Sell $ 50,000 at 3 months FR

Cash Inflows = $ 50,000 × 72.95

= ₹ 36,47,500

Option 2: Money Market Cover

- Amount to borrow from US Money market @ 6% for 3 months

$$\frac{\$\ 50,000}{1 + (0.06 \times 3/12)} = \$\ 49,261.08$$

- Sell $ 49,261.08 at SR = $ 49,261.08 × 72.65 = ₹ 35,78,817
- Invest ₹ 35,78,817 in Indian money market @ 9% p.a. for 3 months

Cash Inflows = ₹ 35,78,817 × [1 + (0.09 × 3/12)]

= ₹ 36,59,340

Money market cover is better due to higher cash Inflows.

(ii) Foreign Exchange Exposure = $ 50,000

Risk (Gain) due to anticipated exchange rate

= (73 – 72.95) × $ 50,000

= ₹ 2,500

(4) CURRENCY FUTURE

Question – 41

EFD Ltd. is an export business house. The company prepares invoice in customers' currency. Its debtors of US$. 10,000,000 is due on April 1, 2015.

Market information as at January 1, 2015 is:

Exchange rates US$/INR		**Currency Futures US$/INR**	
Spot	0.016667	Contract size:	₹ 24,816,975
1-month forward	0.016529	1-month	0.016519
3-months forward	0.016129	3-month	0.016118

	Initial Margin	Interest rates in India
1-Month	₹ 17,500	6.5%
3-Months	₹ 22,500	7%

On April 1, 2015 the spot rate US$/INR is 0.016136 and currency future rate is 0.016134.

Which of the following methods would be most advantageous to EFD Ltd?

(i) Using forward contract

(ii) Using currency futures

(iii) Not hedging the currency risk

(SM TYK – 25, MTP April – 2022 & Exam May – 2015) (8 Marks)

Solution:

(i) Forward Contract

$$= \frac{\$\ 1,00,00,000}{0.016129} = ₹\ 62,00,01,240$$

(ii) Currency Future

Step 1: EFD Ltd. should long position on ₹ at $/₹ 0.016118

Step 2: No. of contracts

Exposure amount $= \frac{\$\ 1,00,00,000}{0.016118} = ₹\ 62,04,24,370$

No. of contracts $= \frac{\$\ 62,04,24,370}{2,48,16,975} = 25$ Contracts long

Step 3: Cash Flows

Variation margin

Gain on long position

($ 0.016134 – 0.016118) × ₹ 2,48,16,975 × 25 = $ 9,926.79

Total receipt ($ 1,00,00,000 + $ 9,926.79) = $ 1,00,09,926.79

Cash inflows (₹) = $\frac{\$\ 1,00,09,926.79}{0.016136}$ = ₹ 6,20,34,7471

(–) Interest on margin (₹ 22,500 × 25 × 7% × 3/12) = ₹ 9,844

= ₹ 62,03,37,627

(iii) No Hedging

$\frac{\$\ 1,00,00,000}{0.016136}$ = ₹ 61,97,32,276

Decision: Currency future is the best option due to highest cash inflows.

Question – 42

Nitrogen Ltd, a UK company is in the process of negotiating an order amounting to €4 million with a large German retailer on 6 months credit. If successful, this will be the first time that Nitrogen Ltd has exported goods into the highly competitive German market. The following three alternatives are being considered for managing the transaction risk before the order is finalized.

(i) Invoice the German firm in Sterling using the current exchange rate to calculate the invoice amount.

(ii) Alternative of invoicing the German firm in € and using a forward foreign exchange contract to hedge the transaction risk.

(iii) Invoice the German firm in € and use sufficient 6 months sterling future contracts (to the nearly whole number) to hedge the transaction risk.

Following data is available:

Spot Rate	€ 1.1750 - €1.1770/£
6 months forward premium	0.55-0.60 Euro Cents
6 months future contract is currently trading at	€1.1760/£
6 months future contract size is	£62500
Spot rate and 6 months future rate	€1.1785/£

Required:

(a) Calculate to the nearest £ the receipt for Nitrogen Ltd, under each of the three proposals.

(b) In your opinion, which alternative would you consider to be the most appropriate and the reason thereof.

