

Question 1: RTP May 2023

XYZ has taken a six-month loan from its foreign collaborator for USD 2 millions. Interest is payable on maturity @ LIBOR plus 1%. The following information is available:

Spot Rate	INR/USD	68.5275
6 months Forward rate	INR/USD	68.4575
6 months LIBOR for USD	2%	
6 months LIBOR for INR	6%	

You are required to :

- Calculate Rupee requirements if forward cover is taken.
- Advise the company on the forward cover.

What will be your opinion if spot rate of INR/USD is 68.4275

Solution 1:

In (i) Rupee requirement if forward cover is taken:

6 Month Forward rate	68.4575
Interest amount $(20,00,000 \times 3\% \times \frac{6}{12})$	US\$ 30,000
Principal amount	US\$ 20,00,000
	US\$ 20,30,000

Rupee Requirement = INR 68.4575 X US\$ 20,30,000 = INR 13,89,68,725

* LIBOR + 1%

- Forward Rate as per Interest Rate Parity after 6 months is expected to be:

$$= 68.5275 \times \frac{(1.03)}{(1.01)} = 69.8845/\text{US\$}$$

The company should take forward cover because as per Interest Rate Parity, the rate after 6 months is expected to be higher than forward rate.

However, if spot rate is 68.4275, the expected rate as per Interest Rate Parity shall be:

$$68.4275 \times \frac{(1.03)}{(1.01)} = 69.7825/\text{US\$}$$

Thus, still the company should take forward cover.

Question 2: MTP 1 May 2023 (March)

ZX Ltd. has made purchases worth USD 80,000 on 1st May 2020 for which it has to make a payment on 1st November 2020. The present exchange rate is INR/USD 75. The company can purchase forward dollars at INR/USD 74. The company will have to make an upfront premium @ 1 per cent of the forward amount purchased. The cost of funds to ZX Ltd. is 10 per cent per annum.

The company can hedge its position with the following expected rate of USD in foreign exchange market on 1st May 2020:

Exchange Rate	Probability
(i) INR/USD 77	0.15
(ii) INR/USD 71	0.25
(iii) INR/USD 79	0.20
(iv) INR/USD 74	0.40

You are required to advise the company for a suitable cover for risk.

Solution 2:

- If ZX Ltd. does not take forward (Unhedged Position):**

$$\begin{aligned} \text{Expected Rate} &= ₹ 77 \times 0.15 + ₹ 71 \times 0.25 + ₹ 79 \times 0.20 + ₹ 74 \times 0.40 \\ &= ₹ 11.55 + ₹ 17.75 + ₹ 15.80 + ₹ 29.60 = ₹ 74.70 \\ \text{Expected Amount Payable} &= \text{USD } 80,000 \times ₹ 74.70 = ₹ 59,76,000 \end{aligned}$$

- If the ZX Ltd. hedge its position in the forward market:**

Particulars	Amount (₹)
If company purchases US\$ 80,000 forward premium is $(80000 \times 74 \times 1\%)$	59,200
Interest on ₹ 59,200 for 6 months at 10%	2,960

Total hedging cost (a)	62,160
Amount to be paid for US\$ 80,000 @ ₹ 74.00 (b)	59,20,000
Total Cost (a) + (b)	59,82,160

Advice: Since cashflow is less in case of unhedged position company should opt for the same.

Question 3: MTP 1 May 2023 (March)

An importer booked a forward contract with his bank on 1st September, for US \$ 5,00,000 due on 1st February @ ₹ 82.60. The bank covered its position in the market @ ₹ 80.90

The exchange rates for dollar in the interbank market on 1st February and 15th February were:

	1st February	15th February
Spot USD 1 =	₹ 80.10/18	₹ 80.01/12
Spot/February	₹ 80.35/45	₹ 80.10/30
March	₹ 80.55/65	₹ 80.45/55
April	₹ 80.70/80	₹ 80.65/75
May	₹ 80.85/95	₹ 80.80/90

Exchange margin is 0.18% and interest on outlay of funds is @ 15%. The importer requested on 15th February for the extension of contract with due date on 1st May.

Rates rounded to 2 decimals.

On 1st February, Bank swaps by selling spot and buying one month forward. Calculate:

- Cancellation rate.
- Amount payable on \$5,00,000.
- Swap loss.
- Interest on outlay of funds, if any.
- New contract rate.
- Total cost.

(Note: Assume 365 days in a Year)

Solution 3:

(i) Cancellation Rate:

The forward sale contract shall be cancelled at Spot TT Purchase for \$ prevailing on the date of cancellation as follows:

\$/ ₹ Market Buying Rate	₹ 80.01
Less: Exchange Margin @ 0.18%	₹ 0.14
	₹ 79.87

(ii) Amount payable on \$ 5,00,000

Bank sells \$ 5,00,000 @ ₹ 82.60	₹ 4,13,00,000
Bank buys \$ 5,00,000 @ ₹ 79.87	₹ 3,99,35,000
Amount payable by customer	₹ 13,65,000

(iii) Swap Loss

On 1st February the bank does a swap sale of \$ at market buying rate of ₹ 80.10 and forward purchase for one month at market selling rate of ₹ 80.45.

Bank buys at	₹ 80.45
Bank sells at	₹ 80.10
Amount payable by customer	₹ 0.35

Swap Loss for \$ 5,00,000 in ₹ = ₹ 1,75,000

(iv) Interest on Outlay of Funds

On 1st February, the bank receives delivery under cover contract at ₹ 80.90 and sell spot at ₹ 80.10.

