"AFM"

INDEX

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This special Index is for Cap. Budgeting Ch. as series of Questions in Q.B. and Questions solved by Ajay sir are different. Hence, the above Q. in this series are as per lecture

Foreign Exchange Exposure and Risk Management

Answer (1.)

Spot Rate (April 1st) → 1 $ = £ 0.7570

Int. Rate (£) = 7.5% p.a.

$ = 3.5% p.a.

Expected fwd. Rate (30th June) ⇒

$$\frac{f_t}{S} = \frac{1 + R_0 \times t}{1 + R_B \times t}$$

$$\frac{f_t}{0.7570} = \frac{1 + 7.5\% \times 3/12}{1 + 3.5\% \times 3/12}$$

$$f_t = 0.7570 \times \frac{1.01875}{1.00875} \Rightarrow £ 0.7645$$

∴ Expected fwd. Rate (30th June) 1 $ = 0.7645 £

Answer (2.)

Spot Rate 1 $ = ₹46

Inf_0 = 8%

Inf_B = 4%

Expected spot Rate :-

After 1 Year →

$$\frac{F_t}{S} = \frac{(1 + Inf_0)^t}{(1 + Inf_B)^t}$$

$$\frac{f_t}{46} = \frac{(1 + 0.08)^1}{(1 + 0.04)^1}$$

$$F = ₹ 47.77$$

After 2 years ⇒ $\frac{F}{46} = \frac{(1+0.08)^2}{(1+0.04)^2}$

$F = ₹49.61$

After 3 years ⇒ $\frac{F}{46} = \frac{(1+0.08)^3}{(1+0.04)^3}$

$F = ₹51.52$

After 4 years ⇒ $\frac{F}{46} = \frac{(1+0.08)^4}{(1+0.04)^4}$

$F = ₹53.50$

Answer (3.)

Spot Rate $1 \$ = ₹55.50$

India = 10%.

US = 4%

(i.) $ will be at premium due to lower Interest Rate

(ii.) $\frac{F}{55.50} = \frac{1 + 0.10 \times 6/12}{1 + 0.04 \times 6/12}$

$\therefore F = ₹57.13$

(iii.) Annual Premium in $ ⇒ $\frac{57.13 - 55.50}{55.50} \times 100 \times \frac{12}{6} \Rightarrow 5.87\%$

(जब Ques. में कुछ नहीं दे रखा हो की Prem या Dis किस currency पर निकालना है तो जिस currency में Quotation दि हो उस पर Prem. या Dis निकाल दो)

OR

Alternatively,

$\frac{10\% - 4\%}{1 + 4\%} \Rightarrow 0.05769$ or 5.77%.

Answer (4.)

Spot Rate (5.4.22) 1 $ = ₹66.2525 / 67.5945

2 months Points 70/90

3 months Points 160/186

(i.) Swap Points for 15 days after 2 Months ⇒

Bid	offer
$\frac{160 - 70}{30} \times 15 = 45$	$\frac{186 - 90}{30} \times 15 = 48$

∴ Points for 2 Months 15 Days (20th June) ⇒

Bid ⇒ 70 + 45 ⇒ 115]
offer ⇒ 90 + 48 ⇒ 138] → ✓ 115/138

(ii.) Forward Rate (20th June) :-

Bid ⇒ Spot Rate 1 $ = ₹66.2525

(+) Premium ₹ .0115

1 $ = ₹66.2640

Offer ⇒ Spot Rate 1 $ = ₹67.5945

(+) Premium = ₹ .0138

1 $ = 67.6083

(iii.) Annual Prem. for $ ⇒

Bid Rate ⇒ $\frac{66.2640 - 66.2525}{66.2583^*} \times 100 \times \frac{12 \text{ Months}}{2.5 \text{ Months}} \Rightarrow 0.0833\%$

* Average Rate ⇒ $\frac{66.2640 + 66.2525}{2} \Rightarrow 66.2583$

Offer Rate ⇒ $\frac{67.6083 - 67.5945}{67.6014^*} \times 100 \times \frac{12 \text{ Months}}{2.5 \text{ Months}}$ ⇒ 0.0980%

* Average Rate ⇒ $\frac{67.6083 + 67.5945}{2}$ ⇒ 67.6014

Answer (5.)

Due Date → 1.3.2022

(i.) Customer wants delivery on due date (1.3.2022) :-

Dealer (Local Bank)

Contract with Customer		Contract with Inter Bank Market	
1.1.22	2 Months fwd. Sale	1.1.22	2 Months fwd. Buy
Spot	1 $ = ₹ 40.50	Spot	1 $ = ₹ 40.50
(+) Prem.	₹ 0.60	(+) Prem.	₹ 0.60
	1 $ = ₹ 41.10		1 $ = ₹ 41.10
(+) Margin @ 0.10%	.0411		
	1 $ = ₹ 41.1411		
R/o	1 $ = ₹ 41.1400		

1.3.22 Request for delivery

⇓

10000 $ × ₹ 41.1400

⇒ ₹ 411400

(ii.) Delivery on 1.2.2022 (Early Delivery) :-

Dealer

Customer		Market	
1.1.22 2 Months fwd. Sale		1.1.22 2 Months fwd. Buy	
Spot	1$ = ₹40.50	Spot	1$ = ₹40.50
(+) Prem.	₹ 0.60	(+) Prem.	₹0.60
	1$ = ₹ 41.10		1$ = ₹41.10
(+) Margin @ 0.10%.	0.0411		
	1$ = ₹41.1411		
R/O	1$ = ₹41.1400		
1.2.22 Request for Delivery (Sale @ 1$ = ₹41.14)		1.2.22 Spot Buy (High)	1$ = ₹40.65
		1.2.22 1 Month fwd. Sale	
		Spot (Low)	1$ = ₹40.10
		(+) Prem.	₹ 0.45
			1$ = ₹40.55

Profit / Loss due to default :-

(i.) Swap Loss :-

1 month fwd. Sale	1$ = ₹40.55
Spot Buy	1$ = ₹40.65
Swap Loss	1$ = ₹0.10

∴ Total Swap loss ⇒ 10000 $ × ₹0.10 ⇒ ₹1000

(ii.) Interest :-

Inflow on 1.2.22	1$	= ₹41.14
Outflow on 1.2.22	1$	= ₹40.65
Net Inflow	1$	= ₹0.49

Total Inflow → ₹49 × 10000 $ ⇒ ₹4900

∴ Interest Income → ₹4900 × 8% × 28/365 → ₹30

Net Loss → ₹1000 − ₹30 → ₹970

(iii) Customer cancel on due date (1.3.22) :-

Dealer

Customer	Market
1.1.22 2 Month fwd Sale	1.1.22 2 Month fwd Buy
1 $ = ₹ 41.1400	1 $ = ₹41.10
	↓
1.3.22 Request for cancellation	1.3.22 ✓ Satisfy
	1.3.22 Cancellation
	spot sale (Low) 1 $ = ₹40.80
	(+Margin@0.10% (0.0408)
	1 $ = ₹40.7592
	R/o 1 $ = ₹40.7600

Profit / Loss :-

(i) Exchange Difference :-

2 months fwd. sale	1 $ = ₹ 41.14
spot sale	1 $ = ₹40.76
Loss	1 $ = ₹0.38

∴ Total Exchange Diff. (Loss) = 10000 $ × ₹0.38

= ₹3800

(iv) Customer cancels on 1.2.22 (Early cancellation) :-

Dealer

Customer	Market
1.1.22 2 months fwd. Sale	1.1.22 2 months fwd. Buy
1 $ = ₹ 41.1400	1 $ = ₹41.10
1.2.22 Request for cancellation	1.2.22 Cancellation
	1 month fwd. Sale
	Spot 1 $ = ₹40.10
	(+) Prem. 0.45
	1 $ = ₹40.55
	(-) Margin @ 0.10% (0.04055)
	1 $ = ₹40.50945
	R/o 1 $ = ₹40.5100

Profit / Loss :-

(i) Exchange Difference :-

2 Months fwd. Sale	1 $ = ₹ 41.14
1 Month fwd. Sale	1 $ = ₹ 40.51
Loss	1 $ = ₹ 0.63

∴ Total Exchange Diff. (Loss) = 10000 $ × ₹0.63
= ₹ 6300

(v.) Customers cancel on 3.3.22 (Late Cancellation):-

Dealer

Customer		Market	
1.1.22	2 Months fwd. Sell 1 $ = ₹41.1400	1.1.22	2 Months fwd. Buy 1 $ = ₹41.10 ↓
1.3.22	Does not Approach	1.3.22	✓ satisfy
		1.3.22	Spot Sale (Low) 1 $ = ₹40.80
		1.3.22	Nearest fwd. (1 Month) Open Buy

* Open Buy [Open Contract] मतलब इस Contract Time Period में किसी भी Date पर delivery ले सकते हो & इसको Default नहीं मानेंगे

	Spot (High)	1 $ = ₹40.95
	(+) Prem.	0.50
		1 $ = ₹41.45
3.3.22	Request for Cancellation	Satisfy
3.3.22	Cancellation	
3.3.22	Spot Sale (Low)	1 $ = ₹40.85
	(-) Margin @0.10%	(0.0409)
		1 $ = ₹40.8091
	R/o	1 $ = ₹40.8100

Profit/Loss:-

(i.) Swap loss:-

Spot Sale	1 $ = ₹40.80
1 Month fwd. Buy	1 $ = ₹41.45
Loss	1 $ = ₹0.65

∴ Total swap loss = 10000 $ × ₹0.65 → ₹6500

(ii.) Exchange Difference :-

2 Months Fwd. Sale	1 $ = ₹41.14
Spot Sale	1 $ = ₹40.81
Loss	1 $ = ₹0.33

∴ Total Exchange Difference (Loss) = 10000 $ × ₹0.33 = ₹3300

(iii.) Interest :

Inflow on 1.3.22	1 $ = ₹40.80
Outflow on 1.3.22	1 $ = ₹41.10
~~Loss~~ Net Outflow	1 $ = ₹0.30

Total Outflow ⇒ ₹0.30 × 10000 $ = ₹3000

∴ Interest → ₹3000 × 12% × $\frac{2}{365}$ ⇒ ₹2

∴ Net Loss = ₹6500 + ₹3300 + ₹2 ⇒ ₹9802

(vi.) Customer does not approach (Automatic cancellation) :-

Dealer

Customer	Market
1.1.22 2 Months fwd. Sale	1.1.22 2 Months fwd. Buy
1 $ = ₹41.14	1 $ = ₹41.10
	↓
1.3.22 Does Not Approach	1.3.22 ✓ Satisfy
	1.3.22 Spot Sale (Low) 1 $ = ₹40.80
	1.3.22 Nearest Fwd. (1 Month) open Buy
	Spot (High) 1 $ = ₹40.95
	(+) Prem. 0.50
	1 $ = ₹41.45
	4.3.22 Satisfy

4.3.23 Rows not Approach

4.3.23 Cancellation

spot sale (Low)	1$ = ₹40.90
(-) margin @ 0.10%	(0.0409)
	1$ = ₹40.8591
R/o	1$ = ₹40.8600

Profit / Loss :-

(i.) swap loss :-

spot sale	1$ = ₹40.80
1 month fwd. Buy	1$ = ₹41.45
Loss	1$ = ₹0.65

∴ Total swap Loss = 10000$ × ₹0.65 = ₹6500

(ii.) Exchange Difference :-

2 Months fwd. Sale	1$ = ₹41.14
Spot Sale	1$ = ₹40.86
Loss	1$ = ₹0.28

∴ Total Exchange Difference (Loss) = 10000$ × ₹0.28
⇒ ₹2800

(iii.) Interest :-

Inflow on 1.3.23	1$ = ₹40.80
Outflow on 1.3.23	1$ = ₹41.10
Net Outflow	1$ = ₹0.30