(SM TYK – 41 & Exam November – 2011) (8 Marks)

Solution:

(i) Invoicing

Invoicing the German firm in £ at current Exchange Rate

€/£ = 1.1770

$$\text{Invoice amount in £} = \frac{€\ 40,00,000}{1.1770} = £\ 33,98,471$$

(ii) Forward Cover

Sell € 40,00,000 at 6 months FR

FR = (1.1770 + 0.0060) = 1.1830

$$\text{Cash Inflows} = \frac{€\ 40,00,000}{1.1830} = £\ 33,81,234$$

(iii) Currency Future

Step 1: € receivables & we afraid from € falling but rate is given of £ means afraid from £ rising hence we take long position of £ future at €/£ 1.1760

Step 2: No. of Contracts

$$\text{£ Equivalent € 40,00,000} = \frac{€\ 40,00,000}{1.1760}$$

$$= €\ 34,01,360$$

$$\text{No. of contracts} = \frac{€\ 34,01,360}{€\ 62,500} = 54 \text{ contract long}$$

Step 3: Variation Margin

Currency future rate on settlement rate is € 1.1760/£, hence gain on long position (€ 1.1785 - € 1.1760) × 54 × € 62,500 = € 8,438

Cash inflows

Amount received = € 40,00,000

(-) Gain on future = € 8,438

= € 40,08,438

Cash inflows in £ = $\frac{€\ 40,08,438}{1.1785}$

= £ 34,01,305

Currency future is the best option due to higher cash inflows.

Question – 43

ABC Technologic is expecting to receive a sum of US$ 4,00,000 after 3 months. The company decided to go for future contract to hedge against the risk. The standard size of future contract available in the market is $1000. As on date spot and futures $ contract are quoting at ₹ 44.00 &₹ 45.00 respectively. Suppose after 3 months the company closes out its position futures are quoting at ₹ 44.50 and spot rate is also quoting at ₹ 44.50. You are required to calculate effective realization for the company while selling the receivable. Also calculate how company has been benefitted by using the future option.

(SM TYK – 34)

Solution:

Currency Future

Step 1: Since $ is receivable, & we afraid from $ falling hence we should take short position of $ future at ₹/$ 45.

Step 2: No. of Contracts

No. of Contracts = $\frac{\$\ 4,00,000}{\$\ 1,000}$ = ₹ 400 Contract short

Step 3: Variation Margin

$ future rate on settlement date is 44.50, hence gain on short position

Variation Margin = (₹ 45 – 44.50) × 400 × $ 1000

= ₹ 2,00,000

Step 4: Cash Inflows

Sell $ 4,00,000 at 3 months SR

($ 4,00,000 × 44.50)	= ₹ 1,78,00,000
(+) Variation Margin	= ₹ 2,00,000
Cash Inflows	= ₹ 1,80,00,000

$$\text{Effective Realization per \$} = \frac{₹\ 1,80,00,000}{\$\ 4,00,000}$$

= ₹ 45

(5) CURRENCY OPTION

Question – 44

XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available:

Spot rate 1 £ = $ 2.00

180 days forward rate of £ as of today = $1.96

Interest rates are as follows:

	U.K.	US
180 days deposit rate	4.5%	5%
180 days borrowing rate	5%	5.5%

A call option on £ that expires in 180 days has an exercise price of $ 1.97 and a premium of $ 0.04.

XYZ Ltd. has forecasted the spot rates 180 days hence as below:

Future rate	Probability
$ 1.91	25%
$ 1.95	60%
$ 2.05	15%

Which of the following strategies would be most preferable to XYZ Ltd.?

(a) A forward contract;

(b) A money market hedge;

(c) An option contract;

(d) No hedging.

Show calculations in each case

(SM TYK – 39 & Exam November – 2015) (8 Marks)

Solution:

(a) Forward Cover

Buy £ 3,00,000 at 180 day FR

£ 3,00,000 × 1.96 = $ 5,88,000

(b) Money Market Cover

- Calculation of Amount to be invested in UK money market @ 4.5% for 180 days

$$= \frac{£\ 3,00,000}{1.045} = £\ 2,87,081.34$$

- $ required to buy £ 2,87,081.34 at SR

£ 2,87,081.34 × 2.00 = $ 5,74,162.68

- Borrow $ 5,74,162.68 @ 5.5% for 180 days from US Money market

Cash outflow

= $ 5,74,162.68 (1.055)

= $ 6,05,741.63

(c) Option Contract

Price	Exercised or not	Cost of $	Pre-mium	Effective Cost per $	Cash outflows £ 3,00,000 × EC	Proba bility	Expected Cash outflows
1.91	No	$ 1.91	$ 0.04	$ 1.95	$ 5,85,000	25%	1,46,250

1.95	No	$ 1.95	$ 0.04	$ 1.99	$ 5,97,000	60%	3,58,200
2.01	Yes	$ 1.97	$ 0.04	$ 2.01	$ 6,03,000	15%	90,450
							$ 5,94,900

(+) Opportunity Cost on premium

(£ 3,00,000 × 0.04) × 5.5% = $ 660

Cash Outflow (5,94,900 + 660) = $ 5,95,560

(d) No Hedging

Expected SR = (1.91 × 0.25) + (1.95 × 0.60) + (2.05 × 0.15)

= 1.955

Cash outflows = £ 3,00,000 × 1.955

= $ 5,86,500

No hedging is the best due to lower cash outflows.

