suffers from certain limitations. Some of the limitations are:

(a) <u>Conflict of interest</u>: The rating agency collects fees from the entity it rates leading to a conflict of interest. Since the rating market is very competitive, there is a distance possibility of such conflict entering into the rating system.

(b) <u>Industry Specific rather than company specific</u>: Downgrades are linked to industry rather than company performance. Agencies given importance to

macro aspects and not to micro ones overreact to existing conditions which come from optimistic / pessimistic views arising out of up/down turns. At times value judgments are not ruled out.

(c) <u>Rating Changes</u>: Ratings given to instruments can change over a period of time. They have to be kept under constant watch. Downgrading of an instrument may not be timely enough to keep investors educated over such matters.

(d) <u>Corporate Governance Issues</u>: Special attention is paid to:

- Rating agencies getting more of their revenues from a single service or group.
- Rating agencies enjoying a dominant market position. They may engage in aggressive competitive practices my refusing to rate a collateralized/securitized instrument or compel an issuer to pay for services rendered.
- Greater transparency in the rating process viz. in the disclosure of assumptions leading to a specific public rating.

(e) <u>Basic of Rating</u>: Rating are based on point of time concept rather than on period of time concept and thus do not private a dynamic assessment.

<u>Cost Benefit Analysis</u>: Since rating is mandatory, it becomes essential for entitles to get themselves rated without carrying out cost benefit analysis.

(c) Union Bankers Ltd. offer the following interest rates to two of its customers for a loan of ₹ 150 Crores, repayable in 7 years.

Company	DHARAM Co.	SMOOTH-TECH Ltd.
Nature of activity	Supply and installations of security systems for homes, offices and corporate surveillance	Providing IT support to various airlines, shipping companies and Government Companies.
Years in Industry	25	1.5
Market position	Market Leader	Market Extrants in fant
Rating by UBL	A++	B+
Floating Interest Rate	MIBOR – 0.50%	MIBOR + 1%
Fixed Interest Rate	10%	12.50%
Share in the Net gain on account of Interest Rate Swap	60%	40%

Assuming Principal amount is repaid at the end of the seven years, what is the effective gain in % as well as in value for both the companies, if they enter into a Swap Arrangement for reducing interest effect.

Also ascertain the net interest cost (in %) for both the companies. **10**

Answer:

(c) Action and Net Cost: Dharma Co. has an advantage of 2.5% in fixed rate (10% Vs. 12.50%) and 1.50% in floating rate therefore. Dharam enjoys a higher advantage in fixed rate loans therefore it will opt for fixed rate loan on the other hand Smooth Tech Ltd. will opt for floating rate loans with its bankers.

Dharma Co.	Smooth Tech Co.
Will borrow at fixed rate & pay interest 10%	Will borrow at floating rate & pay MIBOR + 1%.
Will collect from / Pay to Smooth Tech.	Will pay to / collect from Dharam

i.e., (MIBOR – 0.50%) i.e., 10.5% - MIBOR	Interest amount differential i.e., interest compacted at fixed rate to platinum (10%) less int. at floating rate to Dharam (MIBOR-0.50%) i.e., (10.5% - MIBOR)
Will collect from Smooth Tech. Share in the gain on account of interest rate swap i.e., 60% of difference in spread of fixed rate & floating rate.	Will pay to Dharam Share in the gain on account of interest rate swap i.e., 60% of difference in spared of 1% i.e., 0.60%.

Gain on Account of Interest Swap

Spread in fixed rate (12.50% - 10%) = 2%

Less: Difference in floating 1% - (-0.50%) = 1.50%

Maximum Gain 1%

Share of Dharm Co. in the gain (60% of 1%) = 0.60% p.a.

Share of Smooth Tech (40% of 1%) = 0.40% p.a.