Total Outflow = 10000$ × ₹0.30 ⇒ ₹3000

∴ Interest = ₹3000 × 12% × $\frac{3}{365}$ ⇒ ₹3

∴ Net loss = ₹6500 + ₹2800 + ₹3
⇒ ₹9303

(Vii) Customer wants delivery on 3.3.22 (Late Delivery) :-

Dealer

Customer	Market
1.1.22 2 Month fwd Sale	1.1.22 2 Months fwd. Buy
1 $ = ₹41.14	1 $ = ₹41.10
	↓
1.3.22 Does Not Approach	1.3.22 ✓ Satisfy
	1.3.22 Spot Sale (Low) 1 $ = ₹40.80
	1.3.22 Nearest Fwd. (1 Month) open Buy
	Spot (High) 1 $ = ₹40.95
	(+) Prem. 0.50
	1 $ = ₹41.45
3.3.22 Request for Delivery	3.3.22 Satisfy
↓	3.3.22 Cancellation
First Late Cancellation	Spot Sale (Low) 1 $ = ₹40.85
	(-) Margin @ 0.10% (0.0409)
	1 $ = ₹40.8091
	Rb 1 $ = ₹40.8100

Profit / Loss :-

(i) Swap Loss :-

Spot Sale	1 $ = ₹40.80
1 Month fwd. Buy	1 $ = ₹41.45
Loss	1 $ = ₹0.65

∴ Total swap Loss = 10000 $ × ₹0.65

⇒ ₹6500

(ii.) Exchange Difference :-

2 Months Fwd. Sale	1 $ = ₹41.14
Spot Sale	1 $ = ₹40.81
Loss	1 $ = ₹0.33

∴ Total Exchange Difference (Loss) = 10000 $ × ₹0.33
⇒ ₹3300

(iii.) Interest :-

Inflow on 1.3.22	1 $ = ₹40.80
Outflow on 1.3.22	1 $ = ₹41.10
Net Outflow	1 $ = ₹0.30

∴ Total Outflow = 10000 $ × ₹0.30 ⇒ ₹3000

∴ Interest = ₹3000 × 12% × 2/365 ⇒ ₹2

∴ Net Loss ⇒ ₹6500 + ₹3300 + ₹2
⇒ ₹9802

New Delivery Rate for customer on 3.3.22 :-

Spot (High)	1 $ = ₹41
(+) Margin @ 0.10%	0.0410
	1 $ = ₹41.0410
R/o	1 $ = ₹41.0400

Delivery ⇒ 10000 $ × ₹41.04
⇒ ₹ 410400

(+) Default Charges ₹ 9802

₹420202

(viii.) Customer Extend on due date for 1 month :-

Dealer

Customer	Market
1.1.22 2 Month Fwd Sale	1.1.22 2 Months Fwd. Buy
1 $ = ₹41.14	1 $ = ₹41.10
	↓
1.3.22 Request for Extension	1.3.22 ∪ Satisfy
↓	1.3.22 Cancellation
First Due Date Cancellation	Spot Sale (Low) 1 $ = ₹40.80
	(-) Margin @ 0.10% (0.0408)
	1 $ = ₹40.7592
	R/o 1 $ = ₹40.7600

Profit / Loss :-

(i.) Exchange Difference :-

2 Months Fwd. Sale	1 $ = ₹41.14
Spot Sale	1 $ = ₹40.76
Loss	1 $ = ₹0.38

∴ Total Exchange Difference (Loss) ⇒ 10000 $ × ₹0.38
⇒ ₹3800

1.3.22 New 1 Month Fwd. Sale :-

Spot	1 $ = ₹40.95
(+) Prem.	0.50
	₹41.45
(+) Margin @ 0.10%	0.0415
	1 $ = ₹41.4915
R/o	1 $ = ₹41.4925

(ix) Customer extend 2 Months on 1.2.22 (Early Extension) :-

Dealer

Customer		Market	
1.1.22	2 Months fwd. Sale	1.1.22	2 Months fwd. Buy
	1 $ = ₹41.14		1 $ = ₹41.10
1.2.22	Request for Extension	1.2.22	Cancellation
	↓		1 Month fwd. Sale
	First Early Date Cancellation		Spot 1 $ = ₹40.10
			(+) Prem. 0.45
			1 $ = ₹40.55
			(+) Margin @ 0.10% (0.0406)
			1 $ = ₹40.5094
			R/o 1 $ = ₹40.5100

Profit / Loss :-

(i.) Exchange Difference :-

2 Months fwd. Sale	1 $	= ₹ 41.14
1 Month fwd. Sale	1 $	= ₹ 40.51
Loss	1 $	= ₹ 0.63

∴ Total Exchange Diff. (Loss) → 10000 $ × ₹0.63 → ₹6300

1.2.22 New 2 Months fwd. Sale :-

Spot	1 $	= ₹40.65
(+) Prem.		0.80
	1 $	= ₹41.45
(+) Margin @ 0.10%		0.0415
	1 $	= ₹41.4915
R/o	1 $	= ₹41.4925

(x.) Customer extends for 1 Month on 3.3.22 (Late Extension) :-

Dealer

Customer		Market	
1.1.22	2 Month Fwd. Sale 1 $ = ₹41.14	1.1.22	2 Month Fwd. Buy 1 $ = ₹ 41.10
			↓
1.3.22	Does Not Approach	1.3.22	✓ satisfy
		1.3.22	spot sale (Low) 1 $ = ₹40.80
		1.3.22	Nearest Fwd. (1 Month) open Buy spot (High) 1 $ = ₹40.95 (+) Prem. 0.50 1 $ = ₹41.45
3.3.22	Request for Extension ↓ First Late Date Cancellation	3.3.22	Satisfy
		3.3.22	cancellation
			spot sale (Low) 1 $ = ₹40.85 (-) Margin @ 0.10% (0.0409) 1 $ = ₹40.8091 R/o 1 $ = ₹40.8100

Profit / Loss :-

(i.) swap Loss :-

Spot Sale	1 $ = ₹ 40.80
1 Month Fwd. Buy	1 $ = ₹ 41.45
Loss	1 $ = ₹ 0.65

∴ Total swap loss = 10000 $ × ₹0.65
→ ₹6500

(ii.) Exchange Difference :-

2 Months fwd. sale	1 $	= ₹41.14
Spot sale	1 $	= ₹40.81
Loss	1 $	= ₹0.33

∴ Total Exchange Difference (Loss) = 10000 $ × ₹0.33
⇒ ₹3300

(iii.) Interest :-

Inflow	1 $	= ₹40.80
Outflow	1 $	= ₹41.10
Net Outflow	1 $	= ₹0.30

Total Outflow = 10000 $ × ₹0.30 = ₹3000

∴ Interest = ₹3000 × 12% × $\frac{2}{365}$ ⇒ ₹2

∴ Net Loss ⇒ ₹6500 + ₹3300 + ₹2
⇒ ₹9802

3.3.22 New 1 Month fwd. sale :-

Spot	1 $	= ₹41.00
(+) Prem.		0.40
	1 $	= ₹41.40
(+) Margin @ 0.10%.		0.0414
	1 $	= ₹41.4414
R/o	1 $	= ₹41.4425

Answer (6.) Due date = 1·3·22

(i.) Customer wants Del· on due date (1·3·22) :-

Dealer

Customer

1·1·22 2MF Buy

Spot 1$ = ₹40·00

(+) Prem. 0·50

1$ = ₹40·50

(-) Margin @ 0·10% (0·0405)

1$ = ₹40·4595

R/o 1$ = ₹40·4600

Market

1·1·22 2MF Sale

Spot 1$ = ₹40·00

(+) Prem. 0·50

1$ = ₹40·50

1·3·22 Request for Delivery

(Buy @ 1$ = ₹40·46)

↓

10000 $ X ₹40·46 = ₹404600

(ii.) Customer wants Del· on 1·2·22 (Early Delivery) :-

Dealer

Customer

1·1·22 2MF Buy

1$ = ₹40·46

1·2·22 Request for del·

(Buy @ 1$ = ₹40·46)

Market

1·1·22 2MF Sale

1$ = ₹40·50

1·2·22 Spot sale (Low) 1$ = ₹40·10

1·2·22 1MF Buy

Spot 1$ = ₹40·65

(+) Prem. 0·75

1$ = ₹41·10

Profit / Loss :-

(i.) Swap Loss :-

Spot Sale	1 $ = ₹40·10
1 MF Buy	1 $ = ₹41·40
Loss	1 $ = ₹1·30

∴ Total Swap Loss = 10000 $ × ₹1·30 = ₹13000

(ii.) Interest :-

Inflow	1 $ = ₹40·10
Outflow	1 $ = ₹40·46
Net outflow	1 $ = ₹0·36

Total outflow = 10000 $ × ₹0·36 ⇒ ₹3600

∴ Interest = ₹3600 × 12% × 28/365 ⇒ ₹33

Net Loss = ₹13000 + ₹33 ⇒ ₹13033

(iii.) Customer cancels on Due Date (1·3·22) :-

Dealer

Customer		Market	
1·1·22	2 MF Buy 1 $ = ₹40·46	1·1·22	2 MF Sale 1 $ = ₹40·50
1·3·22	Request for cancellation	1·3·22	✓ Satisfy 1·3·22 Cancellation : Spot Buy (High) 1 $ = ₹40·95 (+) Margin @ 0·10% 0·0410 1 $ = ₹40·9910 R/o 1 $ = ₹40·9900

Profit / Loss :-

(i.) Exchange Difference :-

2 MF Buy	1 $	= ₹40.46
Spot Buy	1 $	= ₹40.99
Loss	1 $	= ₹0.53

∴ Total Exchange Diff. (Loss) = 10000 $ × 0.53 ₹
= ₹5300

(iv.) Customer cancels on 1.2.22 (Early Cancellation)

Dealer

Customer

1.1.22 2MF Buy
1 $ = ₹40.46

1.2.22 Request for cancellation

Market

1.1.22 2MF Sale
1 $ = ₹40.50

1.2.22 Cancellation

1 MF Buy	1 $ = ₹40.65
(+) Prem.	0.75
	1 $ = ₹41.40
(+) Margin @ 0.10%	$ 0.0414 $
	1 $ = ₹41.4414
R/o	1 $ = ₹41.4425

Profit / Loss :-

(i.) Exchange Difference :-

2 MF Buy	1 $	= ₹40.46
1 MF Buy	1 $	= ₹41.4425
Loss	1 $	= ₹0.9825

∴ Total Exch. Diff. (Loss) = 10000 $ × ₹0.9825
⇒ ₹ 9825

(v) Customer cancels on 3.3.22 (Late Cancellation) :-

Customer	Dealer	Market
1.1.22 2MF Buy 1$ = ₹40.46		1.1.22 2MF Sale 1$ = ₹40.50
		↓
1.3.22 Does not Approach	1.3.22	✓ Satisfy
	1.3.22 Spot Buy (High) = 1$ = ₹40.95	
	1.3.22 Nearest Fwd. (1 month) Open Sale	
	Spot 1$ = ₹40.80	
	(+) Prem. 0.25	
	1$ = ₹41.05	
3.3.22 Request for cancellation	3.3.22	Satisfy
	3.3.22 Cancellation	
	Spot Buy 1$ = ₹41.00	
	(+) Margin @ 0.10% 0.0410	
	1$ = ₹41.0410	
	R/o 1$ = ₹41.0400	

Profit/Loss :-

(i.) Swap Gain :-

1 MF Sale	1$ = ₹41.05
Spot Buy	1$ = ₹40.95
Gain	1$ = ₹0.10

∴ Total swap gain = 10000 $ × ₹0.10 → ₹1000

(ii) Exchange ~~gain~~ Differnce :-

2 MF Buy	1 $ = ₹40.46
Spot Buy	1 $ = ₹40.04
Loss	1 $ = ₹0.58

∴ Total Exchange Diff. (loss) = 10000 $ × ₹0.58 → ₹5800

(iii) Interest :-

Inflow on 1.3.22	1 $ = ₹40.50
Outflow on 1.3.22	1 $ = ₹40.95
Net Outflow	1 $ = ₹0.45

Total Outflow = 10000 $ × ₹0.45 → ₹4500

∴ Interest = $\frac{₹4500 \times 12\% \times 2}{365}$ ⇒ ₹3

Net Loss = − ₹1000 + ₹5800 + ₹3 → ₹4803

(vi) Customer does not approach (Automatic Cancellation) :-

Dealer

Customer

1.1.22 2 MF Buy
1 $ = ₹40.46

1.3.22 Does Not Approach

Market

1.1.22 2 MF Sale
1 $ = ₹40.50
↓
1.3.22 ✓ satisfy
1.3.22 Spot Buy (High) 1 $ = ₹40.95
1.3.22 Nearest Fwd. (1 Month) open Sale
Spot 1 $ = ₹40.80
(+) Prem. 0.25
1 $ = ₹41.05

4.3.22 Satisfy

4.3.22 Does not Approach

4.3.22 Cancellation

Spot Buy	1$ = ₹41.05
(+) Margin @0.10%	0.0411
	1$ = ₹41.0911
R/o	1$ = ₹41.0900

Profit/Loss :-

(i-) swap gain :-

1 MF Sale	1$ = ₹41.05
Spot Buy	1$ = ₹40.95
Gain	1$ = ₹0.10

∴ Total swap gain = 10000 $ × ₹0.10 ⇒ ₹1000

(ii-) Exchange Differency :-

2 MF Buy	1$ = ₹40.46
Spot Buy	1$ = ₹41.09
Loss	1$ = ₹0.63

∴ Total Exch. Diff. (Loss) = 10000 $ × ₹0.63 ⇒ ₹6300

(iii-) Interest :-

Inflow on 1.3.22	1$ = ₹40.50
Outflow on 1.3.22	1$ = ₹40.95
Net outflow	1$ = ₹0.45

Total outflow = 10000 $ × ₹0.45 ⇒ ₹4500

∴ Interest = $\frac{₹4500 \times 12\% \times 3}{365}$ ⇒ ₹4

Net loss = -₹1000 + ₹6300 + ₹4

⇒ ₹5304

(vii.) Customer wants Delivery on 3.3.22 (Late Delivery) :-

↓

First late Cancellation (Same as (v.))