Bank buys at	₹ 80.90
Bank sells at	₹ 80.10
Amount payable by customer	₹ 0.80

Outlay for \$ 5,00,000 in ₹ 4,00,000

Interest on ₹ 4,00,000 @ 15% for 15 days ₹ 2,465.75

(v) New Contract Rate

The contract will be extended at current rate

\$/ ₹ Market forward selling Rate for April	₹ 80.75
Add: Exchange Margin @ 0.18%	₹ 0.14
	₹ 80.89

Rounded off to ₹ 80.90

(vi) Total Cost

Cancellation Charges	₹ 13,65,000.00
Swap Loss	₹ 1,75,000.00
Interest	₹ 2,465.75
	₹ 15,42,465.75

Question 4: MTP 2 May 2023 (April)

You have the following quotes from Bank X and Bank Y:

	Bank X	Bank Y
SPOT	USD/CHF 1.0750/55	USD/CHF 1.0753/60
3 months	5/10	
6 months	8/16	
SPOT	GBP/USD 1.1945/60	GBP/USD 1.1940/50
3 months	25/20	
6 months	37/26	

Calculate:

- How much minimum CHF amount you have to pay for 1 Million GBP spot?
- Considering the quotes from Bank X only, for GBP/CHF what are the Implied Swap points for both Bid and Offer Spot rates over 5 months?

Solution 4:

(i) To Buy 1 Million GBP Spot against CHF

- First to Buy USD against CHF at the cheaper rate i.e. from Bank X.

$$1 \text{ USD} = \text{CHF } 1.0755$$

- Then to Buy GBP against USD at a cheaper rate i.e. from Bank Y.

$$1 \text{ GBP} = \text{USD } 1.1950$$

Thus Buying rate would be

$$1 \text{ GBP} = 1.1950 \times 1.0755 \text{ CHF}$$

$$1 \text{ GBP} = \text{CHF } 1.2852$$

Amount payable CHF 1.2852 Million or CHF 12,85,200

(ii) Spot rate Bid rate GBP 1 = CHF 1.0750 * 1.1945 = CHF 1.2841

$$\text{Offer rate GBP 1} = \text{CHF } 1.0755 \times 1.1960 = \text{CHF } 1.2863$$

To calculate swap points for Spot over 5 months first we shall calculate Forward rate for 5 months for USD / CHF and then GBP / USD.

USD / CHF 3 months swap points and 6 month swap points are 5/10 and 8/16 respectively. So, swap points for 5 months:

$$\text{For Bid rate } \{5 + [(8-5) \times 2/3]\} = 7$$

$$\text{For Ask rate } \{10 + [(16-10) \times 2/3]\} = 14$$

USD / CHF 5 months 7/14 swap points are premium

$$\text{Hence, outright 5 Months Forward rate USD/ CHF shall be } (1.0750 + 0.0007) 1.0757 / (1.0755 + 0.0014) 1.0769$$

GBP / USD 3 months swap points and 6 months swap points are 25/20 and 37/26 respectively.

So, swap points for 5 months:

$$\text{For Bid rate } \{25 + [(37-25) \times 2/3]\} = 33$$

$$\text{For Ask rate } \{20 + [(26-20) \times 2/3]\} = 24$$

GBP / USD 5 months 33/24 swap points are discount

$$\text{Hence, outright 5 Months Forward rate GBP/ USD shall be } (1.1945 - 0.0033) 1.1912 / (1.1960 - 0.0024) 1.1936$$

$$\text{Accordingly, the Outright 5 Months forward rate of GBP / CHF shall be } (1.1912 \times 1.0757) 1.2814 / (1.1936 \times 1.0769) 1.2854$$

$$\text{5 Months forward rate GBP 1} = \text{CHF } 1.2814 / 1.2854$$

Spot Rate GBP 1 = CHF 1.2841 / 1.2863
Therefore 5-month swap points are at discount of 27/9.

Question 5: May 2023

Export Ltd., an export oriented unit invoices in the currency of the importer. It is expecting a receipt of USD 2,40,000 on 1st August, 2022 for the goods exported on 1st May, 2022.

The following information is available as on 1st May, 2022:

Exchange Rates		Currency Futures		Contract Size
USD/INR		USD/INR		
Spot	0.0125	May	0.0126	₹ 6,40,000/-
1 Month Forward	0.0124	July	0.0125	
3 Months Forward	0.0123			

Initial Margin		Interest Rates in India
May	₹ 15,000	9%
August	₹ 26,000	8.5%

On 1st August, 2022 the spot rate USD/INR is 0.0126 and currency future rate is 0.0125.

Suggest a suitable approach to Export Ltd. that would be most advantageous out of the following methods.

- Forward Contract
- Currency Futures
- No hedge

Assume that the variation in margin would be settled on the maturity of the futures contract.

Solution 5:

Receipts using a forward contract USD 2,40,000/0.0123	= ₹ 1,95,12,195
Receipts using currency futures The number of contracts needed is (USD 2,40,000/0.0125)/6,40,000	= 30
Initial margin payable is 30 contracts x ₹ 26,000	= ₹ 7,80,000
On August 1, 2022 Close at 0.0125	
Receipts = USD 2,40,000/0.0126	= ₹ 1,90,47,619
Less: Interest Cost – (7,80,000 x 0.085 x 3/12)	= ₹ 16,575
Net Receipts	₹ 1,90,31,044

Question 6: May 2023

Hopeful Ltd., an Indian MNC is executing a plant in Nepal. It has raised ₹ 400 Billion. Half of the amount will be required after six months' time. Hopeful Ltd. is looking for an opportunity to invest this amount for a period of six months. It is considering following two options:

Market	UK	Europe
Nature of Investment	Index Fund (GBP)	Treasury Bills (Euro)
Dividend (GBP in Billions)	0.1369	-
Income from stock lending (GBP in Billions)	0.0007	-
Discount on the investment value at the end	2%	-
Interest	-	7.8 percent per annum
Exchange Rate (Spot)	GBP/ INR 0.0099	EUR/INR 0.011
Exchange Rate (6 month Forward)	GBP/ INR 0.0100	EUR/INR 0.011

As an investment manager, advise the best option to invest.