Effective Interest Rate

	Dharma Co.	**Smooth Tech. Co.**
Expectation on interest rate	Contraction	Increase
Interest Rate scheme (desired)	Floating of Rate	Fixed Rate
Interest Rate	MIBOR – 0.50%	12.50%
Less: Share in Gain	0.60%	0.40%
Effective Interest Rate	MIBOR-1.10%	12.10%

Interest Cost Saved

Share in Gain (P.A.)	0.60%	0.40%
Amount of loan	₹ 150 Crores	₹ 150 Crores
Interest Saving P.A.	₹ 90 lakhs (60% of 150)	₹ 60 Lakhs (40% of 150)
Number of years of loan	7 years	7 years
Total interest saving	(7 × ₹ 0.90) ₹ 6.30 Crores	(7 × ₹ 0.60) ₹ 4.20 Crores

4. **Answer any two sub-divisions from (a) to (c):**   **8×2 = 16**

   (a) The returns on Stock A and Market Portfolio for a period of 6 years are as follows:

Year	Return on A (%) (R_A)	Return on Market Portfolio (%) (R_M)
1	10	8
2	17	10
3	13	13
4	2	-4
5	10	11
6	-10	-2

   You are required to determine:

   (i) Characteristic line for Stock A

   (ii) The systematic and unsystematic risks of Stock A.   **5+3=8**

Answer:

4. **(a) (i) Characteristic Line for security A = Y = α + βx**

CALCULATION OF BETA OF SECURITY

Period	Return of		Deviation from Mean		Variance		Co-Variance of DM × DA
	Market Portfolio (R_m)	Security A (R_A)	Market (D_m) $(R_M - \overline{R_M})$	A (D_A) $(R_A - \overline{R_A})$	Market DM^2	DA^2	
1	8	10	2	3	4	9	6
2	10	17	4	10	16	100	40
3	13	13	7	6	49	36	42
4	-4	2	-10	-5	100	25	50
5	11	10	5	3	25	9	15
6	-2	-10	-8	-17	64	289	136
	Σ=36	Σ=42	Σ=0	Σ=0	ΣDM²=258	ΣDA²=468	ΣDM×DA=289

Mean	Market Portfolio	Share Company
$\left(\dfrac{\Sigma R_M}{N} \& \dfrac{\Sigma R_A}{N}\right)$	$= \dfrac{36}{6} = 6$	$\dfrac{42}{6} = 7$
Variance (σ²)	$\dfrac{258}{6} = 43$	$\dfrac{468}{6} = 78$
($\sigma^2_M = \Sigma DM^2 \div n)$)		
Standard Deviation	√43	√78
(σ)	= 6.56	= 8.83
Covariance (MA)	= Σ(DM × DA) ÷ n	
	289 ÷ 6 = 48.167	

β = CovMA ÷ σ²$_M$ = 48.167 ÷ 43 = 1.12

Correlation = $\dfrac{COVMA}{\sigma_M \times \sigma_A}$ = $\dfrac{48.167}{6.56 \times 8.83}$ = 0.8316

Characteristic line for stock: A: Y = α + βx

7 = α + 1.12 × 6

α = 7 – 6.72   or   α = 0.28

y = 0.28 + 1.12x

(ii)

	Variance Approach	Standard Deviation Approach
Systematic Risk	49% × 0.83² =33.76%	8.83 × 0.83 =7.33%
Unsystematic Risk	49 × (1 – 0.83²) =15.19	8.83 × (1 - 0.83) =1.501
Total Risk	**49%**	**7.00%**

Note: If value of Correlation rounded off as 0.83

Alternative,

	Variance Approach	Standard Deviation Approach
Systematic Risk	49% × 0.8316² =33.89%	8.83 × 0.8316 =7.34%
Unsystematic Risk	49 × (1 - 0.8316²) =15.11	8.83 × (1 - 0.8316) =1.487
Total Risk	**49%**	**7.00%**

Note: If value of Correlation taken as 0.8316

(b) (I) **ABC is at present engaged in production of sport shoes and has a debt equity ratio of 0.70. Its present cost of debt founds is 16% and it has a marginal tax rate of 50%. The company is proposing to diversify to a new field of adhesives which is considerably different from the present line of operations. ABC Ltd. is not well conversant with the new field. The company is not aware of risk involved in area of adhesives but there exists another company STP, which is a representative company in adhesives. STP is also a public limited company whose shares are traded in the market. STP has a debt to equity ratio of 0.25, equally beta of 1.15 and an effective tax rate of 40%. Assume that debt is risk free.**

(i) Calculate what systematic risk is involved for ABC Ltd., if the company enters into the business of adhesives. You may assume CAPM holds and ABC employs the same amount of leverage.