Loss → ₹4803

3.3.22 New Del. Rate for Customer :-

Spot (Low)	1$ = ₹40.85
(-) Margin @ 0.10%	(0.0409)
	1$ = ₹40.8091
R/o	1$ = ₹40.8100

(viii.) Customer extend on due date for 1 Month [Due Date Extension] :-

↓

First Due Date Cancellation (Same as (iii.))

Loss → ₹5300

1.3.22 New 1 MF Buy :-

Spot (Low)	1$ = ₹40.80
(+) Prem.	0.25
	1$ = ₹41.05
(-) Margin @ 0.10%	(0.0411)
	1$ = ₹41.0089
R/o	1$ = ₹41.0100

(ix.) Customer extend for 2 Months on 1.2.22 (Early Extension) :-

↓

First Early Cancellation (Same as (iv.))

Loss → ₹9825

1.2.22 New 2 MF Buy :-

Spot	1 $ = ₹40.10
(+) Prem.	0.65
	1 $ = ₹40.75
(-) Margin @ 0.10%.	(0.0408)
	1 $ = ₹40.7092
R/o	1 $ = ₹40.7100

(x) Customer extend for 1 Month on 3.3.22 (Late Extension) :-

↓

First late Cancellation (Same as (v))

Loss → ₹4803

3.3.22 New 1 MF Buy :-

Spot	1 $ = ₹40.85
(+) Premium	0.30
	1 $ = ₹41.15
(-) Margin @ 0.10%	(0.0412)
	1 $ = ₹41.1088
R/o	1 $ = ₹41.1100

Answer (7.) Same as Ques. 5 except there is Fwd. Discount instead of Prem.

Answer (8.) Same as Ques. 6 except there is Fwd. Discount instead of Prem

Answer (9.)

Dealer

Customer

0 time 3 Month Fwd. Buy
1 CHF = ₹ 27.25

After 2 Months (Early Date) Request for Cancellation

Market

0 time 3 Month fwd. Sale @
1 CHF = [ ]
इस Rate की जानकारी ही नहीं है अतः इसलिये नहीं दे

After 2 Months (Early Date) 1 Month fwd. Buy @ 1 CHF = ₹ 27.52

Profit / Loss :-

(i.) Exchange Difference :-

1 Month fwd. Buy	1 CHF =	₹ 27.52
3 Month fwd. Buy	1 CHF =	₹ 27.25
Loss	1 CHF =	₹ 0.27

∴ Total ⇒ 10000 CHF × ₹ 0.27 ⇒ ₹ 2700

Answer (10.) (Concept of Cross Rate shall be learned for this Ques.)

Dealer

Customer

fwd. of 25th April to buy SF 100000
@ 1 SF = ₹ 32.4000

Market

Fwd. sale of 25th April for SF
@ 1 SF = ₹ 32.4200

25/3 Request for Cancellation (Early)

1 M. fwd. Buy for SF @

SF Buy	₹ Sell

1 SF = ₹ ??

1 $ = ₹ 49.4455
(+) Pm. 0.4200
1 $ = ₹ 49.8655
1 $ = SF 1.5150

$\frac{₹}{SF} = \frac{₹}{\$} \times \frac{\$}{SF}$ → Reverse

₹/SF = 49.8655 × 1/1.5150

1 SF = ₹32.9145

(+) EM @0.10% 0.0329

1 SF = ₹32.9474

R/o 1 SF = ₹32.9475

Profit / Loss :-

(i.) Exchange Difference :-

1 Month Fwd. Buy (Market) 1 SF = ₹32.9475

Fwd. Buy under Orgnal Contract (Customer) 1 SF = ₹32.4000

Loss 1 SF = ₹0.5475

∴ Total Exch loss ⇒ 100000 SF × ₹0.5475 = ₹54750

Answer (11.)

Dealer

Customer

5. March 3 Month Fwd. Buy @ 1 $ = ₹59.6000

∴ May Request for Extension

Market

5. March 3 Month Fwd. Sale @ 1 $ = ₹60.6025

Cancellation

5. May 1 Month Fwd. Buy @ 1 $ = ₹59.2425

(+) Exch. Mar @0.10% 0.0592

1 $ = ₹59.3017

R/o 1 $ = ₹59.3025

Profit / Loss :-

(i.) Exchange Difference :-

3 Months fwd. Buy (Customer)	1$ = ₹59.6000
1 Month fwd. Buy (Market)	1$ = ₹59.3025
Gain	1$ = ₹0.2975

∴ Total gain = US$ 50000 × ₹0.2975

⇒ ₹14875

5/5 New Contract :- [5. July Fwd.]

1$ =	₹59.6300
(-) E.M. @ 0.10%	(0.0596)
1$ =	₹59.5704
R/o 1$ =	₹59.5700

Answer (12.)

Dealer

Customer	Market
15. Jan. 22 — 2 MF Sale @ 1$ = ₹65.3450	15. Jan. 22 — 2 MF Buy @
15. March 22 — Request for cancellation	15. March 22 — ↓ ✓ satisfy
	15. March 22 — Cancellation
	Spot Sale (Low) 1$ = ₹65.2900
	(-) EM @ 0.10% (0.0653)
	1$ = ₹65.2247
	R/o 1$ = ₹65.2250

Profit / Loss :-

(i.) Flat Charges :-

⇒ ₹100

(ii.) Exchange Difference :-

2 Month Fwd. Sale (Customer)	1 $ = ₹65.3450
Spot Sale (Market)	1 $ = ₹65.2250
Loss	1 $ = ₹0.1200

Total Exch. Diff. (loss) = US $250000 × ₹0.1200
= ₹30000

∴ Net Loss = ₹100 + ₹30000 ⇒ ₹30100

Answer (13.)

Dealer

Customer	Market
0 time 2MF Buy @ 1 $ = ₹62.5200	0 time 2Mf Sale @ 1 $ = ₹62.5900
After 2 Months (Due Date) Request for cancellation & extension by 1 Month	After 2 Months (Due Date) ✓ Satisfy
	After 2 Months (Due Date) Cancellation
	Spot Buy (High) 1 $ = ₹62.7200
	(+) EM @ 0.10% 0.0627
	1 $ = ₹62.7827
	R/o 1 $ = ₹62.7825

Profit / Loss :-

(i.) Exchange Difference :-

Spot Buy (Market)	1 $ = ₹62.7825
2MF Buy (Customer)	1 $ = ₹62.5200
Loss	1 $ = ₹0.2625

Total Exch. Diff. (Loss) = US $100000 × ₹0.2625 = ₹26250

Due Date: New contract (1 MF Buy):-

~~spot~~	1$ =	₹62.6400
(-) E.M. @ 0.10%		(0.0626)
	1$ =	₹62.5774
R/o	1$ =	₹62.5775

Answer (14.)

Dealer

- Customer
- Market

o time Fwd. Sale @ 1$ = ₹42.32

o time fwd. Buy @ ____

Due Date		Due Date	✓ Satisfy
30.10.22	Request for Extension	30.10.22	Cancellation

Spot Sale (Low) 1$ = ₹41.50

(-) E.M. @ 0.075% (0.0311)

1$ = ₹41.4689

R/o 1$ = ₹41.4700

In this case Actual Dealer is Inter Bank Dealer which are buying Spot. Hence EM for buying will Apply

Profit / Loss :-

(i.) Exchange Difference :-

Fwd. Sale (Customer)	1$ =	₹42.32
Spot Sale (Market)	1$ =	₹41.47
Loss	1$ =	₹0.85

Total Exch. Diff. (Loss) = US$ 20000 × ₹0.85 = ₹17000

30/10/22 New Contract (3 MF Sale):-

Spot (High)	1$ =	₹41.52
(+) Premium @ 0.93%		0.3861
	1$ =	₹41.9061
(+) EM @ 0.20%		0.0838
	1$ =	₹41.9899
R/o	1$ =	₹41.9900

Answer (15.) Due Date → 31.12.22

Dealer

Customer		Market	
1.10.22	3MF Buy @ 1$ = ₹65.40	1.10.22	3MF Sale @ —
30.11.22	Request for Delivery (Buy @ 1$ = ₹65.40) Outflow	30.11.22	Spot Sale @ 1$ = ₹65.22 (Inflow)
		30.11.22	1MF Buy @ Spot (High) 1$ = ₹65.27
			(+) Prem. 0.15
			1$ = ₹65.42

Profit / Loss :-

(i.) Swap Loss :-

1 Month Fwd. Buy	1$ = ₹65.42
Spot Sale	1$ = ₹65.22
Loss	1$ = ₹0.20

∴ Total Swap Loss = 100000 $ × ₹0.20 ⇒ ₹20000

(ii.) Interest :-

Outflow on 30.11.22	1$ = ₹65.40
Inflow on 30.11.22	1$ = ₹65.22
Net Outflow	1$ = ₹0.18

Total Outflow = 100000 $ × ₹0.18 ⇒ ₹18000

∴ Interest = ₹18000 × 18% × 31/365

⇒ ₹275

Net Loss ⇒ ₹20000 + ₹275 ⇒ ₹20275

Net Inflow to Mr. X (customer) :-

100000 $ × ₹65.40	⇒	₹6540000
(-)		(₹20275)
		₹6519725

Answer (16.)

Dealer

Customer		Market
10/4 2MF Sale @	1$ = ₹64.40	10/4 2MF Buy @ 1$ = ₹64.28
		↓
10/6 Does Not Approach	Outflow ←	10/6 ✓ Satisfy
	Inflow ←	10/6 Spot Sale (Low) @ 1$ = ₹63.80.
	Swap	10/6 Nearest Fwd. open Buy @ 1$ = ₹63.95
13/6 Request for Extension		13/6 Satisfy
		13/6 Cancellation
		Spot Sale (Low) 1$ = ₹63.68
		(-) Exch. Margin @0.10%. (0.0637)
		1$ = ₹63.6163
Exchange Difference		R/o 1$ = ₹63.6175

(i.) **Cancellation Rate :-**

1$ = ₹63.6175

(ii.) **Exchange Difference :-**

2 MF Sale (Customer)	1$ = ₹64.40
Spot Sale (Market)	1$ = ₹63.6175
Loss	1$ = ₹0.7825

Total Exchange Diff. (Loss) = 200000$ × 0.7825₹ ⇒ ₹156500

(iii.) Swap Loss:-

~~8~~ F Buy	1$ = ₹63.95
Spot Sale	1$ = ₹63.80
Loss	1$ = ₹0.15

∴ Total swap Loss = 200000 $ × ₹0.15 → ₹30000

(iv.) Interest on Outlay of Funds:-

Outflow on 10/6	1$ = ₹64.28
Inflow on 10/6	1$ = ₹63.80
Net Outflow	1$ = ₹0.48

∴ Total Outflow = 200000 $ × ₹0.48 → ₹96000

∴ Interest = $\frac{₹96000 \times 12\% \times 3}{360}$ → ₹96

(v) New Contract Rate :- (10th August)

13/6 2 MF Sale @

1$ =	₹64.25
(+) E.M. @ 0.10%	₹0.0643
1$ =	₹64.3143
R/o 1$ =	₹64.3150

(vi) Total Cost → ₹158500 + ₹30000 + ₹96

→ ₹186596

Answer (17.)