Solution 6:

(i) Investment in UK Market

(in billions)

Particulars	Currency INR	ER	Currency GBP
Available amount	200	0.0099	1.98
Dividend Income			0.1369
Stock Lending Income			0.0007
Investment value at the end after discount @ 2%			1.9404
			2.0780

Amount available at the end of 6- months			
Conversion after 6 months		0.0100	₹ 207.80
Gain			₹ 7.80

(ii) Investment in Europe

(in billions)

Particulars	Currency INR	ER	EUR
Available amount	200	0.011	2.2000
Interest for 6 months @ 7.80% p.a.			0.0858
Amount available at the end			2.2858
Amount available at the end of 6-months			
Conversion after 6 months		0.011	₹ 207.80
Gain			₹ 7.80

The gain amount is the same in both the options so Hopeful Ltd. is indifferent. However, Treasury Bills are risk free, so investment in Treasury Bills (Euro) is suggested.

Alternative Solution

(i) If investment is made in Index Fund (GBP)

Initial Investment (₹ 200 Billion x 0.0099)	GBP 1.9800 billions
Dividend Income	GBP 0.1369 billions
Income from Stock Lending	GBP 0.0007 billions
Discount	(GBP 0.0396 billions)
Value of Investment after 6 months	GBP 2.0780 billions
Value of Investment after 6 months in ₹ @ GBP/ INR	₹ 207.8000 billions

(ii) If investment is made in Treasury Bills (Europe)

Initial Investment (₹ 200 Billion x 0.011)	EUR 2.2000 billions
Interest for 6 months @ 7.8% p.a.	EUR 0.0858 billions
Value of Investment after 6 months	EUR 2.2858 billions
Value of Investment after 6 months in ₹ @ EUR/ INR 0.011	₹ 207.8000 billions

The equivalent amount is same in both the options so Hopeful Ltd. is indifferent. However, Treasury Bills are risk free, so investment in Treasury Bills (EUR) is suggested.

Question 7: RTP Nov 2023

The following table shows interest rates for the United States Dollar and French Franc. The spot exchange rate is 7.05 Franc per Dollar. Complete the missing entries:

	3 Months	6 Months	1 Year
Dollar interest rate (annually compounded)	11½%	12¼%	?
Franc interest rate (annually compounded)	19½%	?	20%
Forward Franc per Dollar	?	?	7.5200
Forward discount per Franc (percent per year)	?	6.3%	

Solution 7:**Computation of Missing Entries in the Table:**

For computing the missing entries in the table we will use Interest Rates Parity (IRP) theorem

$$\text{Or } \frac{(1+r_f)}{(1+r_d)} = \frac{S_{f/d}}{F_{f/d}}$$

Where,

r_f is the rate of interest of country F (say the foreign country)

r_d is rate of interest of country D (say domestic country)

$S_{f/d}$ is the spot rate between the two countries F and D and

$F_{f/d}$ is the forward rate between the two countries F and D.

(i) **3 months**

(1) Dollar interest rate = $11\frac{1}{2}\%$ (annually compounded)

Franc interest rate = $19\frac{1}{2}\%$ (annually compounded)

Then Forward Franc per Dollar rate would be:

$$= 7.05 \left(\frac{1 + \frac{0.195}{4}}{1 + \frac{0.115}{4}} \right) = 7.05 \left(\frac{1 + 0.04875}{1 + 0.02875} \right)$$

$$= \text{Franc 7.19 per US Dollar}$$

(2) Further Forward discount per Franc per cent per year = Interest Differential i.e.

$$= 19\frac{1}{2}\% - 11\frac{1}{2}\% = 8\%$$

Alternatively, more precisely it can also be computed as follows:

Spot per Franc Rate = $1 / 7.05 = \text{US Dollar } 0.142 \text{ per Franc}$

One Year Forward Rate = $0.142 \left(\frac{1 + 0.115}{1 + 0.195} \right) = \text{US Dollar } 0.132 \text{ per Franc}$

Accordingly, the discount per annum will be = $\frac{0.142 - 0.132}{0.142} \times 100 = 7.04\%$

Alternatively, it can also be computed using forward rate computed above as follows:

Forward per Franc Rate = $1 / 7.19 = 0.139$

Accordingly, the discount per annum will be = $\frac{0.142 - 0.139}{0.142} \times \frac{12}{3} \times 100 = 8.45\%$

(ii) 6 months

(1) Forward discount on Franc % per year = - 6.3% or - 3.15% for 6 months

Spot per Franc Rate = US\$ 0.142

Forward per Franc Rate = $\text{US\$ } 0.142 \times (1 - 0.0315)$
 $= \text{US\$ } 0.138$

Accordingly, Forward Francs per US\$ = $1 / 0.138 = 7.25$

Alternatively, it can also be computed as follows:

6 months Forward rate = $7.05 / (100\% - 3.15\%)$

Forward Francs per Dollar = 7.28 Francs

(2) Let r be the Franc interest rate (annually compounded) then as per IRP Theory:

$$7.05 \left(\frac{1 + \frac{r}{2}}{1 + \frac{0.1225}{2}} \right) = \text{Franc 7.25 per Dollar}$$

On solving the equation, we get the value $r = 18.27\%$ i.e. Franc Interest rate (annually compounded)

Alternatively, it can also be computed as follows:

$$7.05 \left(\frac{1 + \frac{r}{2}}{1 + \frac{0.1225}{2}} \right) = \text{Franc 7.28 per Dollar}$$

On solving the equation we get the value of $r = 19.17\%$ i.e. Franc interest rate (annually compounded)

(iii) 1 Year

Franc interest rate = 20% (annually compounded)

Forward Franc per Dollar = 7.5200

As per Interest Rate Parity the relationship between the two countries rate and spot rate is

$$7.52 = 7.05 \left(\frac{1 + \text{Franc Interest Rate}}{1 + \text{Dollar Interest Rate}} \right)$$

$$\text{i.e.} = \frac{1 + \text{Dollar interest rate}}{1 + 0.20} = \frac{7.05}{7.52}$$

Accordingly, the Dollar interest rate = $1.20 \times 0.9374 - 1 = 1.125 - 1 = 0.125$ or 12.5%.

The completed Table will be as follows:

	3 Months	6 Months	1 Year
Dollar interest rate (annually compounded)	11½%	12¼%	12.50%
Franc interest rate (annually compounded)	19½%	19.17% or 18.27%	20%
Forward Franc per Dollar	7.19	7.25 or 7.28	7.5200
Forward discount per Franc percent per year	8% or 7.04% or 8.45%	6.3%	

Question 8: MTP 1 Nov 2023 (September)

On 1st October 2021 Mr. P an exporter enters into a forward contract with a XYZ Bank to sell US\$ 5,00,000 on 31 December 2021 at ₹ 75.40/\$. However, due to the request of the importer, Mr. P received amount on 28th November 2021. Mr. P requested the bank to take the delivery of the remittance on 30th November 2021 i.e. before due date. The inter-banking rates on 28th November 2021 were as follows:

Spot	₹ 75.22/75.27
One Month Premium	10/15

If bank agrees to take early delivery then what will be net inflow to Mr. P assuming that the prevailing prime lending rate is 18%.

Note:

1. Consider 365 days a year
2. Round off final calculation in Rupees i.e. not in paisa

Solution 8:

Bank will buy from customer at the agreed rate of ₹ 83.10. In addition to the same if bank will charge/ pay swap difference and interest on outlay funds.

(a) Swap Difference	
Bank Sells at Spot Rate on 28th November 2021	₹ 75.22
Bank Buys at Forward Rate of 31st December 2021 (75.27 + 0.15)	₹ 75.42
Swap Loss per US\$	₹ 00.20
Swap loss for US\$ 5,00,000	₹ 1,00,000
(b) Interest on Outlay Funds	
On 28th November Bank sells at	₹ 75.22
It buys from customer at	₹ 75.40
Outlay of Funds per US\$	₹ 00.18
Interest on Outlay fund for US\$ 5,00,000 for 31 days (US\$500000 x 00.18 x 31/365 x 18%)	₹ 1,376
(c) Charges for early delivery	
Swap loss	₹ 1,00,000
Interest on Outlay fund for US\$ 5,00,000 for 31 days	₹ 1,376
	₹ 1,01,376
(d) Net Inflow to Mr. P	
Amount received on sale (₹ 75.40 x 5,00,000)	₹ 3,77,00,000
Less: Charges for early delivery payable to bank	(₹ 1,01,376)
	₹ 3,75,98,624

Question 9: MTP 1 Nov 2023 (September)

Your bank's London office has surplus funds to the extent of USD 10,00,000/- for a period of 3 months. The cost of the funds to the bank is 4% p.a. It proposes to invest these funds in London, New York or Frankfurt and

obtain the best yield, without any exchange risk to the bank. The following rates of interest are available at the three centres for investment of domestic funds there at for a period of 3 months.

London	5 % p.a.
New York	8% p.a.
Frankfurt	3% p.a.

The market rates in London for US dollars and Euro are as under:

London on New York

Spot	1.5350/90
1 month	15/18
2 months	30/35
3 months	80/85

London on Frankfurt

Spot	1.8260/90
1 month	60/55
2 months	95/90
3 months	145/140

At which centre, investment will be made & what will be the net gain (to the nearest pound) to the bank on the invested funds?

Solution 9:

(i) If investment is made at London

Convert US\$ 10,00,000 at Spot Rate (10,00,000/1.5390) = £ 6,49,773

Add: £ Interest for 3 months on £ 6,49,773 @ 5% = £ 8,122

= £ 6,57,895

Less: Amount Invested \$10,00,000

Interest accrued thereon \$ 10,000

= \$10,10,000

Equivalent amount of £ required to pay the

Above sum (\$10,10,000/1.5430*) = £ 6,54,569

Arbitrage Profit = £ 3,326

(ii) If investment is made at New York

Gain \$ 10,00,000 (8% - 4%) x 3/12 = \$ 10,000

Equivalent amount in £ 3 months (\$ 10,000/ 1.5475) £ 6,462

(iii) If investment is made at Frankfurt

Convert US\$ 10,00,000 at Spot Rate (Cross Rate) 1.8260/1.5390= € 1.1865

Euro equivalent US\$ 10,00,000 = € 11,86,500

Add: Interest for 3 months @ 3% = € 8,899

= € 11,95,399

3 month Forward Rate of selling € (1/1.8150) = £ 0.5510

Sell € in Forward Market € 11,95,399 x £ 0.5510 = £ 6,58,665

Less: Amount invested and interest thereon = £ 6,54,569

Arbitrage Profit = £ 4,096

Since, out of the three options maximum profit is in case investment is made in Frankfurt. Hence, it should be opted.