(ii) In case risk free rate at present is 12% and expected return on market portfolio is 15% what return should ABC Ltd. require for the new business if it uses a CAPM approach. **2+3=5**

(II) Explain any three macro economic factors considered in Economic analysis. **3**

Answer:

(b) (I) Basic data for Computation of Beta

β_E of STP Ltd.	1.15
Debt Equity Ratio of ABC Ltd.	0.70
Debt Equity Ratio of STP Ltd.	0.25
Cost of Debt	16%

Note: It is assumed that the debt is risk – free.

1. **Asset Beta of STP Ltd.**

β_A = [β_E × E/(E + D × (1 – Tax) + [β_D × D× (1 – Tax)/ E + D× (1 – Tax)

= [1.15 × 1 ÷ (1 + 0.25 × (1 – 0.40)] + 0

= 1.00

2. **Equity Beta of ABC Ltd.**

β_A = [β_E × E/(E + D × (1 – Tax) + [β_D × D× (1 – Tax)/ E + D× (1 – Tax)

1.00 = [β_E ×[1+ 0.70×(1 – 0.50)]

β_E = 1 ×(1 + 0.70 × 0.50)

= 1.35

3. **Computation of Cost of Equity**

K_e = R_f + β (R_m – R_f)

= 12% + 1.35 × (15% - 12%)

= 12 + 4.05 = 16.05%

4. **Computation of cost of Debt**

K_d = 16 ×(1 – tax rate)

= 16(1- 0.5)

= 16(.6) = 8%

5. **Weighted average required Return for new business**

$$= K_e \times \frac{E}{(E + D \times (1 - Tax)} + K_d \times \frac{D \times (1 - Tax)}{E + D \times (1 - Tax)}$$

$$= 16.05 \times \frac{1}{1 + 0.70 \times 0.50} + 8 \times \frac{0.70(0.5)}{1 + 0.70 \times 0.50}$$

= 16.05/1.35 + 2.8/1.35 = 13.96%

(II) The Commonly analyzed macro economic factors are:

- ❖ **Gross domestic product (GDP):** GDP indicates the rate of growth of the economy. GDP represents the value of all the goods and services produced by a country in one year. The higher the growth rate is more favourable to the share market.

- ❖ **Savings and investment:** The economic growth results in substantial amount of domestic savings. Stock market is a channel through which the savings of the investors are made available to the industries. The savings and investment pattern of the public affect stock market.

- ❖ **Inflation:** Along with the growth of GDP, if the inflation rate also increases, then the real rate of growth would be very little. The decreasing inflation is good for corporate sector.

- ❖ **Interest rates:** The interest rate affects the cost of financing to the firms. A decrease in interest rate implies lower cost of finance for firms and more profitability.

- ❖ **Budget:** Budget is the annual financial statement of the government, which deals with expected revenues and expenditures. A deficit budget may lead to high rate of inflation and adversely affect the cost of production. Surplus budget may result in deflation. Hence, balanced budget is highly favourable to the stock market.

- ❖ **The tax structure:** The tax structure which provides incentives for savings and investments.

- ❖ **The balance of payment:** The balance of payment is the systematic record of all money transfer between India and the rest of the world. The difference between receipts and payments may be surplus or deficit. If the deficit increases, the rupee may depreciate against other currencies. This would affect the industries, which are dealing with foreign exchange.

- ❖ **Monsoon and agriculture:** India is primarily an agricultural country. The importance of agricultural in Indian economy is evident. Agriculture is directly and indirectly linked with the industries. For example, Sugar, Textile and Food processing industries depend upon agriculture for raw material. Fertilizer and Tractor industries are supplying input to the agriculture. A good monsoon leads better harvesting; this in turn improves the performance of Indian economy.

- ❖ **Infrastructure:** Infrastructure facilities are essential for growth of Industrial and agricultural sector. Infrastructure facilities include transport, energy, banking and communication. In India even though Infrastructure facilities have been developed, still they are not adequate.

- ❖ **Demographic factors:** The demographic data provides details about the population by age, occupation, literacy and geographic location. This is needed to forecast the demand for the consumer goods.