Dealer

Customer	Market
10/7 2MF Sale @ 1$ = ₹66.84	10/7 2MF Buy @ 1$ = ₹66.68
10/9 Does Not Approach [Due Date]	10/9 (Due Date) ✓ Satisfy
	10/9 Spot Sale (Low) @ 1$ = ₹66.15
	10/9 Nearest Fwd. Open Buy @ 1$ = ₹66.32
13/9 Customer Requests :-	13/9 Satisfy
(i.) Cancellation	13/9 Cancellation
(ii.) Delivery	Spot Sale (Low) 1$ = ₹65.98
(iii.) Extension	(-) Exch. margin @0.1% (0.0650)
Therefore, first we have to cancel this contract in each of the cases.	1$ = ₹65.8940
	R/o 1$ = ₹65.8950

Profit / Loss :-

(a.) Swap Loss :-

Fwd. Buy on 10. Sept.	1$ = ₹66.32
Spot Sale on 10. Sept.	1$ = ₹66.15
Loss	1$ = ₹0.17

∴ Total swap loss = 50000 $ × ₹0.17 ⇒ ₹8500

(b.) Exchange Difference :-

Spot Sale on 13. Sept. (Market)	1$ = ₹65.8950
2MF Sale (Customer)	1$ = ₹66.84
Loss	1$ = ₹0.9450

∴ Total Exch. Diff. (loss) = 50000 $ × ₹0.9450 ⇒ ₹47250

(c.) Interest :-

Outflow on 10. sept.	1 $ = ₹66.68
Inflow on 10. sept.	1 $ = ₹66.15
Net Outflow	1 $ = ₹0.53

Total Outflow = 50000 $ × ₹ 0.53 ⇒ ₹26500

∴ Interest = ₹26500 × 12% × 3/365 ⇒ ₹26

∴ Net Loss = ₹ 8500 + ₹47250 + ₹26 ⇒ ₹55776

(i.) Customer cancels the contract on 13. sept. :-

Net loss = ₹ 55776 (Charges for cancellation)

(ii.) Customer Execute the Contract on 13. sept. :-

Charges for Cancellation (Net Loss)	₹ 55776
Delivery ⇒ ($50000 × ₹66.0550*)	₹ 3302750
Charges for Execution ⟶	₹ 3358526

* New Delivery Rate for customer on 13. sept. :-

Spot (High)	1 $ = ₹65.99
(+) Exch. Margin @ 0.10%	0.0660
	1 $ = ₹65.0580
R/o	1 $ = ₹65.0550

(iii.) Customer extend the Contract on 13. sept. (Due Date: 10. Nov.) :-

Charges for Cancellation (Net Loss) = ₹ 55776

* New Fwd. Rate for Sale :-

1 $ =	₹66.49
(+) Exch. Mar. @ 0.1%	0.0665
	1 $ = ₹66.5565
R/o	1 $ = ₹66.5575

Answer (18.)

Dealer

Customer		Market
4.1.22 3MF Sale @ 1 $ = ₹ 73.8775	4.1.22	3MF Buy @ 1 $ = ₹ 73.7575
		↓
4.4.22 Does Not Approach	4.4.22	✓ Satisfy
	4.4.22	Spot Sale (Low) @ 1 $ = ₹ 73.2775
	4.4.22	Nearest fwd. open Buy @ 1 $ = ₹ 73.4275
7.4.22 Does Not Approach (Automatic Cancellation)	7.4.22	Satisfy
	7.4.22	Cancellation
		Spot Sale (Low) 1 $ = ₹ 73.1575
		(-) Exch. Margin @ 0.10% (0.0732)
		1 $ = ₹ 73.0843
		R/o 1 $ = ₹ 73.0850

(i.) Cancellation Rate → 1 $ = ₹ 73.0850

(ii.) Amt. Payable on $ 100000 [Exchange Difference] :-

3MF Sale on 4.1.22 (Customer)	1 $ = ₹ 73.8775
Spot Sale on 7.4.22 (Market)	1 $ = ₹ 73.0850
Loss	1 $ = ₹ 0.7925

∴ Total Exch. Diff. (Loss) = $ 100000 × ₹ 0.7925 → ₹ 79250

(iii.) Swap Loss :-

Nearest fwd Open Buy 4.4.22	1 $ = ₹ 73.4275
Spot Sale on 4.4.22	1 $ = ₹ 73.2775
Loss	1 $ = ₹ 0.15

∴ Total Swap Loss = $ 100000 × ₹ 0.15 → ₹ 15000

(iv.) Interest on outlay of funds :-

Outflow on	4.4.22	1 $ = ₹73.7575
Inflow on	4.4.22	1 $ = ₹73.2775
	Net Outflow	1 $ = ₹0.48

Total Outflow = $100000 × ₹0.48 = ₹48000

∴ Interest = ₹48000 × 12% × 3/365 ⇒ ₹47

(v.) New Contract Rate :- (2MF Sale)

14.4.22	2MF Sale	1 $ = ₹74.0525
(+) Exchange Margin @ 0.10%		0.0741
		1 $ = ₹74.1266
	Ro	1 $ = ₹74.1275

(vi.) Total Cost ⇒ ₹79250 + ₹15000 + ₹47
⇒ ₹94297

Answer (19.)

(i.) Expected Rate for 1.9.22 :-

Rate (1£ = $)	Probability	Rate × Probability
1.60	0.15	0.24
1.70	0.20	0.34
1.80	0.25	0.45
1.90	0.20	0.38
2.00	0.20	0.40
		1.81

∴ Expected spot Rate (1.9.22) ⇒ 1£ = 1.81 $

(ii.) 6 Months Fwd. Rate ⇒ 1£ = $ 1.80

Decision :- Co. should not do Forward. It should retain or open its exposure

Answer (20.)

Expected Spot Rate for 1. Nov. 22 :-

Rate (1$ = ₹)	Prob.	Rate × Prob.
77	0.15	11.55
71	0.25	17.75
79	0.20	15.80
74	0.40	29.60

∴ Expected Spot Rate (1.11.22) ⇒ 1$ = ₹74.70

∴ Payment ⇒ 80000 $ × ₹74.70 ⇒ ₹5976000

Forward Contract :-

Payment (80000 $ × ₹74)		₹5920000
Add :- Upfront Prem. (80000 $ × 74 $ × 1%)	₹59200	
(+) Interest (₹59200 × 10% × 6/12)	₹2960	₹62160
		₹5982160

Self Note* :- Since Upfront Prem. is paid at the time of entering in Fwd. Contract (i.e. on 1. May 22) and for the purpose of Advising the company on fwd. Contract we compare Payment at the settlement date, so, we will add Int. Amt. on Upfront Prem. for a 6 Months Pd. (1. May 22 to 1. Nov. 22). This can also be understood as Co. has taken Loan for Paying Upfront Prem. on which Int. will be paid.

Decision :- Co. should not do fwd. It should retain or open its Exposur

Answer (21.)

(i.) Principal — 2000000 $

(+) Interest $\left(2000000 \times 3\% \times \frac{6}{12}\right)$ — 30000 $

Total Repayment — 2030000 $

Fwd. Rate ⇒ 1 $ = ₹68.4575

∴ Repayment in ₹ (2030000 $ × ₹68.4575) ⇒ ₹13,89,68,725

(ii.) Expected spot Rate :-

$$\frac{F}{68.5275} = \frac{1 + 0.06 \times 6/12}{1 + 0.02 \times 6/12}$$

F = ₹69.8845 / $ (i.e. 1 $ = ₹69.8845)

Total ⇒ 2030000 $ × ₹69.8845 ⇒ ₹14,18,65,535

Decision: Company should take Fwd. cover because expected spot Rate after 6 months is higher than fwd. rate.

If spot Rate is 1 $ = ₹68.4275 :-

$$\frac{F}{68.4275} = \frac{1 + 0.06 \times 6/12}{1 + 0.02 \times 6/12}$$

F = ₹69.7825 / $ (i.e. 1 $ = ₹69.7825)

Decision: Thus, still company should take forward cover.

Answer (22.)

(i.) Principal		2000000 $
(+) Interest	$(2000000 \times 3\% \times \frac{6}{12})$	30000 $
	Total Repayment	2030000 $

Fwd. Rate ⇒ 1 $ = ₹ 48.4575

∴ Repayment in ₹ (2030000 $ × ₹ 48.4575) ⇒ ₹ 9,83,68,725

(ii.) Since value of Dollar is Depreciating according to deals as can be seen from the fwd. Rates that means Market Expects the value of dollar to depreciates, then it is advised not to do forward and exposure should be retained and kept open.

Alternatively, based on Past Trends it can be seen that Dollar is a stronger currency (i.e. usually value of Dollar never Depreciates$ in long term), then it is advised to ~~do~~ take forward cover.

Answer (23.)

Forward Contract :-

Payment	(60000 $ × ₹ 64)		₹ 3840000
Add:- Upfront Premium	(60000 $ × ₹ 64 × 2%)	₹ 76800	
(+) Interest	(₹ 76800 × 12% × 6/12)	₹ 4608	₹ 81408
	Total		₹ 3921408

Expected Rate :-

(i.) Payment ⇒ 60000 $ × ₹ 68 ⇒ ₹ 4080000

Profit on fwd. ⇒ ₹ 4080000 − ₹ 3921408 ⇒ ₹ 158592

(ii.) Payment → 60000 $ × ₹62 ⇒ ₹3720000
Loss on fwd. → ₹3921408 − 3720000 → ₹201408

(iii.) Payment → 60000 $ × ₹70 → ₹4200000
& Profit on fwd. → ₹4200000 − ₹3921408 ⇒ ₹278592

(iv.) Payment ⇒ 60000 $ × ₹65 → ₹3900000
Loss on Fwd. → ₹3921408 − ₹3900000 → ₹21408

Answer (24.) (In this Ques we will receive Can $ from our customer that we will sale in Bank & receive £ on that behalf)

Forward :−

$$\frac{F}{2.5} = \frac{1 + 0.15 \times 6/12}{1 + 0.12 \times 6/12}$$

F = Can $ 2.535 / £ (i.e. 1 £ = Can $ 2.535)

Receipt under fwd. ⇒ $\frac{\text{Can \$ } 500000}{\text{Can \$ } 2.535}$ ⇒ £ 197239

Expected :−

(i.) If Can $ declines by 2%

∴ Expected Spot Rate → 1£ = Can $ 2.5 × 1.02
1£ ⇒ Can $ 2.55

Reciept − $\frac{\text{Can \$ } 500000}{\text{Can \$ } 2.55}$ ⇒ £ 196078

∴ Profit on fwd. = £ 197239 − £ 196078
→ £ 1161

(ii.) If Can $ spot Rate Gains by 4%.

∴ Expected spot Rate ⇒ 1£ = Can $ 2.5 × 0.96

1£ = Can $ 2.4

Receipt = Can $ 500000 / Can $ 2.4 ⇒ £208333

∴ Loss on Fwd. = £208333 − £197239

⇒ £11094

(iii.) If Can $ spot Rate remains Unchanged

∴ Expected spot Rate → 1£ = Can $ 2.5

Receipt = Can $ 500000 / Can $ 2.5 ⇒ £200000

∴ Loss on Fwd. = £200000 − £197239

⇒ £2761

Answer (25.)