Question – 45

A Ltd. of U.K. has imported some chemical worth of USD 3,64,897 from one of the U.S. suppliers. The amount is payable in six months time. The relevant spot and forward rates are:

Spot rate USD 1.5617–1.5673

6 months' forward rate USD 1.5455 –1.5609

The borrowing rates in U.K. and U.S. are 7% and 6% respectively and the deposit rates are 5.5% and 4.5% respectively.

Currency options are available under which one option contract is for GBP 12,500. The option premium for GBP at a strike price of USD 1.70/GBP is USD 0.037 (call option) and USD 0.096 (put option) for 6 months period.

The company has 3 choices:

(i) Forward cover

(ii) Money market cover, and

(iii) Currency option

Which of the alternatives is preferable by the company?

Solution:

Option 1: Forward Cover

Buy $ 3,64,897 at 6 months FR

$$\text{Cash outflows} = \frac{\$\ 3,64,897}{1.5455} = 2,36,103$$

Option 2: Money Market Cover

- Amount to be invested in US money market @ 4.5% p.a. for 6 month

$$\frac{\$\ 3,64,897}{1 + (0.045 \times 6/12)} = \$\ 3,56,867$$

$$= £\ 2,28,512$$

- Borrow £ 2,28,512 from UK money market @ 7% p.a. for 6 months

Cash outflows = £ 2,28,512 × [1 + (0.07 × 6/12)]

= £ 2,36,510

Option 3: Currency Option

Step 1: Since $ payables & we afraid from $ rising but rate is given of £. It means £ falling hence we should we should buy put option £ at EP $/£ 1.70.

Step 2: No. of Contract

Contract size in $ = £ 12,500 × 1.70

= $ 21,250

$$\text{No. of contracts} = \frac{\$\ 3,64,897}{\$\ 21,250}$$

= 17.17 "Means 17 Contracts"

Step 3: Cash Outflows

Covered through option hedging

Put option EP = $/£ = $ 1.70

Contract size = $ 21,250 No. = 17 contracts

Covered through option hedging ($ 21,250 × 17) = $ 3,61,250

It means total £ required to buy $\frac{\$\ 3,61,250}{\$\ 1.70}$ = £ 2,12,500.

Covered through forward contract

Uncovered portion = $ 3,64,897 – $ 3,61,250

= $ 3,647

Buy $ 3,647 at 6 months FR = $\frac{\$\ 3,647}{1.5455}$ = £ 2,360.

Premium Amount

Premium of put option = $ 0.0096 per £

Contract size = £ 12,500,

No. of contracts = 17

Total premium in $ = $ 0.096 × 12,500 × 17

= $ 20,400

Buy $ 20,400 at SR = $\frac{\$\ 20,400}{1.5617}$

= £ 13,063

Total Cash Outflows = £ 2,12,500 + £ 2,360 + £ 13,063

= £ 2,27,923.

Currency option is best due to lower cash outflows.

Question – 46

XYZ, an Indian firm, will need to pay JAPANESE YEN (JY) 5,00,000 on 30th June. In order to hedge the risk involved in foreign currency transaction, 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
1.9516/1.9711.	1.9726./1.9923

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

Strike Price	JY 2.125
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 cheaper hedging alternative for XYZ.

(SM TYK – 33 & Exam November – 2015) (8 Marks)

Solution:

Option 1: Forward Cover

Buy ¥ 5,00,000 at 3 Month FR

$$\text{Cash Outflow} = \frac{¥\ 5,00,000}{1.9726} = ₹\ 2,53,472$$

Option 2: Currency Option

Step 1: Since ¥ Payable & We afraid from ¥ rising but rate is given of ₹ means ₹ falling hence we buy put option at

EP ¥/ ₹ = ¥ 2.125

Step 2: Cash Outflow

Option Hedging

Exposure = ¥ 5,00,000

EP ¥/ ₹ = ¥ 2.125

$$\frac{¥\ 5,00,000}{2.125} = 2,35,294$$

Premium

Premium of put option = JY 0.098 per ₹

Total premium (¥) = 0.098 × 2,35,294

= ¥ 23,059

Buy ¥ 23,059 at SR $= \frac{¥\ 23,059}{1.9516}$

= ₹ 11,815

Cash Outflows (2,35,294 + 11,815) = ₹ 2,47,109

Currency option is better due to lower cash outflow.