- ❖ **Political** stability**:** A stable political system would also be necessary for a good performance of the economy. Political uncertainties and adverse change in government policy affect the industrial growth.

(c) (I) Portfolio Value is ₹ 2,00,000 and Beta is 1.50. Compute the value of risk free investment to be bought or sold in following cases:

(i) **Desired Beta is 1.8.**

(ii) **Desired Beta is 1.10.**   **2+2=4**

(II) Build-Con Ltd. is a real-estate company. Market value of their debt is ₹ 400 Lakh. The company has 8,00,000 equity shares of ₹ 10 each, market price of which is presently ₹ 40/-. Equity beta is 1.10. Market risk premium is 5%. RBI Bonds are quoted at 7%. Find the following: **4**

(A) Required return on equity share

(B) Beta of Assets

(C) Cost of Capital

(D) Appropriate discount rate that the company should use for an expansion proposal.

(E) The company is diversifying into Steel manufacturing. Average ungeared company in that industry carries a beta of 1.20. What should be expected return on this new venture?

Answer:

(c) (I) (A) Desired beta is more than the existing beta, hence,

Value of Risk Free Investment to be sold

= (Portfolio Value × Desired Beta) Less (Portfolio Value × Present Beta)

= (2,00,000 × 1.8) − (2,00,000 × 1.50) = 3,60,000 − 3,00,000 = ₹ 60,000

(B) Desired beta is less than the existing beta, hence,

Value of Risk Free Investment to be bought

= (Portfolio Value × Present Beta) Less (Portfolio Value × Desired Beta)

= (2,00,000 × 1.5) − (2,00,000 × 1.10) = 3,00,000 − 2,20,000 = ₹ 80,000

(II) (A) Required return = Rf + β(Rm) = 7 + 1.1(5) = 12.5%

(B) Market value of shares = 8,00,000 × 40 = ₹ 320 Lakh

Debt Equity mix therefore = 400 : 320 (5 : 4)

Debt is assumed to be risk free

Beta of assets = (0) + 1.1 (4/9) = 0.489

(C) Cost of Capital is = 7 + 0.489 (5) = 9.445%

(D) Appropriate discount rate to be used for expansion is 9.445%

(E) Required return for the new venture: 7 + 1.2(5) = 13%.

5. Answer any two sub-divisions from (a) to (c): **10×2=20**

(a) A Ltd. company has undertaken market research at a cost of ₹ 4 Lakhs in order to forecast the future Cash Flows of an Investment Project with an expected life of four years as follows:

Year	1	2	3	4
Sales revenue	₹ 25,00,000	₹ 51,40,000	₹ 1,37,80,000	₹ 9,06,000
Costs	₹ 10,00,000	₹ 20,00,000	₹ 50,00,000	₹ 35,00,000

These forecast Cash Flows are before considering inflation of 4.7% p.a., The Capital Cost of the project, payable at the start of first year will be ₹ 40 Lakhs. The Investment Project will have zero scrap value at the end of the fourth year. The level of working capital investment at the start of each year is expected to be 10% of the sales revenue in that year.

Capital allowances would be available on the Capital Cost of the Investment Project on a

25% reducing balances basis. A Ltd. pays tax on Profit at an annual rate of 30% per year with tax being paid one year in arrears.

A Ltd. has a nominal (money terms) after tax Cost of Capital of 12% per year.

Discount Factor at 12% is as under:

Year	1	2	3	4	5
Discount Factor	0.893	0.797	0.712	0.636	0.567

Calculate the net Present Value of the Investment Project in nominal terms and comment on its financial acceptability. **10**

Answer:

5. (a) Calculation of Net Present value of the investment project using a nominal terms approach. (₹ In '000')

