CALCULATION OF DEBT BETA

QUESTION NO.7 ABC Ltd. manufactures Car Air Conditioners (ACs), Window ACs and Split ACs constituting 60%, 25% and 15% of total market value. The standalone Standard Deviation and Coefficient of Correlation with market return of Car AC and Window AC is as follows:

	S.D.	Coefficient of Correlation		S.D.	Coefficient of Correlation
Car AC	0.30	0.6	Window AC	0.35	0.7

No data for stand-alone SD and Coefficient of Correlation of Split AC is now available. However, a company who derives its half value from Split AC and half from Window AC has a SD of 0.50 and Coefficient of correlation with market return is 0.85. Index has a return of 10% and has SD of 0.20. Further, the risk-free rate of return is 4%.

You are required to determine: **(i)**Beta of ABC Ltd. **(ii)**Cost of Equity of ABC Ltd. **(iii)**Assuming that ABC Ltd. wants to raise debt of an amount by replacing equal to half of its Market Value then determine equity beta, if yield of debt is 5%. **[Hint**:The new weights of Equity & Debt is now 50% each]

Solution:

(i)Determination of Beta of Car AC and Window AC

Car AC: 0.6 x 0.3 / 0.2 = .90 ; **Window AC:** 0.7 x 0.35 / 0.2= 1.225

Beta of Split AC/ Window AC is 0.85 x 0.50/ 0.2 = 2.125

The Beta of Split AC alone is : 2.125 = 0.50 x Beta Of Split AC + 0.50 x Beta Of Window AC

or 2.125 = 0.50 x Beta Of Split AC + 0.50 x 1.225 or Beta Of Split AC = 3.025

ABC Ltd.'s Beta shall be: 0.6 x 0.9 + 0.25 x 1.225 + 0.15 x 3.025 = 1.30

(ii)Cost of Equity of ABC Ltd.: Ke = 4% + 1.30(10% - 4%) = 11.80%

(iii)Calculation of Debt Beta

Debt beta can be calculated by using this method i.e. Kd = Rf + debt beta(Rm - Rf)

5 = 4 + Debt Beta x (10 - 4) or Debt Beta = .167

CALCULATION OF COST OF EQUITY OF A PARTICULAR COMPANY WITH THE HELP OF PROXY ENTITY

QUESTION NO.8*(Exam Question)(8 Marks)* ABC, a large business house is planning to sell its wholly owned subsidiary B Ltd.Another large business entity A Ltd. has expressed its interest in making a bid for B Ltd.. A Ltd expects that after acquisition the annual earning synergy of B Ltd. will increase by 10%.

Following information, ignoring any potential synergistic benefits arising out of possible acquisitions, are available:

(i) Profit after tax for B Ltd. for the year which has just ended is estimated to be ₹ 10 crore.

(ii)B Ltd.'s after tax profit has an increasing growth rate of 7% each year and the same is expected to continue.

(iii) Estimated post tax market return is 10% and risk free rate is 4%. These rates are expected to continue.

(iv) Corporate tax rate is 30%.

	A Ltd	ABC	Proxy entity for B Ltd. in the same line of business
No. of shares	100 lakhs	80 lakhs	--
Current share price	₹ 287	₹ 375	--
Dividend pay out	40%	50%	50%
Debt : Equity at market values	1 : 2	1 : 3	1 : 4
P/E ratio	10	13	12
Equity beta	1	1. 1	1.1

Assume gearing level of B Ltd. to be the same as for ABC and a debt beta of zero. **You are required to calculate:**

(a) Appropriate cost of equity for B Ltd. based on the data available for the proxy entity.
(b)A range of values for B Ltd. both before and after any potential synergistic benefits to A Ltd of the acquisition based on PE Ratio & Dividend Growth Model using both proxy as well as A Ltd data where ever applicable.
Question (b) part may be framed in the following manner
(b)A range of values for KLM both before and after any potential synergistic benefits to XYZ of the acquisition.
Solution:
(a) Overall Beta for the proxy company = 1.1 x 4 / [4 + (1 - 0.3)] = 0.9362
Now we know that Overall Beta we remain same for every company belonging to the same sector.
Therefore we have 0.9362 = Equity Beta x 3/ [3 + (1 - 0.3)] OR Equity Beta = 1.1546
Cost of equity = 0.04 + 1.1546 x (0.1 – 0.04) = 10.93%
(b)P/E Valuation

(Based on earning of Rs. 10 Crore)	Using proxy Entity's P/E	Using A Ltd.'s P/E
Pre synergistic value	12 x Rs. 10 Crore = Rs. 120 Crore	10 x Rs. 10 Crore = Rs. 100 Crore
Post synergistic value	12 x Rs. 10 Crore x1.1 = Rs. 132 Crore	10 x Rs. 10 Crore x 1.1 = Rs. 110 Crore