	Japan	USA	Europe
Total Sales Volume (A)	¥ 7800000	$102300	€ 95920
Sale Price p.u. (B)	¥ 650	$10.23	€ 11.99
No. of Units (C) = (A) ÷ (B)	12000 Units	10000 Units	8000 Units
Variable Cost p.u. (D)	₹225	₹395	₹510
Total Var. Cost (E) = (C) × (D)	₹2700000	₹3950000	₹4080000

If Fwd. Contract is done :-

3 Month Fwd. Rate	1₹ = ¥2.427	1₹ = $0.0216	1₹ = €0.0178
Sales Value in ₹ (F)	₹3213844 +	₹4736111 +	₹5388764
Contribution (F) − (E)	₹513844 +	₹786111 +	₹1308764

∴ Total contribution ⇒ ₹ 2608719
Total Sales ⇒ ₹ 13338719

Contribution to Sales Ratio = $\frac{2608719}{13338719} \times 100 \Rightarrow 19.56\%$

	Japan	USA	Europe
If Expected :-			
3 Months Expected spot	1₹ = ¥ 2.459	1₹ = $ 0.02156	1₹ = € 0.0179
Sales Value in ₹ (G)	₹ 3172021	+ ₹ 4744898	+ ₹ 5358659
Contribution (G) - (E)	₹ 472021	+ ₹ 794898	+ ₹ 1278659

∴ Total Contribution ⇒ ₹ 2545578
Total Sales ⇒ ₹ 13275578

Contribution to sales Ratio = $\frac{2545578}{13275578} \times 100 \Rightarrow ₹ 19.17\%$

Decision :- AKC Ltd. should take forward cover

Answer (26.)

3 Months fwd. Rate 1₹ = 3.3 ¥

Spot Rate ₹ 30 lakh = ¥ 108 lakh
1₹ = 3.6 ¥

Expected spot Rate ⇒ 1₹ = 3.6 ¥ × 0.90
⇒ 1₹ = 3.24 ¥

Expected loss :-

Expected Payment $\left(\frac{¥\ 108\ lakh}{¥\ 3.24}\right)$ ₹ 33.33 lakh

starting spot Payment $\left(\frac{¥\ 108\ lakh}{¥\ 3.6}\right)$ ₹ 30 lakh

₹ 3.33 lakh

Forward :- (Hedging by Fwd. Contract)

Forward Payment $\left(\frac{¥\ 108\ lakh}{¥\ 3.33}\right)$ ₹ 32.73 lakh

starting spot Payment $\left(\frac{¥\ 108\ lakh}{¥\ 3.6}\right)$ ₹ 30 lakh

₹ 2.73 lakh

Decision :- Company should take fwd. cover as expected loss can be reduced from ₹ 3.33 lakh to ₹ 2.73 lakh.

Answer (27.) [Concept of Cross Rate shall be shall be learned for this Ques.]

1 JPY = ₹ ??

Spot :-

1 $ = ₹ 62.22

1 $ = JPY 102.34

₹ = ₹ × $
JPY $ JPY → Reverse

₹/JPY = $62.22 \times \frac{1}{102.34} \Rightarrow 0.6080$

1 JPY = ₹ 0.6080 → Spot Rate

Expected Rate of August 31st, 2022

1 $ = 124 JPY

1 $ = ₹ 65

₹/JPY = ₹/$ × $/JPY	→ Reverse

₹/1 JPY = 65 × 1/124 ⇒ 0.5242

1 JPY = ₹ 0.5242 → Expected Rate

Forward Rate :-

1 $ = ₹66.50

1 $ = JPY 110.35

₹/1 JPY = 66.50 × 1/110.35 ⇒ 0.6026

1 JPY = ₹ 0.6026 → Fwd. Rate

(i) **Expected loss :-**

Spot (JPY 100000000 × ₹0.6080)	₹6080000
Expected (JPY 100000000 × ₹0.5242)	₹5242000
Exp. Loss	₹838000

Hedging by forward :-

Spot (JPY 100000000 × ₹0.6080)	₹6080000
Forward (JPY 100000000 × ₹0.6026)	₹6026000
Loss	₹54000

Decision :- By taking fwd. cover loss is reduced to ₹54000

(ii.) Actual Spot Rates on 31 August 22 :-

1 $ = ₹66.25

1 $ = JPY 110.85

₹/JPY = 66.25 × 1/110.85 ⇒ 0.5977

1 JPY = ₹0.5977 → Actual Spot Rate on 31/8/22

Actual Payment :-

Spot (JPY 10000000 × ₹0.6080)	₹ 6080000
Actual Spot (JPY 10000000 × ₹0.5977)	₹ 5977000
Loss	₹ 103000

The decision to take forward cover is still justified

Answer (28.)

(i.) ₹ 25 lakhs Buy, $ Sell = ??

2MF ⇒ 1 $ = ₹47

∴ $ to be sold ⇒ ₹25 lakhs / ₹47 ⇒ $ 53191.49

(ii.) $ ⇒ Buy ₹ → Sell

1 $ = ₹46.25 (Spot)

∴ ₹ to be paid ⇒ 200000 $ × ₹46.25 ⇒ ₹9250000

(iii.) Encash Now :-

$ → Sell ₹ → Buy

1 $ = ₹46

Convert in ₹ (69000 $ × ₹46)	=	₹ 3174000
(+) Interest (3174000 × 10% × 2/12)	=	₹ 52900
		₹ 3226900

2 Month later :-

$ → sell ₹ → Buy

1 $ = ₹47

Convert in ₹ (69000 × ₹47) ⇒ ₹3243000

Decision: Firm should encash 2 month later

Answer (29.) ★

(A.) To cover payable in fwd. Market :-

1 $ = ₹48.45

∴ Payment after 3 Months (700000 $ × ₹48.45) ₹ 33915000

Receive after 2 Months (450000 $ × ₹48.90) ₹22005000

(+) Interest (22005000 × 12% × 1/12) ₹220050 ₹22225050

Net Payment ₹11689950

(B.) To Lag Receivables by one Month :-

Net Payment ($700000 - $450000) $250000

1 $ = ₹48.45

Convert in ₹ (250000 × ₹48.45) ₹12112500

(-) Profit on Cancellation (W.N.) (₹270000)

(Int. on this profit is ignored because Ques. Specifically said No Interest for delaying) ₹11842500

Since, Net Payment is least in option A. Hence company should cover payable & receivables in Forward Market.

W.N. :-

	Dealer		
	Customer		Market
0 time	2 MF Buy @ 1 $ = ₹48.90	0 time	2 MF Sale @ 1 $ = ₹48.50 (not needed to solve Ques.)
0 time	Request for Cancellation	0 time	Cancellation 2 MF Buy @ 1 $ = ₹48.30

Profit / Loss :-

Exchange Difference :-

2M F Buy (Customer) 1 $ = ₹48.90

2M F Buy (Market) 1 $ = ₹48.30

Profit 1 $ = ₹ 0.60

Total Exch. Diff. (Profit) = $450000 × ₹0.60 = ₹270000

Answer (30.)

(i.) Pay to supplier on 60th day (leading) :-

Invoice Amt.	$ 1 crore
1 $ = ₹63.15	
Convert in ₹ ($ 1 crore × ₹63.15)	₹63.15 crore
(+) Interest ($₹63.15 \text{ crore} \times 9.5\% \times \frac{30}{360}$)	₹ 0.50 crore
	₹63.65 crore

(ii.) Pay to supplier on 90th day (lagging) :-

Invoice Amt	$ 1 crore
(+) supplier Interest ($1 \text{ crore} \times 7.75\% \times \frac{30}{360}$)	$ 0.00646 crore
	$ 1.00646 crore
1 $ = ₹63.45	
Convert in ₹ ($ 1.00646 crore × ₹63.45)	₹63.86 crore

Decision :- Alternative (i.) is better

Answer (31.)

(i.) Pay the supplier in 60 days (Leading) :-

Invoice Amount	$ 2000000
1 $ = ₹57.10	
Convert in ₹ ($2000000 × ₹57.10)	₹ 1142000000
(+) Interest (₹1142000000 × 10% × 30/360)	₹ 951667
	₹ 11,51,51,667

(ii) Pay the supplier in 90 days (Lagging) :-

Invoice Amt.	$ 2000000
(+) supplier Interest ($2000000 × 8% × 30/360)	$ 13333
	$ 2013333
1 $ = ₹57.50	
Convert in ₹ ($2013333 × ₹57.50)	₹ 11,57,66,648

Decision :- option (i) is better

Answer (32.)

Invoice Amt. → 5000 Bottles × $ 20 → $ 100000

(i.) Pay the supplier in 3 Months (Lagging) :-

Invoice Amt.	$ 100000
(+) supplier Interest ($100000 × 10% × 3/12)	$ 2500
	$ 102500
1 $ = ₹ 60.55	
(-) discount	(0.25)
1 $	₹60.30
Convert in (₹) [$102500 × ₹60.30]	₹6180750

(ii.) Pay the supplier Immediately (Leading):-

Invoice Amt.	$ 100000
1 $ = ₹60.55	
Convert in ₹ ($100000 × ₹60.55)	₹6055000
(+) Interest (₹6055000 × 14% × 3/12)	₹211925
	₹6266925

Decision: Option (i.) is better

Answer (38.)

(i.) Pay the Supplier Immediately (Leading):-

Invoice Amt.	$ 130000
1 $ = ₹48.36	
Convert in ₹ ($130000 × ₹48.36)	₹6286800
(+) Interest (6286800 × 15% × 3/12)	₹235755
	₹65,22,555

(ii.) Pay the Supplier in 3 months (Lagging):-

Invoice Amt.	$130000
(+) Supplier Interest ($130000 × 5% × 3/12)	$1625
	$131625
1 $ = ₹48.83	
Convert in ₹ ($131625 × ₹48.83)	₹64,27,249

Decision: Option (ii) is better

Answer (34.)

(i.) Pay Immediately (Leading):-

Invoice Amt.	$8 Million
(-) Discount @ 1%	($ 0.08 Million)
	$ 7.92 Million

1 $ = ₹66.98

Convert in ₹ ($7.92 Million × ₹66.98)	₹53.0482 Crore
(-) Cash available	₹0.25 Crore
Loan	₹52.7982 Crore
(+) Interest (₹52.7982 Crore × 9% × 90/360)	₹1.1880 Crore
Total Payment	₹53.9862 Crore

(ii.) Pay suppliers on 60th Day (Leading):-

Invoice Amt.	$8 Million

1 $ = ₹67.16

Convert in ₹ ($8 Million × ₹67.16)	₹53.7280 Crore
(-) Cash Available	₹0.25 Crore
(+) Int. earned on cash (₹25 lakh × 4% × 60/360)	₹0.0017 Crore (₹0.2517 Crore)
Loan	₹53.4763 Crore
(+) Interest (₹53.4763 Crore × 9% × 30/360)	₹0.4011 Crore
Total Payment	₹53.8774 Crore

(iii) Pay supplier on 90th Day (Lagging):-

Invoice Amt.	$8 Million
(+) Supplier Interest ($8 Million × 8% × 30/360)	$0.0533 Million
	$8.0533 Million

1 $ = ₹68.03

	Convert in ₹ ($8.0533 Million × ₹68.03)	₹54.7866 Crore
(-)	Cash Available	₹0.25 Crore
(+)	Int. earned on cash (₹25 Lakh × 4% × 90/360)	₹0.0025 Crore (₹0.2525 Crore)
	Total Payment	₹54.5341 Crore

Decision: Option (ii) is better as cash outflow is least.

Self Note for Ques 34 :- Cash Available (including Int. earned on it) is not considered as a part of "Total Payment" as it will be common in all the three cases. So we have to less Cash Available (including int. earned on it while calculating "Total Payment"

Answer (35.)

(i.) Supplier is paid within 10 days (leading) :-

Invoice Amt.	$100000
(-) Discount @ 2%	($2000)
	$98000
1 $ = ₹55	
Convert in ₹ ($98000 × ₹55)	₹5390000

(ii.) Supplier is paid in 90 days (lagging) :-

Invoice Amt.	$100000
1 $ = ₹56	
Convert in ₹ ($100000 × ₹56)	₹5600000

(iii.) Difference → ₹5600000 - ₹5390000 → ₹210000 [₹1 का fluctuation 98000$ पर आया है]

Time Value [क्योंकि ये 2000$ का Payment 90 days में हुआ] → 2000 $ × ₹56 → ₹112000

Currency Value Fluctuation → $98000 × (₹56 - ₹55) → ₹98000

Answer (36.)