Question – 47

An American firm is under obligation to pay interests of Can$ 10,10,000 and Can$ 7,05,000 on 31st July and 30th September respectively. The Firm is risk averse and its policy is to hedge the risks involved in all foreign currency transactions. The Finance Manager of the firm is thinking of hedging the risk considering two methods i.e. fixed forward or option contracts.

It is now June 30. Following quotations regarding rates of exchange, US$ per Can$, from the firm's bank were obtained:

Spot	1 Month Forward	3 Months Forward
0.9284-0.9288	0.9301	0.9356

Price for a Can$ /US$ option on a U.S. stock exchange (cents per Can$, payable on purchase of the option, contract size Can$ 50,000) are as follows:

Strike Price	Calls		Puts	
(USD/Can$)	July	Sept.	July	Sept.
0.93	1.56	2.56	0.88	1.75
0.94	1.02	NA	NA	NA
0.95	0.65	1.64	1.92	2.34

According to the suggestion of finance manager if options are to be used, one month option should be bought at a strike price of 94 cents and three month option at a strike price of 95 cents and for the remainder uncovered by the options the firm would bear the risk itself. For this, it would use forward rate as the best estimate of spot. Transaction costs are ignored.

Recommend, which of the above two methods would be appropriate for the American firm to hedge its foreign exchange risk on the two interest payments.

(SM TYK – 36, MTP March – 2022 & Exam Nov – 2013) (8 Marks)

Solution:

Option 1: Forward Cover

1 Month Exposure

Cash Outflow = Can $ 10,10,000 × 0.9301 = $ 9,39,401

3 Month Exposure

Cash Outflow = Can $ 7,05,000 × 0.9356 = $ 6,59,598

Option 2: Currency Option

Step 1: Since Can $ Payable & we Afraid from Can $ rising Hence we should buy call option

For 1 Month EP $ 0.94 & Premium = $ 0.0102

For 3 Month EP $ 0.95 & Premium = $ 0.0164

Step 2: No. of Contracts

$$1 \text{ Month} = \frac{\text{Can \$ } 10,10,000}{\text{Can \$ } 50,000} = 20 \text{ Contracts}$$

$$3 \text{ Month} = \frac{\text{Can \$ } 7,05,000}{\text{Can \$ } 50,000} = 14 \text{ Contracts}$$

	1 Month	3 Month
Option Hedging	(20 Contract × Can $ 50,000) Can $ 10,00,000 × 0.94 US $ 9,40,000	(14 Contract × Can $ 50,000) Can $ 7,00,000 × 0.95 US $ 6,65,000
Uncovered position using forward cover	(Can $ 10,10,000 – Can $ 10,00,000) Can $ 10,000 × 0.9301 US $ 9,301	(Can $ 7,05,000 – 7,00,000) Can $ 5,000 × 0.9356 US $ 4,678
Premium	$ 0.0102 per Can $ (Can $ 10,00,000 × 0.0102) = US $ 10,200	$ 0.0164 per Can $ (Can $ 7,00,000 × 0.0164)

		= US $ 11,480
USD	9,59,501	6,81,158

Forward Contract is better due to lower cash outflows.

Question – 48

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

(Exam November – 2023) (8 Marks)

Solution:

Option 1: Forward Hedge

Buy $ 10,00,000 at 3 months FR

$ 10,00,000 × 145 = ¥ 14,50,00,000

Option 2: Buy 3 months call, X = 145.20

Call = Right to buy

If expected spot price on maturity is ¥ 145.05, then company would not exercise its option

Buy $ 10,00,000 at ¥ 145.05

($ 10,00,000 × 145.05)	= ¥ 14,50,50,000
(+) Premium (¥ 145.20 × 1.6766%) × $ 10,00,000	= ¥ 24,34,423
	= ¥ 14,74,84,423

Option 3: Sell 3 months put, X = 145.20

Put = Right to sell

If expected price after 3 months is ¥ 144.90, then put option will be exercised

Buy $ 10,00,000 at strike price

($ 10,00,000 × 145.20)	= ¥ 14,52,00,000
(-) Received premium	
(¥ 145.20 × 1.7414%) × $ 10,00,000	= ¥ 25,28,513
	= ¥ 14,26,71,487

Option 4: Buy call & sell put at, X = 146

Premium on call

(¥ 146 × 1.3505%) × $ 10,00,000 = ¥ 19,71,730

Premium received on put

(¥ 146 × 2.1006%) × $ 10,00,000 = ¥ 30,66,876

Net premium received = ¥ 10,95,146

If expected price to be ¥ 144.90/145.05, then call option will lapsed & put will exercise

Buy $ at EP ($ 10,00,000 × 146) = ¥ 14,60,00,000

(–) Premium = ¥ 10,95,146

= ¥ 14,49,04,854

Decision: Option 3 is the best due to lowest cash outflows.