Dividend valuation model	Based on 50% payout	Based on 40% payout
Pre synergistic value	0.5 x 10 x 1.07 / 0.1093 - 0.07 = Rs. 136.13 Crore	0.4 x 10 x 1.07 / 0.1093 - 0.07 =Rs. 108.91 Crore
Post synergistic value	0.5 x 10 x 1.1 x 1.07 / 0.1093 - 0.07 = Rs. 149.75 Crore	0.4 x 10 x 1.1 x 1.07 / 0.1093 - 0.07 = Rs. 119.79 Crore

Range of valuation	Minimum	Maximum
Pre synergistic	Rs. 100 Crore	Rs. 136.13 Crore
Post synergistic	Rs. 110 Crore	Rs. 149.75 Crore

APPLICATION OF INFLATION IN CAPITAL BUDGETING QUESTIONS

QUESTION NO.9A*(Exam Question)(10 Marks)* XY Limited is engaged in large retail business in India. It is contemplating for expansion into a country of Africa by acquiring a group of stores having the same line of operation as that of India.
The exchange rate for the currency of the proposed African country is extremely volatile. Rate of inflation is presently 40% a year. Inflation in India is currently 10% a year.
Management of XY Limited expects these rates likely to continue for the foreseeable future.

Estimated projected cash flows, in real terms, in India as well as African country for the first three years of the project are as follows:	Year 0	Year 1	Year 2	Year 3
Cash flows in Indian ₹	(50,000)	(1,500)	(2,000)	(2,500)
Cash flows in African Rands	(2,00,000)	+50,000	+70,000	+90,000

XY Ltd. assumes that the year 3 nominal cash flows will continue to be earned each year indefinitely. It evaluates all investments using nominal cash flows and a nominal discounting rate. The present exchange rate is African Rand 6 to ₹ 1.
You are required to calculate the net present value of the proposed investment of both Indian & African Operation considering the following:
(i) African Rand cash flows are converted into rupees and discounted at a risk adjusted rate.
(ii) All cash flows for these projects will be discounted at a rate of 20% to reflect it's high risk.

(iii) Ignore taxation.

	Year 1	Year 2	Year 3
PVIF @ 20%	.833	.694	.579

Solution:

Calculation of NPV

Year	0	1	2	3
Inflation factor in India	1.00	1.10	1.21	1.331
Inflation factor in Africa	1.00	1.40	1.96	2.744
Exchange Rate (as per PPPT)	6.00	7.6364	9.7190	12.3696
Cash Flows in ₹				
Real	-50000	-1500	-2000	-2500
Nominal (1)	-50000	-1650	-2420	-3327.50
Cash Flows in African Rand				
Real	-200000	50000	70000	90000
Nominal	-200000	70000	137200	246960
In Indian ₹ (2)	-33333	9167	14117	19965
Net Cash Flow in ₹(1)+(2)	-83333	7517	11697	16637

$$NPV = -83333 + \frac{7517}{(1+.20)^1} + \frac{11697}{(1+.20)^2} + \frac{1}{(1+.20)^2}\left[\frac{16637}{.20}\right] = -11185(\text{approx})$$

MODIFIED IRR

QUESTION NO.11*(Exam Question)(8 Marks)* XYZ Ltd., a company based in India, manufactures very high quality modem furniture and sells to a small number of retail outlets in India and Nepal. It is facing tough competition. Recent studies on marketability of products have clearly indicated that the customer is now more interested in variety and choice rather than exclusivity and exceptional quality. Since the cost of quality wood in India is very high, the company is reviewing the proposal for import of woods in bulk from Nepalese supplier.

The estimate of net Indian ₹ and Nepalese Currency (NC) cash flows for this proposal is shown below:

	Net Cash Flow (in millions)			
Year	0	1	2	3
NC	-25.000	2.600	3.800	4.100
Indian (₹)	0	2.869	4.200	4.600

The following information is relevant: (i)XYZ Ltd. evaluates all investments by using a discount rate of 9% p.a. All Nepalese customers are invoiced in NC. NC cash flows are converted to Indian (₹) at the forward rate and discounted at the Indian rate.**(ii)**Inflation rates in Nepal and India are expected to be 9% and 8% p.a. respectively. The current exchange rate is ₹ 1= NC 1.6

Assuming that you are the finance manager of XYZ Ltd., **calculate** the net present value (NPV) and modified internal rate of return (MIRR) of the proposal.

You may use following values with respect to discount factor for ₹ 1 @9%.