Home Currency (HC) ⇒ ₹ , foreign currency (FC) ⇒ £

S.1) Amt. to be received = £ 500000

S.2) Amt. to be borrowed in £ = $\frac{£\ 500000}{1 + 0.05 \times \frac{3}{12}}$ ⇒ £ 4,93,827

S.3) ₹ to be Invested = £ 493827 × ₹ 56 ⇒ ₹ 2,76,54,312

S.4) Withdraw ₹ Investment :-

Principal	₹ 2765431 2
(+) Interest (2765431 2 × 12% × 3/12)	₹ 829629
Actual Inflow	₹ 28483941

Spot Convert ⇒ £ 500000 × ₹ 56 ⇒ ₹ 28000000

∴ Benefit ⇒ 28483941 − 28000000 ⇒ ₹ 483941

Answer (37.)

HC ⇒ £ , FC ⇒ $

Amt. Rec. (MMC) :-

S.1) Amt. to be Received ⇒ $ 350000

S.2) ~~Borrow~~ Amt. to be borrowed in $ = $\frac{\$\ 350000}{1 + 0.09 \times \frac{3}{12}}$ ⇒ $ 342298.29

S.3) £ to be Invested = $\frac{\$\ 342298.29}{\$\ 1.5905}$ ⇒ £ 215214.27

S.4) Withdraw £ Investment :-

Principal	£ 215214.27
(+) Interest (215214.27 × 5% × 3/12)	£ 2690.18
Actual Inflow	£ 217904.45

#Amt. Rec. (Fwd. Contract) → $\frac{\$350000}{\$1.6140}$ → £216852.54

Money Mkt. Cover is beneficial. Net Gain → £217904.45 - £216852.54
→ £1051.91

Answer (38.)*

HC = $, FC = £ and €

£ Exposure :- £480000 - £138000 → £342000
(Payable) (Receivable) (Net Payable in 3 Months)

Forward Contract → $\frac{342000\ £}{0.9520\ £}$ → $359244

MMC :-

S.1) Amt. to be paid = £342000

S.2) £ to be Invested = $\frac{£342000}{1+0.10\times\frac{3}{12}}$ → £333658

S.3) $ to be borrowed = $\frac{£333658}{£0.9830}$ → $339429

S.4) $ Repayment :-

Principal	$339429
(+) Interest (339429 × 13% × 3/12)	$1103)
Actual Outflow	$350460

Decision :- MMC is a cheaper option

€ Exposure :- € 590000
↓
Receivable

Forward Contract ⇒ € 590000 × $ 1.9510 ⇒ $ 1151090

MMC :-

S.1) Amt. to be Received = € 590000

S.2) Amt. to be borrowed in € ⇒ $\frac{€\ 590000}{1 + 0.16 \times \frac{4}{12}}$ ⇒ € 580144

S.3) $ to be Invested = € 580144 × $ 1.8890
⇒ $ 1058113

S.4) Withdraw $ Investment :-

Principal	$ 1058113
(+) Interest (1058113 × 11.50% × 4/12)	$ 40561
Actual Inflow	$ 1098674

Decision :- forward contract is a better option as more $ will be received.

Answer (39.)

HC = ₹ , FC = $

(a.) forward Contract :- $ sell ₹ Buy

⇒ $\frac{\$\ 100000}{\$\ 0.02127}$

⇒ ₹ 4701457

(b.) Future Contracts :-

S.1) $ Sell ₹ Buy

S.2) Lot size → ₹472000 → Buy Currency Future

S.3) Buy Currency future contract @ 1₹ = $0.02118

S.4) No. of contracts to be bought

→ $100000 / $0.02118 → 10 contracts
₹472000

S.5) Initial Margin → ₹15000 × 10 contracts
→ ₹150000

S.6) Final Amt. through Future Contract (Maturity Date) :-

Actual selling of $ [$100000 / $0.02133] → ₹4688233

(-) Interest on Initial Margin (₹3000)
(150000 × 8% × 3/12)

(+) Profit on Futures ₹35406
[10 × ₹472000 × (0.02134$ - 0.02118$)]
→ 755.20$

Conversion of Profit in ₹ [755.20$ / 0.02133$]

₹4720639

(C.) No Hedging :-

→ $100000 / $0.02133

→ ₹4688233

Decision :- The most Advantageous is option (b) i.e. Hedging with Futures

Answer (40.)

H.C. ⇒ £ , F.C. ⇒ €

(a.) Receipt under Three Proposals :

(i.) Invoice in sterling :-

⇒ € 4000000 / € 1.1770 = £ 3398471

(ii.) Forward Contract :- | € sell £ Buy |

⇒ € 4000000 / € 1.1715 = £ 3414426

* Forward Rate ⇒

Spot Rate	1 £ = € 1.1770	
(-) Discount	(0.0055)	1 € = 100 cents ∴ 0.55 = 0.0055 cents €
	1 £ = € 1.1715	

(iii.) Future Contracts :-

S.1) € sell £ Buy

S.2) Lot size ⇒ £ 62500 ⇒ Buy Currency Future

S.3) Buy currency future contract @ 1 £ = € 1.1760

S.4) No. of Contracts to be bought

⇒ € 4000000 / € 1.1760 / £ 62500 ⇒ 54 Contracts

S.5) Initial Margin ⇒ Nil

SD

5.6) Final Amt. (Maturity Date) :-

Actual selling of € $\left(\frac{€4000000}{€1.1785}\right)$ — £ 3394145

(+) Profit on futures

[54 × £62500 × (1.1785€ − 1.1760€)] — £ 7160

→ € 8438

Convert in £ $\left[\frac{€8438}{€1.1785}\right]$

£ 3401305

(b.) Alternative (ii.) (i.e. Fwd. Contract) is most Appropriate as it produces highest receipts compared to Alternative (i.) & (iii.)

Answer (41.)

H.C. → £ , F.C. → €

(i.) ~~For~~ Receipt under Three Proposals :-

(a) Invoice in Sterling :-

→ $\frac{€2800000}{€1.1965}$ → £ 2340159

* Current Avg. Spot Rate → 1£ = $\frac{1.1960 + 1.1970}{2}$ = €1.1965

(b.) Forward Contract :- | € Sell | £ Buy |

→ $\frac{€2800000}{€1.1915}$ → £2349979

* Fwd. Rate → Spot Rate (−) Discount — 1£ = €1.1970 (0.0055) — [£ = €1.1915

[100 cents = 1€
∴ 0.55 = 0.0055 €
cents]

(c.) Future Contracts :-

S.1) € Sell £ Buy

S.2) Lot size → £62500 → Buy currency future

S.3) Buy currency future contract @ 1£ = € 1.1943

S.4) No. of contracts to be bought

→ $\frac{€2800000 / €1.1943}{£62500}$ → 37 Contracts

S.5) Initial Margin ⇒ 0

S.6) Final Amt. (Maturity Date) :-

Actual selling of € $\left[\frac{€2800000}{€1.1873}\right]$ £2358292

(-) Loss on futures (£13634)

[37 × 62500£ × (1.1943€ - 1.1873€)]

→ €16188

Convert in £ $\left[\frac{€16188}{€1.1873}\right]$

£2344658

(ii.) Alternative (b.), i.e. Fwd. Contract, is most appropriate

(iii.) Proposal (a.); i.e. Invoicing in sterling using current Avg. spot rate, can be doubtful whether to accept or not by German firm as German Market is Highly competitive & for Zac Plc. it will be first time

Answer (42) [Int. Rates given are for 180 days not p.a. as per ICAI only in this Ques.]

Home currency → ₹ Foreign currency → $

S.1) $ sell, ₹ Buy

S.2) Lot size → 1000 $ → sell currency future

S.3) sell currency future contract at 1 $ = ₹45

S.4) No. of contracts to be sold

→ $\frac{\$\ 400000}{\$\ 1000}$ = 400 Contracts

S.5) Initial Margin → 0

S.6) Final Amt. (Maturity Date) :-

Actual selling of $ (400000 × 44.50 ₹)	₹17800000
(+) Profit on futures (400 × 1000 $ × (₹45 − ₹44.50)	₹ 200000
	₹18000000

∴ Effective Realisation / Rate → $\frac{₹18000000}{\$\ 400000}$ = ₹45 / $

Answer (43.) [Int. Rates given are not p.a. (ICAI mistake), तो इस तरह का सवाल आये तो ICAI के solution को ही मानना पड़ेगा]

HC → $, FC → £

(a.) Forward Contract :- | £ Buy | $ sell |

→ £ 300000 × $ 1.96

→ $ 588000

(b.) Money Market :-

S.1) Amt. to be paid = £ 300000

S.2) £ to be Invested - $\frac{£\ 300000}{1+0.045}$ ⇒ £ 287081

S.3) $ to borrowed = £ 287081 × $2 ⇒ $ 574162

S.4) $ Repayment on Maturity :

Principal	$ 574162
(+) Interest (574162 × 5.5%.)	$ 31579
	$ 605741

(c.) Currency option :-

S.1) $ sell , £ Buy

S.2) Buy Call Option as lot size is 1 £

S.3) No. of contracts to be bought for call options

→ $\frac{£\ 300000}{£\ 1}$ = 300000 Contracts

S.4) Covered Amount → 300000 contracts × £ 1 = £ 300000

Uncovered Amount → £ 300000 - £ 300000 = 0

S.5) Final Payment through option Hedging :

(i.) Premium on option (300000 × 1 £ × $0.04) $12000

(ii.) Interest on Prem. ($12000 × 5.5%.) $ 660

(iii.) Payment of Amount Covered through option :-

Exp. Price	option Exer. or not	Payment Rate	Total Exp. Payment	Prob.	Total Exp. × Prob. Payment
$1.91	No	$1.91	573000	25%.	$ 143250
$1.95	No	$1.95	585000	60%.	$ 351000
$2.05	Yes	$1.97 (Strike Price)	591000	15%.	$ 88650
					$ 582900

(iv.) Payment of Uncovered Amt. → 0

∴ Final Payment ⇒ $12000 + $660 + $582900
⇒ $595560

(d.) No Hedging :-

Expected Price	Probability	Expected Price × Probability
$1.91	25%	$0.4775
$1.95	60%	$1.17
$2.05	15%	$0.3075
		1£ = $1.9555

Payment → 300000 £ × $1.955
→ $586500

Answer (44.)

H.C. ⇒ US$ FC-Can $

(a.) Forward :- | Can $ Buy US $ Sell |

(i.) 31st July Payment → Can $ 1010000 × $0.9301
→ US $ 939401

(ii.) 30th September Payment ⇒ Can $ 705000 × $0.9356
⇒ US $ 659598

(b.) Option:-

(i.) July Payment → Can $ 1010000

S.1) Can $ Buy , US $ Sell

S.2) Buy Call option as Lot size is Can $ 50000

S.3) No. of Call Options Contracts buy

→ $\frac{\text{Can \$ 1010000}}{\text{Can \$ 50000}}$ = 20.20 Lots or 20 Lots

S.4) Covered Amt. → 20 × 50000 Can $ → Can $ 1000000

Uncovered Amt. → Can $ 1010000 - Can $ 1000000

⇒ Can $ 10000 → Fwd. @ 0.9301 $/Can $

S.5) Final Payment :-

(i.) Premium (20 × Can $ 50000 × 0.0102 $) US $ 10200

(ii.) Payment of Amt. covered through option

→ 20 × Can $ 50000 × US $ 0.94

⇒ US $ 940000

(iii.) Payment of Uncovered Amt. ⇒ 10000 Can $ × US $ 0.9301

⇒ $ 9301

∴ Final Payment ⇒ 10200 + 940000 + 9301

⇒ US $ 959501

(ii.) September Payment ⇒ Can $ 705000

S.1) Can $ Buy , US $ Sell

S.2) Buy Call option as Lot size is Can $ 50000

S.3) No. of contracts ⇒ $\frac{\text{Can \$ 705000}}{\text{Can \$ 50000}}$ = 14.10 Contracts or 14 Contracts

S.4) Covered Amt. → 14 × Can $ 50000 → Can $ 700000

Uncovered Amt → Can $ 705000 − Can $ 700000 → Can $ 5000

Fwd. @ 1 Can$ = US$ 0.9356

S.5) Final Payment :-

(i.) Premium = 14 × Can $ 50000 × US$ 0.0164

= US$ 11480

(ii.) Payment of covered Amt. = 14 × Can $ 50000 × US$ 0.95

= US$ 665000

(iii.) Payment of Uncovered Amt. = Can $ 5000 × US$ 0.9356

= US $ 4678

∴ Final Payment → 11480 + 665000 + 4678

→ US $ 681158

Decision :- Fixed Fwd. contract is the cheapest alternative in both cases. Hence, it will be appropriate.

