Cash Flow (₹)	-10,000	-4,000	15,000	5,000	10,000
Probability	0.10	0.15	0.40	0.25	0.10

Which project should be selected and why ?

(SM TYK –)

Solution:

Evaluation of project utilizes of Project A and Project B

	Project A		
Cash Flow (in ₹)	**Probability**	**Utility**	**Utility Value**
-15,000	0.10	-100	-10
-10,000	0.20	-60	-12
15,000	0.40	40	16
10,000	0.20	30	6
5,000	0.10	20	2
			2

	Project B		
Cash Flow (in ₹)	**Probability**	**Utility**	**Utility Value**
-10,000	0.10	-60	-6
-4,000	0.15	-3	-0.45
15,000	0.40	40	16
5,000	0.25	20	5
10,000	0.10	30	3
			17.55

Project B should be selected as its expected utility is more.

CHAPTER – 13

INTERNATIONAL FINANCIAL MANAGEMENT

PART I: INTERNATIONAL CAPITAL BUDGETING

Question – 01

ABC Ltd. is considering a project in US, which will involve an initial investment of US $ 1,10,00,000. The project will have 5 years of life. Current spot exchange rate is ₹ 48 per US $. The risk free rate in US is 8% and the same in India is 12%. Cash inflow from the project is as follows :

Year	Cash in flow
1	US $ 20,00,000
2	US $ 25,00,000
3	US $ 30,00,000
4	US $ 40,00,000
5	US $ 50,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%.

(SM TYK – 01)

Solution:

RADR of USA $= \left[\left(\frac{1.14}{1.12} \times 1.08\right) - 1\right] \times 100$

$= 9.9\%$

Calculation of NPV

Year	Cash Flow (Million) US$	PV Factor @ 9.9%	P.V.
1	2.00	0.910	1.820
2	2.50	0.828	2.070
3	3.00	0.753	2.259
4	4.00	0.686	2.744
5	5.00	0.624	3.120

		Less: Investment NPV	12.013 11.000 1.013

Therefore, Rupee NPV of the project is = ₹ (48 × 1.013) Million

= ₹ 48.624 Million

Question – 02

X Ltd., an Indian company, is considering a proposal to make an investment of USD 1,65,00,000 in Latin America. The project will have a life of 5 years. The current spot exchange rate is INR/USD 72. All investments and revenues will occur in USD. The USD and INR risk free rates are 8% and 12% respectively.

The following cash flow is expected from the project.

Year	Cash Inflows (USD)
1	30,00,000
2	37,50,000
3	45,00,000
4	60,00,000
5	75,00,000

Assume required rate of return on the project as 14%.

You are required to calculate:

(i) The viability of the project using foreign currency approach.

(ii) What will be the impact if there is a withholding tax of 10% applicable on the project.

(Exam January – 2021)

Solution:

(i) NPV

RADR of USA $= \left[\left(\frac{1.14}{1.12} \times 1.08\right) - 1\right] \times 100$

= 9.93%

NPV = ($ 30,00,000 × 0.910) + ($ 37,50,000 × 0.827) + ($ 45,00,000 × 0.753) + ($ 60,00,000 × 0.685) + ($ 75,00,000 × 0.623) – 1,65,00,000

= $ 15,02,250

NPV in (₹) = $ 15,02,250 × 72

= ₹ 10,81,62,000

Since NPV is positive hence project should be accepted.

(ii) Withholding Tax

PVCI (15,02,250 + 1,65,00,000)	= 18,00,02,250
(-) withholding tax	= 10%
PVCI	= $ 1,62,02,025
(-) PVCO	= $ 1,65,00,000
NPV	= - $ 2,97,975

NPV in (₹) = - $ 2,97,975 × 72

= - ₹ 2,14,54,200

NPV is negative project should be rejected.

Question – 03

DK Ltd. is considering as investment proposal in Sri Lanka involving an initial investment of LKR 25 billion. The current spot exchange rate is INR/LKR 0.37. The risk free rate in India is 6% and the same is Sri Lanka is 5.02%. The project will generate a cash flow of LKR 5 billion in the first year. The cash flow will increase by LKR 1 billion each year for the next 4 years. The project will bind up on completion of 5 years with no salvage value.

The required rate of return for the project is 8%

(i) You are required to find out the investment worth of the project by

(a) Home Currency Approach

(b) Foreign Currency Approach

(ii) Compare the outcome under both the approaches.

Given :

t	1	2	3	4	5
PVIF (8%, t)	0.92593	0.85734	0.79383	0.75503	0.68058
PVIF (7%, t)	0.93457	0.87344	0.81630	0.76290	0.71299

(Exam December – 2021)

Solution:

Working Notes :

Calculation of Forward Exchange Rates

End of Year	₹	₹/KR
1	$0.37 \times \frac{1.06}{1.052}$	0.373
2	$0.373 \times \frac{1.06}{1.052}$	0.376
3	$0.376 \times \frac{1.06}{1.052}$	0.380
4	$0.379 \times \frac{1.06}{1.052}$	0.384
5	$0.382 \times \frac{1.06}{1.052}$	0.388

(i) Home Currency Approach

Year	Cash Flow Billon LKR	₹/LKR	Cash Flow Billon ₹	PVF @ 8%	PV Billion ₹
1	5	0.373	1.865	0.92593	1.7269
2	6	0.376	2.256	0.85734	1.9342
3	7	0.380	2.660	0.79383	2.1116
4	8	0.384	3.072	0.73503	2.2580
5	9	0.388	3.492	0.68058	2.3766
					10.4073
Less: Investment	25	0.37			9.2500