* Due to conservative outlook.

Question 10: MTP 2 Nov 2023 (October)

XP Pharma Ltd., has acquired an export order for ₹ 10 million for formulations to a European company. The Company has also planned to import bulk drugs worth ₹ 5 million from a company in UK. The proceeds of exports will be realized in 3 months from now and the payments for imports will be due after 6 months from now. The invoicing of these exports and imports can be done in any currency i.e. Dollar, Euro or Pounds sterling at the company's choice. The following market quotes are available.

	Spot Rate	Annualised Premium
₹/\$	67.10/67.20	\$ - 7%
₹/Euro	63.15/63.20	Euro - 6%
₹/Pound	88.65/88.75	Pound - 5%

Advice XP Pharma Ltd. about invoicing in which currency.

(Calculation should be upto three decimal places).

Solution 10:

(i) Proceeds of Exports in INR = ₹ 10 Million

Position of Inflow under three currencies will be as follows:

Currency	Invoice at Spot Rate	Expected Rate after 3-months	Conversion in INR after 3-months
\$	₹ 100,00,000/ ₹ 67.10 = \$ 149031.297	₹ 67.10 (1 + 0.07/4) = ₹ 68.27	₹ 68.27 x \$ 149031.297 = ₹ 1,01,74,367
€	₹ 100,00,000/ ₹ 63.15 = € 1,58,353.127	₹ 63.15 (1 + 0.06/4) = ₹ 64.10	₹ 64.10 x € 1,58,353.127 = ₹ 1,01,50,435
£	₹ 100,00,000/ ₹ 88.65 = £ 1,12,803.158	₹ 88.65 (1 + 0.05/4) = ₹ 89.76	₹ 89.76 x £ 1,12,803.158 = ₹ 1,01,25,211

(ii) Payment of Import in INR = ₹ 5 Million

Position of outflow under three currencies will be as follows:

Currency	Invoice at Spot Rate	Expected Rate after 6-months	Conversion in INR after 6-months
\$	₹ 50,00,000/ ₹ 67.20 = \$ 74404.762	₹ 67.20 (1 + 0.07/2) = ₹ 69.55	₹ 69.55 x \$ 74404.762 = ₹ 51,74,851
€	₹ 50,00,000/ ₹ 63.20 = € 79,113.924	₹ 63.20 (1 + 0.06/2) = ₹ 65.10	₹ 65.10 x € 79,113.924 = ₹ 51,50,316
£	₹ 50,00,000/ ₹ 88.75 = £ 56,338.028	₹ 88.75 (1 + 0.05/2) = ₹ 90.97	₹ 90.97 x £ 56,338.028 = ₹ 51,25,070

Advice: Since cash inflow is highest (1,01,74,367) in case of \$ hence invoicing for Export should be in \$. However, cash outflow is least (51,25,070) in case of £ the invoicing for import should be in £.

Question 11: MTP 2 Nov 2023 (October)

A bank enters into a forward purchase TT covering an export bill for Swiss Francs 1,00,000 at ₹ 32.4000 due 25th April and covered itself for same delivery in the local inter bank market at ₹ 32.4200. However, on 25th March, exporter sought for cancellation of the contract as the tenor of the bill is changed.

In Singapore market, Swiss Francs were quoted against dollars as under:

Spot	USD 1 = Sw. Fcs.	1.5076/1.5120
One month forward		1.5150/ 1.5160
Two months forward		1.5250 / 1.5270
Three months forward		1.5415/ 1.5445

and in the interbank market US dollars were quoted as under:

Spot	USD 1 = ₹	49.4302/4455
Spot / April		4100/4200
Spot/May		4300/4400
Spot/June		4500/4600

Calculate the cancellation charges, payable by the customer if exchange margin required by the bank is 0.10% on buying and selling.

Solution 11:

First the contract will be cancelled at TT Selling Rate

USD/ Rupee Spot Selling Rate	₹ 49.4455
Add: Premium for April	₹ 0.4200
	₹ 49.8655
Add: Exchange Margin @ 0.10%	₹ 0.04987
	₹ 49.91537 Or 49.9154
USD/ Sw. Fcs One Month Buying Rate	Sw. Fcs. 1.5150
Sw. Fcs. Spot Selling Rate (₹49.91537/1.5150)	₹ 32.9474
Rounded Off	₹ 32.9475
Bank buys Sw. Fcs. Under original contract	₹ 32.4000
Bank Sells under Cancellation	₹ 32.9475
Difference payable by customer	₹ 00.5475

Exchange difference of Sw. Fcs. 1,00,000 payable by customer ₹ 54,750 (Sw. Fcs. 1,00,000 x ₹ 0.5475)

Question 12: Nov 2023

A Japanese company imports hi-tech printer cartridges from US worth \$1 million. The chief financial officer of the company wishes to know the best strategy for protection against uncertainty, for the payment that has to be made at the end of 3 months. Financial team of the company has collected the following options for evaluation:

Table-1: Exchange rates quoted in FOREX Market:

¥/\$ Quotations	Bid Price	Offer/Ask Price
Spot Rates	146.03	146.63
3M – Forward Rates	144.03	145.00
6M – Forward Rates	146.35	146.70

Table-2 : Options Market rates for European options with 3 months expiry :

Type of Option	Strike Price (X) (¥/\$)	Premium (%) for Call & Put Options
Call & Put	145.20	1.6766% (Call) & 1.7414% (Put)
Call & Put	146.00	1.3505% (Call) & 2.1006% (Put)

The expected spot price at expiry is ¥/\$: 144.90/145.05

Suggest the best strategy for CFO of the Japanese Company to protect against uncertainty, with respect to the following alternatives :

- (i) Forward Hedge
- (ii) Buy 3 months call, X = 145.20
- (iii) Sell 3 months put, X = 145.20
- (iv) Buy call & sell put both having X = 146.00

Solution 12:

- (i) Forward Hedge
- | | |
|--------------------------------|---------------|
| Amount payable after 3 months | \$ 1000000 |
| 3 month applicable buying rate | ¥ 145/\$ |
| Amt. payable in Yen | ¥ 145 million |

- (ii) Buy 3 month call option X = ¥ 145.20

If expected spot price after 3 month is ¥ 145.05

Then company would not exercise its option. Accordingly the cost of import will be

Buying Yen in spot Market after 3 month	¥ 145.05 million
Add: Premium Paid ¥ 145.20 x 1.6766% x \$ 1 million	¥ 2.43 million
	¥ 147.48 million

- (iii) Selling 3 month Put at X = ¥ 145.20

If expected spot price after 3 month ¥ 144.90 , then Put Option buyer will exercise his /her option.

Accordingly the import Bill will be :

Buying Yen in under option after 3 month	¥ 145.20 million
Less: Premium Receipt ¥ 145.20 x 1.7414% x \$ 1 million	¥ 2.53 million
	¥ 142.67 million

- (iv) Buying Call and selling Put at X = ¥ 146

Net Premium receipt

Premium paid on call option = ¥ 146.00 x 1.3505%	¥ 1.9717 million
Premium Receipt on Put option = ¥ 146.00 x 2.1006%	¥ 3.0669 million
	¥ 1.0952 million

If expected spot Rate expiry happens to be ¥ 144.90/145.05, then call option will be lapsed and Put option by buyer will be exercised. Accordingly, the import bill will be:

Buying US\$ under Put Option	¥ 146.00 million
Less: Receipt of Net Premium	¥ 1.09520 million
	¥ 144.905 million

Decision: Since expected outflow is least in case of selling Put option, the same strategy is recommended.

Question 13: MTP 2 Nov 2024 (October)

Followings are the spot exchange rates quoted at three different forex markets:

USD/INR 48.30 in Mumbai

GBP/INR 77.52 in London
GBP/USD 1.6231 in New York

The arbitrageur has USD 1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

Solution 13:

The arbitrageur can proceed as stated below to realize arbitrage gains.

(i) Buy ₹ from USD 10,00,000 At Mumbai $48.30 \times 10,00,000 = ₹ 483,000,000$

(ii) Convert these ₹ to GBP at London $\left(\frac{₹483,000,000}{₹77.52} \right)$

GBP 6,230,650.155

(iii) Convert GBP to USD at New York $GBP 6,230,650.155 \times 1.6231 = USD 10,112,968.26$

There is net gain of USD 10,112,968.26 less USD 10,00,000 i.e. USD 112,968.26

Question 14: RTP May 2024

JKL Ltd., an Indian company has an export exposure of JPY 10,00,000 receivable December 31, 2022. Japanese Yen (JPY) is not directly quoted against Indian Rupee.

The current spot rates are:

INR/US \$ = ₹ 82.22

JPY/US\$ = JPY 132.34

It is estimated that Japanese Yen will depreciate to 154 against US \$ and Indian Rupee to depreciate to ₹ 85 against US \$.

Forward rates as on date for 31st December 2022 are as follows:

INR/US \$ = ₹ 86.50

JPY/US\$ = JPY 140.35

Required:

(i) Evaluate the expected loss based on estimated rates if the hedging is not done.

(ii) Justify the decision to take forward cover even if actual rates on December 31, 2022 happens to be as follows:

INR/US \$ = ₹ 86.25

JPY/US\$ = JPY 140.85

Note: Make calculation of ¥ rate in ₹ upto 4 decimal points.

Solution 14:

Since the direct quote for ¥ and ₹ is not available it will be calculated by cross exchange rate as follows:

₹/\$ x \$/¥ = ₹/¥ $82.22/132.34 = 0.6213$

Spot rate on date of export 1 ¥ = ₹ 0.6213

Estimated Rate of ¥ for Dec.31, 2022 = ₹ 0.5519 (₹ 85/¥ 154)

Forward Rate of ¥ for Dec.31, 2022 = ₹ 0.6163 (₹ 86.50/ ¥ 140.35)

(i) The expected loss without hedging

Value of export at the time of export (₹ 0.6213 x ¥ 10,00,000)	₹ 62,13,000
Expected payment to be received on 31 st Dec. 2022 as per estimated rates (₹ 0.5519 x ¥ 10,00,000)	₹ 55,19,000
Loss	₹ 6,94,000

(ii)

(a) Hedging of loss under Forward Cover

Value of export at the time of export (₹ 0.6213 x ¥ 10,00,000)	₹ 62,13,000
Payment expected to be received under Forward Cover (₹ 0.6163 x ¥ 10,00,000)	₹ 61,63,000
Loss	₹ 50,000

Thus, by taking forward cover loss is reduced to ₹ 50,000 from ₹ 6,94,000

(b) Actual Rate of ¥ on December 2022 = ₹ 0.6124 (₹ 86.25/ ¥ 140.85)

Value of export at the time of export (₹ 0.6213 x ¥ 10,00,000)	₹ 62,13,000
Payment to be received on 31 st Dec. 2022 as per actual rate (₹ 0.6124 x ¥ 10,00,000)	₹ 61,24,000

Loss

₹ 89,000

From the above solution, we can find that net loss in actual situation is ₹ 89,000 while net loss when taken Forward Cover is only ₹ 50,000. Hence, the decision to take Forward Cover is justified even if the actual rate happens to be as prescribed.