(7) CANCELLATION OF FORWAD CONTRACT

(I) CANCELLATION & EXTENSION OF FORWARD CONTRACT

Question – 49

An importer requests his bank to extend the forward contract for US$ 20,000 which is due for maturity on 30th October, 2010, for a further period of 3 months. He agrees to pay the required margin money for such extension of the contract.

Contracted Rate – US$ 1= ₹ 42.32

The US Dollar quoted on 30-10-2010:- Spot – 41.5000/41.5200

3 months' Premium -0.87% /0.93%

Margin money for buying and selling rate is 0.075% and 0.20% respectively.

Compute:

(i) The cost to the importer in respect of the extension of the forward contract, and

(ii) The rate of new forward contract.

(SM TYK – 32 & Exam May – 2017) (4 Marks)

Solution:

(i) Extension Cost

Selling Rate of Bank = ₹ 42.32

(–) Buying Rate of Bank (41.5000 – 0.075%)	= ₹ 41.47
Gain to Bank	= ₹ 0.85
(×) Contract Size	= $ 20,000
Extension Cost	= ₹ 17,000

(ii) Rate of New Forward Contract

Selling SR	= 41.5200
(+) 3 Month Swap	= 0.93%
	= 41.91
(+) Margin	= 0.20%
New FR	= 41.99

Question – 50

On 15th January 2015 you as a banker booked a forward contract for US$ 2,50,000 for your import customer deliverable on 15th March 2015 at ₹ 65.3450. On due date customer request you to cancel the contract. On this date quotation for US$ in the inter-bank market is as follows:

Spot	₹ 65.2900/2975 per US$
Spot/April	3,000/3,100
Spot/May	6,000/6,100

Assuming that the flat charges for the cancellation is ₹ 100 and exchange margin is 0.10%, then determine the cancellation charges payable by the customer.

Solution:

Calculation of Cancellation Charges

Selling Rate of Bank	= ₹ 65.3450
Buying Rate of Bank (65.2900 – 0.10%)	= ₹ 65.2250
Gain to Bank	= ₹ 0.1200

(×) Contract Size	= $ 2,50,000
Gain to Bank	= ₹ 30,000
(+) Flat Charges	= ₹ 100
	= ₹ 30,100

Question – 51

A customer with whom the bank had entered into 3 months forward purchase contract for Swiss Francs 1,00,000 at the rate of ₹ 36.25 comes to the bank after two months and requests cancellation of the contract. On this date, the rates are:

Spot	CHF 1 = ₹ 36.30	36.35
One month forward	36.45	36.52

Determine the amount of profit or loss to the customer due to cancellation of the contract.

(SM TYK – 44)

Solution:

Profit/Loss to Customer

Buying rate	= 36.25
Selling rate	= 36.52
Gain to bank	= ₹ 0.27
(×) Contract Size	= SF 1,00,000
Loss to the customer	= ₹ 27,000

Question – 52

Suppose you are a banker and one of your export customer has booked a US$ 1,00,000 forward sale contract for 2 months with you at the rate of ₹ 62.5200 and simultaneously you covered yourself in the interbank market at 62.5900. However on due date, after 2 months you customer comes to you and requests for cancellation of the contract and also requests for extension of the contract by one month. On this date quotation for US$ in the market was as follows:

Spot ₹ 62.7200/62.6800

1 month forward ₹ 62.6400/62.7400

Determine the extension charges payable by the customer assuming exchange margin of 0.10% on buying as well as selling.

Solution:

Calculation of Extension Charge

Particular	Amount
Buying Rate of Bank	₹ 62.5200
Selling Rate of Bank (62.7200 + 0.10%)	₹ 62.7825
Gain to Bank	₹ 0.2625
(×) Contract Size	$ 1,00,000
Extension Charge	₹ 26,250

New Forward Rate

Particular	Amount
Buying Rate (1 Month)	₹ 62.6400
(–) Margin	0.10%
	62.5774
New FR	62.5775

Question – 53

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