Answer (45.)

HC → £ , FC → $

(i.) Forward Contract :- [£ sell , $ Buy]

Amt. payable → $364897 / $1.5455 ⇒ £ 236103

(ii.) MMC :-

S.1) Amt. to be paid = $ 364897

S.2) Invest Amt. in $ = $364897 / (1 + 0.045 × 6/12) → $364897 / 1.0225

⇒ $ 356867

S.3) £ to be borrowed → $356867 / $1.5617 = £ 228512

S.4) £ Repayment on Maturity :-

Principal	£ 228512
(+) Interest (228512 × 7% × 6/12)	£ 7998
	£ 236510

(iii.) Currency option :-

S.1) $ Buy £ Sell

S.2) Buy Put Option as Contract Size is £ 12500

S.3) No. of Contracts ⇒ $364897/1.70$ / £12500 = 17.17 Contracts or 17 Contracts

S.4) Covered Amt. ⇒ 17 Contracts × £ 12500
⇒ £ 212500

Uncovered Amt. ⇒ $ 364897 − (£ 212500 × 1.70 $)
⇒ $ 3647

S.5) final Payment :-

(i.) Premium ⇒ 17 × £ 12500 × $ 0.096 = $ 20400
Convert in £ [$20400 / $1.5617] ⇒ £ 13063

(ii.) Interest on Premium ⇒ £ 13063 × 7% × 6/12 ⇒ £ 457

(iii.) Payment of Covered Amt. ⇒ 17 × £ 12500
⇒ £ 212500

(iv.) Payment of Uncovered Amt. Hedged through 6 Months Fwd. @ 1£ = $ 1.5455
⇒ $3647 / $1.5455 = £ 2360

∴ final Payment ⇒ 13063 + 457 + 212500 + 2360
⇒ £ 228380

Alternatively, to match the solution as per ICAI we will calculate final Payment without including "Interest on Prem." in it.
∴ Final Payment → 13063 + 212500 + 2360 → £227923

Decision:- Option (iii), i.e. currency option, is the best Alternative.

Answer (46)

H.C. → ₹ F.C. → ¥

(i.) Forward Market Cover :- | ¥ Buy ₹ Sell |

Amt. Payable → ¥ 500000
¥ 1.9726
→ ₹ 253473

(ii.) Currency option Contract :-

S.1) ¥ buy ₹ sell

S.2) Lot Size = ₹1. Hence, Buy Put option

S.3) No. of lots → ¥ 500000 / ¥ 2.125 / ₹1 → 235294.12 lots or 235294 lots

S.4) Covered Amt. → 235294 × ₹1 → ₹235294
Uncovered Amt. → ¥ 500000 − (₹235294 × ¥ 2.125)
→ 0

S.5) Final Payment :-

(a.) Premium → 235294 × ₹1 × ¥ 0.098 → ¥ 23059
Convert in ₹ [¥23059 / ¥1.9516] → ₹11815

(b.) Payment for Covered Amt. → 235294 × ₹1 → ₹235294

∴ Final Payment → ₹11815 + ₹235294 → ₹247109

Decision:- Option (ii) [option contract] is the cheaper hedging alternative.

Answer (47)

Buy @ 1.2806 $	(62500 £ × 1.2806)	80037.50 $
Sell @ 1.2816 $	(62500 £ × 1.2816)	80100 $
	Profit	62.50 $

Answer (48.)

(a.) No, Citi Bank's Quotation is a Direct Quote for JPY (Japan) & Hong Kong Bank's Quotation is a Direct Quote for USD (USA).

(b.) 1 $ = ¥ 105 / 106.50

1 ¥ = $ 0.0090 / 0.0093

OR

1 ¥ = 0.0090 $

$$1\$ = \frac{1¥}{0.0090} = \$\ 111.11$$

1 ¥ = 0.0093 $

$$1\$ = \frac{1¥}{0.0093} = ¥\ 107.53$$

OR

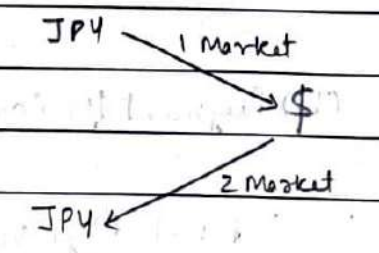
1 $ = ¥ 107.53 / 111.11

Yes, Arbitrage is possible

(c.) If in case we have ¥ 100000 :-

Citi Bank: 1 $ = ¥ 105 / 106.50

HK Bank: 1 $ = ¥ 107.53 / 111.11



Buy $ by selling JPY in Citi Bank = ¥ 100000 ⇒ $ 938.97
¥ 106.50

sell $ to buy JPY in H.K. Bank = $ 938.97 × ¥ 107.53
⇒ ¥ 100967.44

∴ Profit ⇒ ¥ 100967.44 − ¥ 100000 ⇒ ¥ 967.44

• If in case we have $ 1000 :—

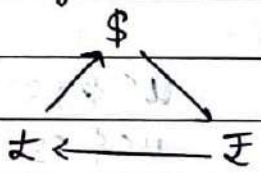
Buy JPY by selling $ in H.K. Bank = $ 1000 × ¥ 107.53 ⇒ ¥ 107530
sell JPY to buy $ in Citi Bank = ¥ 107530 ⇒ $ 1009.67
¥ 106.50

∴ Profit ⇒ $ 1009.67 − $ 1000 ⇒ $ 9.67

Answer (49.)

1 $ = ₹ 48.30
1 £ = ₹ 77.52
1 £ = $ 1.6231

Arbitrageur has $ 10000000



Convert $ in ₹ ⇒ $ 10000000 × ₹ 48.30 ⇒ ₹ 483000000
Convert ₹ in £ ⇒ ₹ 483000000 ⇒ £ 6230650.155
₹ 77.52
Convert £ in $ ⇒ £ 6230650.155 × $ 1.6231
⇒ $ 10112968.26

∴ Profit ⇒ $ 10112968.26 − $ 10000000 ⇒ $ 112968.26

Answer (50.)

S.1) Identify currency of Borrowing :-

(i.) Interest Rate Difference → 12% - 8% → 4%.

(ii.) Exchange Rate Difference → $\frac{₹48.8190 - ₹48.0123}{₹48.0123} \times 100 \times \frac{12}{6}$

→ 3.36%.

(iii.) since High Differential is of Interest rate, Hence, we will borrow in currency having Low Interest Rate; i.e., Borrow US$ 83312

S.2) Convert in ₹ = US$ 83312 × ₹48.0123 → ₹ 4000000

S.3) Deposit ₹4000000 in India till 6 Months

S.4) Forward Contract @ 1$ = ₹ 48.8190

S.5) Withdraw ₹ →

Principal	₹4000000
(+) Interest @ 12% for 6 Months	₹ 240000
	₹4240000

Convert in US$ at fwd. rate = $\frac{₹4240000}{₹48.8190}$ = $ 86851.43

S.6) Repay $ with Interest →

Principal	US$ 83312
(+) Interest @ 8% for 6M	US$ 3332.48
Outflow	US$ 86644.48

S.7) Gain → US$ 86851.43 - US$ 86644.48 → US$ 206.95

OR

₹ 10103 [$206.95 × ₹48.8190]

Note: If Quotation is given for ₹/$ then Gain [S.7] is calculated in both currency क्योंकि ICAI ने बोला है तो करना पड़ेगा पर ~~A~~ जो और currency का Quotation है तो दोनों currency में Gain निकालने की Need नहीं है

Answer (51.)

S.1) Identify currency of Borrowing :-

(i.) Interest Rate Difference ⇒ 10% - 8% ⇒ 2%

(ii.) Exchange Rate Difference → $\frac{0.671 - 0.666}{0.666} \times 100 \times \frac{12}{3} \Rightarrow 3\%$

Since High differential is of Exchange Rate. Hence, Borrow in currency having High Interest Rate, i.e., Borrow Can $ 1000.

S.2) Convert in DM → $\frac{\text{Can \$ 1000}}{\text{Can \$ 0.666}}$ → DM 1501.50

S.3) Deposit DM 1501.50 @ 8% p.a. for 3 Months

S.4) 3 Months fwd. Contract @ 1 DM = Can $ 0.671

S.5) Withdraw DM →

Principal	DM 1501.50
(+) Interest @ 8% for 3 Months	DM 30.03
	DM 1531.53

S.6) Convert in Can $ at fwd. rate = DM 1531.53 × Can $ 0.671
= Can $ 1027.66

S.6) Repay Can $ with Interest →

Principal	Can $ 1000
(+) Interest @ 10% for 3 Months	Can $ 25
Outflow	Can $ 1025

S.7) Gain → Can $ 1027.66 - Can $ 1025
→ 2.66 Can $

Answer (52.)

(i.) IRP :-

$$\frac{F}{S} = \frac{1 + r_0 \times 3/12}{1 + r_B \times 3/12}$$

$$\frac{0.780}{0.775} = \frac{1 + 0.09 \times 3/12}{1 + 0.07 \times 3/12}$$

$$1.0065 = \frac{1.0225}{1.0175}$$

$$1.0065 \neq 1.0049$$

∴ IRP theory does NOT holds

(ii.) Since, IRP does not hold, Hence, Arbitrage opportunity available.

Arbitrage :-

S.1) Identify currency in which we have to borrow

(i.) Interest Rate Difference → 9% − 7% → 2%

(ii.) Exchange Rate Difference → $\frac{0.780 - 0.775}{0.775} \times 100 \times \frac{12}{3}$ → 2.58%

(iii.) since, High Rate Differential is of Exchange Rate. Hence, Borrow in currency having High Interest Rate ; i.e. Borrow CAD 1000000.

S.2) Convert in DEM → $\frac{\text{CAD } 1000000}{\text{CAD } 0.775}$ → DEM 1290323

S.3) Deposit DEM 1290323 @ 7% for 3 Months

S.4) 3 Month fwd. Contract @ 1 DM ⇒ CAD 0.780

S.5) Withdraw DEM :⇒

Principal	DEM 1290323
(+) Interest @ 7% for 3 Months	DEM 22581
	DEM 1312904

Convert in CAD at Fwd. Rate ⇒ DEM 1302908 × CAD 0.780
⇒ CAD 1024065

S.6) Repay CAD with Interest :⇒

Principal	CAD 1000000
(+) Interest @9% for 3 Months	CAD 22500
Outflow	CAD 1022500

S.7) Gain ⇒ CAD 1024065 - CAD 1022500 ⇒ CAD 1565

Answer (53.)

~~S.1)~~ ~~Identify Currency~~ Spot 1 $ = ₹ 68.50
6 Months Prem. ⇒ 3%.

6 Months forward Rate :-

Spot Rate	1 $ = ₹ 68.50
(+) Premium @ 3%	₹ 2.055
	1 $ = ₹ 70.56

S.1) Identify currency of Borrowing
(i.) Interest Rate Difference = 9% - 4% ⇒ 5%.
(ii.) Exchange Rate Difference = $\frac{70.56 - 68.50}{68.50} \times 100 \times \frac{12}{6}$ ⇒ 6%.
Short Trick ← [3% × 12/6 = 6%.]
(iii.) since, High Rate Differential is of Exchange Rate. Hence Borrow in High Interest Rate, i.e. Borrow in ₹
Equivalent Amt. ⇒ $ 3000000 × ₹ 68.50
⇒ ₹ 205500000

S.2) Convert in $ = $\frac{₹ 205500000}{₹ 68.50}$ = $ 3000000

S.3) Deposit $ 3000000 @ 4% for 6 Months

S.4) 6 Months forward Contract @ 1 $ = ₹ 70.56

5.5) Withdraw $ →

Principal	$ 3000000
(+) Interest @ 4% for 6 Months	$ 60000
	$ 3060000

Convert in ₹ at Fwd. Rate = $ 3060000 × ₹ 70.56
= ₹ 215913600

5.6) Repay ₹ with Interest →

Principal	₹ 205500000
(+) Interest @ 9% for 6 Months	₹ 9247500
Outflow	₹ 214747500

5.7) Gain = ₹ 215913600 − ₹ 214747500 = ₹ 1166100

OR

$\left(\frac{₹\ 1166100}{₹\ 70.56}\right)$ → $ 16526

Answer (54.)