Year	1	2	3	4	5
Sales Revenue	2617.50	5634.52	15815.74	1088.72	-
Less Costs	1047.00	2192.42	5738.66	4205.86	-
Net Revenue	1570.50	3442.10	10077.08	(3117.14)	-
Less Tax Payable	-	(471.16)	(1032.64)	(3023.12)	-
Capital Allowance	-	300.00	225.00	168.76	506.26
After Tax Cash Flow	1570.50	3270.94	9269.44	-5971.50	506.26
Less Working Capital	(301.72)	(1018.12)	1472.70	108.87	-
Project Cash Flow	1268.78	2252.82	10742.14	(5862.63)	506.26
Discount Factor 12%	0.893	0.797	0.712	0.636	0.567
Present Value of Cash Flow	1133.02	1795.50	7648.40	(3728.63)	287.05

(₹ In '000')

P. V. of Future Cash Flow	7135.34
Less: Initial Investment	(4000.00)
Less: Working Capital	(261.76)
NPV	**2873.58**

The net present value is ₹ 2873.58. So the investment is financially acceptable.

Working Notes: (₹ In '000')

Year	1	2	3	4
Sales Revenue	2500	5140	13780	906
Inflated sales (by 4.7%)	2617.50	5634.52	15815.74	1088.72

Inflated costs have been calculated accordingly although the normal discount rate is 12% and general rate of inflation is 4.7%..

(b) (I) DJ Company has a Capital Structure of 20% debt and 80% equity. The company is considering various investment proposals costing less than ₹ 60 Lakhs. The company does not want to disturb its Present Capital Structure. The cost of raising the debt and equity are as follows:

Project Cost	Cost of debt	Cost of equity
Upto ₹ 10 Lakhs	9%	13%
Above ₹ 10 lakhs and upto ₹ 40 Lakhs	10%	14%
Above ₹ 40 lakhs and upto ₹ 80 Lakhs	11%	15%
Above ₹ 80 lakhs and upto ₹ 2 Crores	12%	15.55%

Assume that the tax rate is 50%. Compute the cost of two Projects A and B, whose fund requirements are ₹ 16 Lakhs and ₹ 44 Lakhs respectively. If the project are expected to yield after tax return of 11%, determine under what conditions it would be acceptable. **6**

(II) X enters into an arrangement with Y and receives advance against its receivables from P, Q, R and S. Y retains a margin of m % of an each of the receivables P & Q and n% on receivables R and S.

X instructs P, Q, R and S to make the payment to Y on the due dates.

Under the arrangement, if debts from P or Q turn bad, X bears the loss, whereas it receivable R or S turn bad debts, Y bears the loss.

Assume X and Y are Indian entities.

(A) What is the arrangements between X and Y called with respect to:
  (i) Receivables, from P and Q?
  (ii) Receivables, from R and S?

(B) What is the mathematical relationship between m and n?

(C) What aspects does the margin m% cover for Y?   1+1+1+1=4

Answer:

(b) (I)

Particulars	K_d(Debt)%	K_e(Equity)%	WACC = Ko
% of Debt and Equity	20%	80%	
Upto ₹ 10 Lakhs	9% × 50% = 4.5%	13%	4.5% × 20% + 13% × 80% = 11.30%
Above 10 Lakhs to 40 Lakhs	10% × 50% = 5.0%	14%	5.0% × 20% + 14% × 80% = 12.20%
Above 40 Lakhs to 80 Lakhs	11% × 50% = 5.5%	15%	5.5% × 20% + 15% × 80% = 13.10%
Above 80 Lakhs to 2 Crore	12% × 50% = 6.0%	15.55%	6.00%×20%+15.55%×80% =13.64%

Project	Investment	Wacc	Return	Decision
A	₹ 16 Lakhs	12.20%	11%	ROI<WACC
B	₹ 44 Lakhs	13.10%	11%	ROI<WACC

Project A would be acceptable when its return is greater than WACC ie. (12.20%)
Project B would be acceptable when its return is greater than 13.10%

(II) The arrangement between X and Y w.r.t. receivables from:

P & Q is called Recourse factoring;

R & S is called non recourse factoring

m is less than n.

(n – m) covers the compensation to the factor for the additional risk borne by him.