Question 15: MTP 1 May 2023 (March)

XYZ Ltd. an Indian firm needs to pay JAPANESE YEN (JY) 1 crore on 30th June. In order to hedge the risk involved in foreign currency transactions, the firm is considering two alternative methods i.e. forward market cover and currency option contract.

On 1st April, following quotations (JY/INR) are made available:

Spot 3 months forward

1.7825/1.8245. 1.8726./1.8923

The prices for forex currency option on purchase are as follows:

Strike Price JY 1.8855

Call option (June) JY 0.047

Put option (June) JY 0.098

For excess or balance of JY covered, the firm would use forward rate as future spot rate. You are required to recommend a cheaper hedging alternative for XYZ LTD.

Note: Except rates round off other calculations to nearest rupees.

Solution 15:**(i) Forward Cover**

$$\text{3-month Forward Rate} = \frac{1}{1.8726} = 0.5340/\text{JY}$$

Accordingly, INR required for JY 1,00,00,000 (1,00,00,000 X ₹ 0.5340) = ₹ 53,40,000

(ii) Option Cover

To purchase JY 1,00,00,000, XYZ LTD shall enter into a Put Option @ JY 1.8855/INR

Accordingly, outflow in INR $\left(\frac{\text{JY } 1,00,00,000}{1.8855} \right)$ ₹ 53,03,633

Premium $\left(\frac{\text{INR } 53,03,633 \times 0.098}{1.7825} \right)$ 2,91,588

55,95,221

Since outflow of cash is least in case of Forward Cover, same should be opted for.

Question 16: MTP 2 May 2023 (April)

On January 28, 2023, an importer customer requested a Bank to remit Singapore Dollar (SGD) 2,500,000 under an irrevocable Letter of Credit (LC). However, due to unavoidable factors, the Bank could affect the remittances only on February 4, 2023. The inter-bank market rates were as follows:

	January 28, 2023	February 4, 2023
US\$ 1=	₹ 80.91/80.97	₹ 80.85/80.90
GBP £ 1 =	US\$ 1.7765/1.7775	US\$ 1.7840/1.7850
GBP £ 1 =	SGD 2.1380/2.1390	SGD 2.1575/2.1590

The Bank wishes to retain an exchange margin of 0.125% on ₹/ SGD.

Required:

Estimate how much does the customer stand to gain or lose due to the delay?

(Note: Calculate the rate in multiples of 0.0001)

Solution 16:

On January 28, 2023, the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US \$= ₹ 80.97
 Pound 1 = US\$ 1.7775
 Pound 1 = SGD 3.1380
 Therefore, SGD 1 = $\frac{\text{₹ } 80.97 \times 1.7775}{\text{SGD } 3.1380}$

SGD 1	=	₹ 67.3172
Add: Exchange margin (0.125%)		<u>₹ 0.0841</u>
		₹ 67.4013
On February 4, 2023 the rates are		
US \$=		₹ 80.90
Pound 1	=	US\$ 1.7850
Pound 1	=	SGD 2.1575
Therefore, SGD 1	=	$\frac{₹ 80.97 \times 1.7850}{SGD 2.1575}$

SGD 1	=	₹ 66.9323
Add: Exchange margin (0.125%)		<u>₹ 0.0837</u>
		₹ 67.0160

Hence, Gain to the importer = SGD 25,00,000 (₹ 67.4013 – ₹ 67.0160) = ₹ 9,63,250

Question 17: RTP Nov 2024

PKR Ltd. has made purchases worth USD 8,00,000 on 1st May 2020 for which it has to make a payment on 1st November 2020. The present exchange rate is INR/USD 75. The company can purchase forward dollars at INR/USD 74. The company will have to make an upfront premium @ 1 per cent of the forward amount purchased.

The company can hedge its position with the following expected rate of USD in foreign exchange market on 1st May 2020:

PKR Ltd. has made purchases worth USD 8,00,000 on 1st May 2020 for which it has to make a payment on 1st November 2020. The present exchange rate is INR/USD 75. The company can purchase forward dollars at INR/USD 74. The company will have to make an upfront premium @ 1 per cent of the forward amount purchased.

The company can hedge its position with the following expected rate of USD in foreign exchange market on 1st May 2020:

Exchange Rate	Probability
(i) INR/USD 77	0.15
(ii) INR/USD 71	0.25
(iii) INR/USD 79	0.20
(iv) INR/USD 74	0.40

You are required to advise the company for a suitable cover for risk assuming that the cost of funds to PKR Ltd. is 10 per cent per annum.