				NPV	1.1573

*Alternatively if students have used the PVIF (8%, 4) as given in the question paper then answer NPV would be 1.2188 instead of 1.1573

(ii) Foreign Currency Approach

(1 + 0.06) (1 + Risk Premium) =1.08

1 + Risk Premium = 1.08/1.06 = 1.01887

Therefore, Risk adjusted LKR Rate = 1.01887× 1.0502 – 1 = 0.07

Calculation of NPV

Year	Cash Flow (Billon LKR)	PVF @ 7%	PV (Billion LKR)
1	5	0.93457	4.6729
2	6	0.87344	5.2406
3	7	0.81630	5.7141
4	8	0.76290	6.1032
5	9	0.71299	6.4169
			28.1477
Less: Investment			25.0000
		NPV	3.1477

Thus, Rupee NPV of the project = 0.37 × 3.1477 = 1.1646 billion

Decision: NPV is positive in the approach so, project will worth investment.

Question – 04

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 ₹ (000)	–50,000	–1,500	–2,000	–2,500
Cash flows in African Rands (000)	–2,00,000	+50,000	+70,000	+90,000

XY Ltd. assumes 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 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

(SM TYK – 03 & Exam May – 2013)

Solution:

Step 1: Calculation of Exchange Rate

$$FR = SR \times \frac{1+i}{1+i}$$

$$\text{Year 1 FR} = 6 \times \frac{1.40}{1.10} = 7.6364$$

$$\text{Year 2} = 7.6364 \times \frac{1.40}{1.10} = 9.7191$$

$$\text{Year 3} = 9.719 \times \frac{1.40}{1.10} = 12.3696$$

	0	1	2	3
Real CF (AR)	- 2,00,000	+ 50,000	+ 70,000	+ 90,000

Nominal CF (40%)	- 2,00,000	+ 70,000	+ 1,37,200	+ 2,46,960
Exchange rate (AR/€)	6	7.6364	9.7191	12.3696
Nominal CF (₹) (1)	- 33,333	+ 9167	+14,117	+ 19,965
Real CF (India)	- 50,000	- 1,500	- 2,000	- 2,500
NCF (2)	- 50,000	- 1,650	- 2,420	- 3,328
Total CF (1) + (2)	- 83,333	+ 7517	+ 11,697	+ 16,637
(×) PVF @ 20%	1.000	0.833	0.694	0.579
PV	- 83,333	+ 6,262	+ 8,118	+ 9,633

Present Value = - 59,320

(+) PV of TV $= \left(\frac{16,637}{20\%}\right) \times 0.579$ = 48,164

NPV = -11,156 Reject

Question – 05

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 customers are 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 in Nominal terms for this proposal is shown below:

Year	Net Cash Flow (in millions)			
	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%.

	Present Value	Future Value
Year 1	0.917	1.188
Year 2	0.842	1.090
Year 3	0.772	1

(SM TYK – 05 & Exam November – 2015)

Solution:

(i) Calculation of NPV

Step 1: Forward Rates

1 $= \text{NC } 1.60 \times \frac{1.09}{1.08} = 1.6148$

2 $= \text{NC } 1.6148 \times \frac{1.09}{1.08} = 1.6298$

3 $= \text{NC } 1.6298 \times \frac{1.09}{1.08} = 1.6449$

Step 2: NPV

	0	1	2	3
CF (NC)	- 25.000	+ 2.600	+ 3.800	+ 4.100
Exchange rate (NC/₹)	1.60	1.6148	1.6298	1.6449
CF (₹)	- 15.625	+ 1.6101	+ 2.3316	+ 2.4926
CF India	0	+ 2.869	+ 4.200	+ 4.600
Total CF	- 15.625	4.4791	6.5316	7.0926
X PVF (9%)	1	0.917	0.842	0.772
PV	- 15.625	+ 4.1073	+ 5.4996	+ 5.4755

NPV = - 0.5426

(ii) Modified IRR

Terminal value

(1) $4.4791\ (1.09)^2 = 5.3216$

(2) $6.5316 \times 1.09 = 7.1194$

(3) $= 7.0926$

$= 19.53$

$15.625\ (1 + r)^3 = 19.53$

$$r = \left[\left(\frac{19.53}{15.625}\right)^{1/3} - 1\right] \times 100$$

$= 7.72\%$

Question – 06

DD Ltd. a company based in India manufactures good quality of leather bags and sells to retail outlets in India and USA. The cost of quality leather in India is very high, the company is reviewing the proposal of importing of leather in bulk from USA supplier. The estimate of net US $ and Indian ₹ Currency Cash Flows in nominal terms for this proposal is given below:

	Net Cash Flow (in Lakh)			
Year	0	1	2	3
In US $	(25)	5	7	8
In ₹	0	60	80	90
If not imported cost of leather to be purchased in India (in ₹)	400	450	500	600

Other information:

(i) DD Ltd. evaluates all investments by using discount rate of 9% p.a.

(ii) All US customers are invoiced in US $. US $ Cash flows converted into ` at the forward rate and discounted at Indian Rate.

(iii) Inflation in USA and India are expected to be 9% and 8% respectively.

(iv) The current exchange rate 1 US $ = ₹ 74

You are required to Calculate Net Present Value and recommend the decision. Present value factor @ 9% are as under:

1 Year	2 Year	3 Year
0.917	0.842	0.772