(c) (I) A firm has an investment proposal, requiring an outlay of ₹ 8 Lakhs. the investment proposal is expected to have two years economic life with no Salvage Value. In year 1, there is a 0.4 probability that Cash Inflow after tax will be ₹ 5 Lakhs and 0.6 probability that Cash Inflow after tax will be ₹ 6 Lakhs. the probability assigned to Cash Inflow after tax for the year 2 are as follows:

Cash Inflow for year I (₹)	5 Lakhs		6 Lakhs	
Cash Inflow for year II (₹)	₹	Probability	₹	Probability
	2.40 Lakh	0.2	4 Lakhs	0.4
	3.20 Lakh	0.3	5 Lakhs	0.5
	4.40 Lakh	0.5	6Lakhs	0.1

The firm uses 8% discount rate for this type of investment.

(i) Construct a decision tree for the proposed Investment Project.

(ii) Calculate the expected Net Present Value (NPV).

(iii) What Net Present Value will the project yield, if the worst outcome is realized?
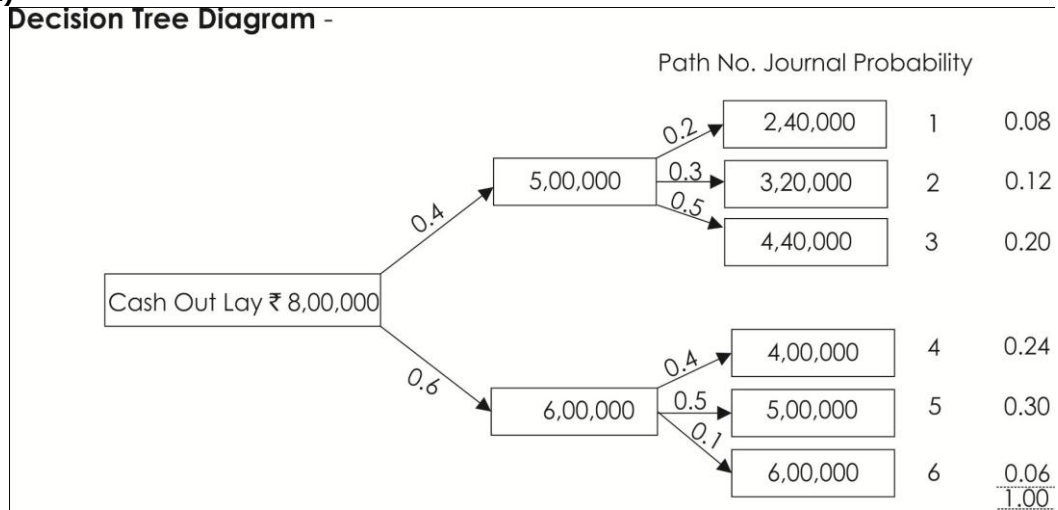   (8% discount factor 1 year 0.9259; 2 year 0.8573).   2+3+2=7

(II) A purchases an equipment with life 5 years and permits its use by B for 5 years under a non-cancellable contract; which provides for a fixed year end equal payments.

(i) What is the financing arrangement called?

(ii) What are the income tax benefits for A and B?

(A and B are Indian entities.) 1+2=3

Answer:

(c) (I)

Decision Tree Diagram -

The net present value of each path at 8% discount rate

Path	Year 1 Cash Flow (₹)	Year 2 Cash Flow (₹)	Total P.V. of Inflow	Cash inflow	NPV
1	500000×0.9259=462950	240000×0.8573=205750	668700	800000	-131300
2	462950	320000×0.8573=274340	737290	800000	-62710
3	462950	440000×0.8573=377210	840160	800000	40160
4	600000×0.9259=555540	400000×0.8573=342920	898460	800000	98460
5	555540	500000×0.8573=428650	984190	800000	184190
6	555540	600000×0.8573=514380	1069920	800000	269920

Statement Showing Expected Net Present Value:

N	NPV	Joint Probability	
1	-131300	0.08	-10504
2	-62710	0.12	-7525.2
3	40160	0.20	8032
4	98460	0.24	23630.4
5	184190	0.30	55257
6	269920	0.06	16195.20

Best outcome will be path 5 when the NPV is at ₹ 184190 the expected profit.

(II) Term of lease is equal to the life of the asset and is non cancellable. Hence, the arrangement is an operating lease.

A gets the tax advantage of depreciation of the asset. By charging depreciation, taxable profits are reduced.

B gets the expense write-off on the lease rentals. By charging off lease rentals, taxable profits get reduced.