Solution 17:

- (i) If PKR Ltd. does not take forward cover (Unhedged Position):
 Expected Rate = ₹ 77 × 0.15 + ₹ 71 × 0.25 + ₹ 79 × 0.20 + ₹ 74 × 0.40
 = ₹ 11.55 + ₹ 17.75 + ₹ 15.80 + ₹ 29.60 = ₹ 74.70
 Expected Amount Payable = USD 8,00,000 × ₹ 74.70 = ₹ 5,97,60,000

- (ii) If the PKR Ltd. hedge its position in the forward market:

Particulars	Amount (₹)
If company purchases US\$ 8,00,000 forward premium is (800000 × 74 × 1%)	5,92,000
Interest on ₹ 5,92,000 for 6 months at 10%	29,600
Total hedging cost (a)	6,21,600
Amount to be paid for US\$ 8,00,000 @ ₹ 74.00 (b)	5,92,00,000
Total Cost (a) + (b)	5,98,21,600

Advice: Since cash outflow is lesser in case of unhedged position company should opt for the same.

Question 18: RTP May 2024

You as a dealer in foreign exchange have the following position in GBP on 31st October, 2019:

	GBP
Balance in the Nostro A/c Credit	2,00,000
Opening Position Overbought	1,00,000
Purchased a bill on London	1,60,000

Sold forward TT	1,20,000
Forward purchase contract cancelled	60,000
Remitted by TT	1,50,000
Draft on London cancelled	60,000

Decide the steps would you take, if you are required to maintain a credit Balance of GBP 65,000 in the Nostro A/c and keep as oversold position on GBP 20,000?

Solution 18:

(i) Exchange Position:

Particulars	Purchases (GBP)	Sales (GBP)
Opening Balance Overbought	1,00,000	
Bill on London	1,60,000	
Forward Sales – TT		1,20,000
Cancellation of Forward Contract		60,000
TT Sales		1,50,000
Draft on London cancelled	60,000	—
	3,20,000	3,30,000
Closing Balance Oversold	10,000	—
	3,30,000	3,30,000

(ii) Cash Position (Nostro A/c)

	Credit	Debit
Opening balance credit	2,00,000	—
TT sales	—	1,50,000
	2,00,000	1,50,000
Closing balance (credit)	—	50,000
	2,00,000	2,00,000

The Bank has to buy spot TT GBP 15,000 to increase the balance in Nostro account to GBP 65,000.

This would bring the overbought position on GBP to 5,000.

Since the bank requires an oversold position of GBP 20,000, it has to sell forward GBP 25,000.

Question 19: MTP 1 Nov 2024 (September)

Mr. H as Treasurer for your bank working under you sold HK\$ 10 million value Spot to your customer at ₹ 10.55/ HK\$ and covered yourself in the London market on the same day when the exchange rates were:

US\$ 1 = HK\$ 7.8880 / 7.8920

Local interbank market rates for US\$ were:

Spot US\$ 1 = ₹ 82.70 / 82.85

Required:

- Calculate Cover Rate
- Calculate Profit or loss in the transaction
- Do you agree with the views of the Internal Auditor that Mr. H has a speculative nature?

Note: Ignore brokerage.

Solution 19:

- Rupee – Dollar Selling Rate: = ₹ 82.85
 Dollar – Hong Kong Dollar Buying Rate: = H.K.\$ 7.8880
 Hong Kong Dollar (Selling) Cross Rate: = ₹ 82.85 / 7.8880
 = ₹10.5033
- Profit / Loss to the Bank
 Amount received from customer
 (HK\$ 10 million × 10.55) ₹ 10,55,00,000
 Amount paid on cover deal
 (HK\$ 10 million × ₹10.5033) ₹ 10,50,33,000
 Profit to Bank ₹ 4,67,000

(iii) To some extent, we agree with views of Internal Auditor as the gain on the same transaction is bit lesser keeping in view the amount involved.

Question 20: MTP 1 Nov 2024 (September)

BDR Ltd. is an Indian export business house. The company prepares invoice in customers' currency. It has debtors amounting US\$ 10 Million which are due to be received on April 1, 2023.

Market information as at January 1, 2023 is:

Exchange rates US\$/INR		Currency Futures US\$/INR	
Spot	0.012500	Contract size: ₹ 32,816,474	
1-month forward	0.012422	1-month	0.012417
3-months forward	0.012195	3-month	0.012189
Initial Margin		Interest rates in India	
1-Month	₹ 22,500	6.5%	
3-Months	₹ 27,500	7%	

On April 1, 2023, the spot rate US\$/INR is 0.012199 and Currency Futures rate is 0.012198.

Advise which of the following methods would be most advantageous to BDR Ltd. or keep the exposure unhedged.

- (i) Using forward contract
- (ii) Using currency futures.

Solution 20:

(i) Receipts using a Forward Contract = US\$ 10 Million/0.012195 = ₹ 820,008,200

(ii) Receipts using Currency Futures

The number of contracts needed is (US\$ 10 Million/0.012189)/32,816,474 = 25

Initial margin payable is 25 contracts x ₹ 27,500 = ₹ 687,500

On April 1, 2023 Close at 0.012198

Receipts = US\$ 10 Million/0.012199 = ₹ 819,739,323

Variation Margin =

$[(0.012198 - 0.012189) \times 25 \times 32,816,474]/0.012199$

OR

$(0.000009 \times 25 \times 32,816,474)/0.012199$

= 7383.71/0.012199

= ₹ 605,271

Less: Interest Cost – ₹ 6,87,500 x 0.07 x 3/12

= ₹ 12,031

Net Receipts

₹ 820,332,563

(iii) Receipt if exposure is kept unhedged

US\$ 10 Million/0.012199

₹ 819,739,323

Advise: The most advantageous option would hedge with Futures because it has highest receipt.