	PV	FV		PV	FV		PV	FV
Year 1	0.917	1.188	Year 2	0.842	1.090	Year 3	0.772	1

Solution:

Working Notes: (i)Computation of Forward Rates

End Of Year	NC	NC/₹

1	$NC\,1.60\times\left[\frac{1+.09}{1+.08}\right]$	1.615
2	$NC\,1.60\times\left[\frac{1+.09}{1+.08}\right]$	1.630
3	$NC\,1.630\times\left[\frac{1+.09}{1+.08}\right]$	1.645

(ii)NC Cash Flows converted in Indian Rupees

Year	NC (Million)	Conversion Rate	₹(Million)
0	-25.00	1.600	-15.625
1	2.60	1.615	1.61
2	3.80	1.630	2.33
3	4.10	1.645	2.49

Net Present Value(₹ Million)

Year	Cash Flow in India	Cash Flow in Nepal	Total	PVF @ 9%	PV
0	—	-15.625	-15.625	1.000	-15.625
1	2.869	1.61	4.479	0.917	4.107
2	4.200	2.33	6.53	0.842	5.498
3	4.600	2.49	7.09	0.772	5.473
					-0.547

Modified Internal Rate of Return

Year	0	1	2	3
Cash Flow (₹ Million)	-15.625	4.479	6.53	7.09
Year 1 Cash Inflow reinvested for 2 years (1.188 x 4.479)			5.32	
Year 2 Cash Inflow reinvested for 1 years (1.090 x 6.53)			7.12	
			19.53	

$$MIRR = \sqrt[n]{\frac{\text{Terminal Cash Flow}}{\text{Initial Outflow}}} - 1 = \sqrt[3]{\frac{19.53}{15.625}} - 1 = 7.72\%$$

CALCULATION OF EQUITY BETA IN CASE OF BUYBACK

QUESTION NO.15A ***(8 Marks)*** Equity of KGF Ltd. (KGFL) is ₹ 410 Crores, its debt, is worth ₹ 170 Crores. Printer Division segments value is attributable to 74%, which has an Asset Beta (β_{Asset}) of 1.45, balance value is applied on Spares and Consumables Division, which has an Asset Beta (β_{Asset}) of 1.20. KGFL Debt beta (β_{Debt}) is 0.24. **You are required to calculate:**

(i) Equity Beta (β_{Equity}) **(ii)**Ascertain Equity Beta(β_{Equity}), if KGF Ltd. decides to change its Debt Equity position by raising further debt and buying back of equity to have its Debt Equity Ratio at 1.90. Assume that the present Debt Beta (β_{Debt}) is 0.35 and any further funds raised by way of Debt will have a Beta (β_{Debt}) of 0.40.

(iii) Whether the new Equity Beta(β_{Equity}) justifies increase in the value of equity (beta) on account of leverage?

Solution:

(i)Equity Beta: To calculate Equity Beta first we shall calculate Weighted Average of Asset Beta as follows:
= 1.45 x 0.74 + 1.20 x 0.26 = 1.073 + 0.312 = 1.385

Accordingly, 1.385 = β_{Equity} x 410 / (410+170) + .24 x 170 / (410+170) or (β_{Equity}) = 1.86

(ii)Equity Beta on change in Capital Structure

Total Value After Buyback (Equity ₹ 410 cr + Debt ₹ 170 cr) i.e Debt + Equity = ₹ 580 Cr or Debt = 580 - Equity .....**(i)**[**Hint:**Why Total Value after Buyback is kept same? Since amount of debenture which will be issued will reduce the amount of equity due to its buybacK.So total value of Debt+Equity will be same.]

Desired Debt Equity Ratio 1.90 : 1.00 i.e D/E = 1.90 OR Debt = 1.90 Equity .....**(ii)**

From **(i)** & **(ii)** we get Equity = 200 crore and Debt = ₹ 380 Cr

Therefore Additional Amount of Debt to be raised = ₹ 380 Cr Less: Value of Existing Debt (₹ 170 Cr)= ₹ 210 Cr

Weighted Average Beta of KGFL:

Source of Finance	Investment (Rs Cr)	Weight	Beta of the Division	Weighted Beta
Equity	200	0.345	$\beta_{(E=X)}$	0.345x
Debt - 1	170	0.293	0.35	0.103
Debt - 2	210	0.362	0.40	0.145
	580	1.00	Weighted Average Beta	0.248 + (0.345x)

Now we know that Asset Beta always remain same, 1.385 = 0.248 + 0.345x or x i.e Equity Beta = 3.296

(iii)β_{Equity} before buyback= 1.86; β_{Equity} after buyback = 3.296; Beta equity increases after buyback.

Yes, there is a justification of such increase. Reason of such increase:Due to increase in Debt,which increases company's financial risk.

Additional Analysis: As we know that higher the proportion of debenture in a company, higher the risk of Equity. In short, A high debt/equity ratio is often associated with high risk; A high ratio also indicates that a company may be putting itself at a risk of default.