1 $ = ¥ 107.31
1 £ = $ 1.26
1 A$ = $ 0.70

(i.) 1 £ = ¥ ?
1 £ = 1.26 $
1 £ = 1.26 × 107.31 ¥
1 £ = ¥ 135.21

(ii.) 1 A$ = ¥ ?

1 A$ = 0.70 $

1 A$ = 0.70 × 107.31 ¥

1 A$ = ¥ 75.12

(iii.) 1£ = A$?

1£ = 1.26 $

1£ = 1.26 × $\frac{1}{0.70}$ A$

1 A$ = $ 0.70
∴ 1$ = $\frac{1}{0.70}$ A$

1£ = A$ 1.80

Answer (55.)

5.1) ₹ Buy £ sell

1₹ = £ ?

1$ = ₹61.3625 / ₹61.3700

1£ = $1.5260 / $1.5270

5.2) 1£ = $1.5260 (Selling Rate of £ i.e. Bid Rate)

1$ = ₹61.3625 (Selling Rate of $ i.e. Bid Rate)

5.3) 1₹ = £ ?

$\frac{£}{₹} = \frac{£}{\$} \times \frac{\$}{₹}$

£/₹ = $\frac{1}{1.5260} \times \frac{1}{61.3625}$

£/₹ = 0.0107 £

1₹ = £ 0.0107

Convert ₹ in £ → ₹25000000 × £0.0107 ⇒ £267500

Answer (5)*

5.1) SGD → Buy ₹ → sell

1 SGD = ₹ ?

5.2)

January 28, 2022	February 4, 2022
1 $ = ₹45.90	1 $ = ₹45.97
1 £ = $ 1.7850	1 £ = $ 1.7775
1 ₹ = SGD 3.1575	1 £ = SGD 3.1380

5.3)

$$\frac{₹}{SGD} = \frac{₹}{\$} \times \frac{£}{SGD} \times \frac{\$}{£}$$

$$\frac{₹}{SGD} = ₹ \times £ \times \frac{\$}{£}$$

January 28, 2022

1 £ = SGD 3.1575

1 SGD = 1/3.1575 £

1 SGD = 1/3.1575 × 1.7850 $

1 SGD = 1/3.1575 × 1.7850 × 45.90

1 SGD = ₹25.9482

₹1 SGD = ₹25.9482

February 4, 2022

Similarly

1 SGD = 1/3.1380 × 1.7775 × 45.97

1 SGD = ₹26.0394

₹1 SGD = ₹26.0394

5.4)

1 SGD = ₹25.9482	1 SGD = ₹26.0394
(+) EM @ 0.125% 0.0324	(+) EM @ 0.125% 0.0325
1 SGD = ₹25.9806	1 SGD = ₹26.0719

Payment in ₹ ⇒ 2500000 SGD × ₹25.9806

⇒ ₹64951500

Payment in ₹ ⇒ 2500000 SGD × ₹26.0719

⇒ ₹65179750

Loss ⇒ 65179750 − 64951500 ⇒ ₹228250

Answer (57)

5.1) SGD ~~Sale~~ Buy ₹ sell

1 SGD = ₹ ?

5.2)

1 $ =	₹ 49.3800	1 $ =	SGD 1.7058
(+) Premium	₹ 0.1300	(+) Premium	SGD 0.0096
	₹ 49.5100	1 $ =	SGD 1.7154
(+) EM. (5 paisa)	₹ 0.05		
1 $ =	₹ 49.5800		

5.3) ₹ / SGD = $49.5800 \times \frac{1}{1.7154} \Rightarrow 28.8912$

∴ 1 SGD = ₹ 28.8912

₹ / SGD = ₹ 28.8912

$$\left[\frac{₹}{SGD} = \frac{₹}{\$} \times \frac{\$}{SGD}\right]$$

Answer (58)*

(i) £ Buy CHF sell

~~Paid~~ 1 £ = CHF ?

1 $ = 1.4655 CHF (Bank A)

1 £ = 1.7650 $ (Bank B)

1 £ = 1.7650 $

1 £ = 1.7650 × 1.4655

1 £ = CHF 2.5866

CHF / £ = CHF 2.5866

∴ CHF to be paid → 1000000 £ × CHF 2.5866

⇒ CHF 2586600

(ii.)

Spot Rates :- Bid (B) Offer (O)

1 $ = 1.4650 / 1.4655 CHF

1 £ = 1.7645 / 1.7660 $

$$\frac{CHF}{£} = \frac{CHF}{\$} \times \frac{\$}{£}$$

1 GBP ⇒ 1.4650 × 1.7645 ⇒ CHF 2.5850 [Spot Bid]

1 GBP ⇒ 1.4655 × 1.7660 ⇒ CHF 2.5881 [Spot offer]

Forward Rates :- Bid(B) Offer(O)

1 $ = 1.4655 / 1.4665 CHF

1 £ = 1.7620 / 1.7640 $

$$\frac{CHF}{£} = \frac{CHF}{\$} \times \frac{\$}{£}$$

1 GBP ⇒ 1.4655 × 1.7620 ⇒ CHF 2.5822 [Forward Bid]

1 GBP ⇒ 1.4665 × 1.7640 ⇒ CHF 2.5869 [Forward offer]

Spot ⇒ 1 £ = 2.5850 / 2.5881 CHF

3 Months Fwd. ⇒ 1 £ = 2.5822 / 2.5869 CHF

Bid Discount ⇒ 2.5850 − 2.5822 ⇒ 0.0028

Offer Discount ⇒ 2.5881 − 2.5869 ⇒ 0.0012

Discount = 0.0028 / 0.0012

Swap Points = 28 / 12

Answer (59.)

Dealer

HK$ Buy ₹ Sell

spot sale HK 1 Crore @
1 HK $ = ₹ 5.70

spot Buy HK 1 Crore @
1 HK $ = ₹ ??
1 $ = ₹ 42.85
1 $ = HK $ 7.5880

$$\frac{₹}{HK\$} = \frac{₹}{\$} \times \frac{\$}{HK\$}$$

$$₹1 HK\$ = 42.85 \times \frac{1}{7.5880} \Rightarrow ₹5.6471$$

∴ 1 HK $ = ₹ 5.6471

Dealer Profit →

Sale = 1 Crore × ₹ 5.70	⇒	₹ 57000000
Buy = 1 Crore × ₹ 5.6471	⇒	₹ 56471000
Profit		₹ 529000

Answer (60.)

Dealer

DKK Buy ₹ Sell

spot sale DKK 1000000 @
DKK 1 = ₹ 6.5150

spot Buy DKK 1000000 @
1 DKK = ₹ ??

London Market :-

1 £ = ₹ 74.3200
1 £ = DKK 11.4200

$$1 DKK = \frac{1}{11.4200} \times 74.3200 = ₹ 6.5079$$

∴ ₹ 1 DKK = ₹ 6.5079

Dealers Profit (London Market) :⇒

Sale = 1000000 DKK × ₹6.5150 = ₹6515000
Buy = 1000000 DKK × ₹6.5079 = ₹6507900
Profit ₹7100

New York Market :-

1 $ = ₹49.2625
1 $ = DKK 7.5670
1 DKK = 1/7.5670 × 49.2625 ⇒ ₹6.5102
∴ ₹1/DKK = ₹6.5102

Dealers Profit (New York Market) ⇒

Sale = 1000000 DKK × ₹6.5150 = ₹6515000
Buy = 1000000 DKK × ₹6.5102 = ₹6510200
₹4800

Since, Profit is higher when covered through London Market
Extra Benefit if covered through London Market :
⇒ ₹7100 - ₹4800 = ₹2300

Answer (61.)

Dealer

$ Buy € Sell

Spot Sale $1000000 @
$1 = € 1.4400

Spot Buy $1000000 @
1 $ = € ??
1 $ = € 1.4450

Dealers loss ⇒

Buy = $1000000 × € 1.4450 = € 1445000
Sale = $1000000 × € 1.4400 = € 1440000
Net Loss € 5000

₹/€ = ?? [€ Buy ₹ Sell]

1 $ = ₹ 31.4500

1 $ = € 1.4400

1€ = 1/1.4400 × 31.4500 ⇒ ₹ 21.8403

∴ ₹/€ = ₹ 21.8403

Convert Net loss of € 5000 in ₹ :-

⇒ € 5000 × ₹ 21.8403 ⇒ ₹ 109201.50

Answer (62.)

(i.) (a.) Acting Independently :-

Country	Principal	Interest	Final Amt.	Convert in H.C. (₹) (Using Fwd. Rate)
India	-₹500000	-500000 × 6.4% × 30/360 = -2666.67 ₹	-502667 ₹	-₹ 502667
US	$ 12500	12500 × 1.5% × 30/360 = 15.63 $	12515.63 $	₹ 576757
UK	£ 6000	6000 × 3.7% × 30/360 = 18.50 £	6018.50 £	₹ 401233
				₹ 475323

(b.) Immediate Cash Pooling

Country	Principal (Surplus)	Convert in H.C. (₹) at Spot Rate
India	-₹500000	-₹500000
US	$ 12500	₹ 581395
UK	£ 6000	₹ 402685
	Total Principal Amt. =	₹ 484080
	(+) Interest @ 6.2% for 30 days	₹ 2501
		₹ 486581

Since, Interest Earnings are more in "Immediate Cash Pooling" it is preferable.

Answer (63.)

(i.) Acting Independently

Country	Principal	Interest	Final Amt.	Convert in £
Amsterdam	€725000	€725000 × 2% × 91/360 ⇒ €3665.27	€728665.28	£502414.71
Switzerland	CHF998077	CHF998077 × ½% × 91/360 ⇒ CHF1261.46	CHF999338.46	£432651.5)
UK	£75000	£75000 × 1% × 91/360 ⇒ £189.58	£75189.58	£75189.58
				£1010255.80

(ii.) Immediate cash Pooling

Country	Principal (Surplus)	Convert in £ at Spot Rate
Amsterdam	€725000	£497205
Switzerland	CHF998077	£427881.76
UK	£75000	£75000
Total Principal Amt.		£1000086.76
(+) Interest @5.375% for 91 days		£13587.98
		£1013674.74

Net Gain = £1013674.74 − £1010255.80
⇒ £3418.94

Answer (64.)

Acting Independently :-

Country	Principal	Interest	final Amt.	Convert in £ at Fwd. Rate
£ (UK)	£150000	150000 × 1% × 91/360	£150379.17	£150379.17
		⇒ £379.17		
€ (Amster.)	€1450000	1450000 × 2% × 91/360	€1457330.56	⇒ £1004829.42
		⇒ €7330.56		(€1457330.56 × £0.6895)
CHF (Swit.)	CHF1996154	1996154 × 0.50% × 91/360	CHF1998676.92	⇒ £865303.02
		⇒ CHF2522.92		(CHF1998676.92 ÷ 2.3098)
				£2020511.61

Immediate Cash Pool :-

Country	Principal (Surplus)	Convert in £ at Spot Rate
£ (UK)	£ 150000	£ 150000
€ (Amster.)	€ 1450000	£ 944410 (€ 1450000 × 0.6858)
CHF (Switzer.)	CHF 1996154	£ 855763.53 (CHF 1996154 ÷ 2.3326)
Total Principal Amount (A)		£ 2000173.53
Min. Amt. req. on Mat. (B)		£ 2020511.61
∴ Min. Int. (B) - (A)		£ 20338.08

$$\text{Minimum Int. rate (\%.)} = \frac{£\,20338.08}{£\,2000173.53} \times 100 \times \frac{360}{91}$$

$$\Rightarrow 4.023\%\ \text{p.a.}$$

Answer (65)

Indian Co. → Home Currency = ₹

Fund Requirement → $ (Foreign Currency) → $ 100

(i)

Cal^{n} of Outflow in H.C. Loan :-

Equivalent Amount (100 $ × ₹ 36.10)	₹ 3610
(+) Interest @ (3610 × 11.50% × 6/12)	₹ 207.58
Repayment	₹ 3817.58

Cal^{n} of Outflow in F.C. Loan :-

Amt. Borrowed	$ 100
(+) Interest @ 5.5% [100 × 5.5% × 6/12]	$ 2.75
Outflow in F.C.	$ 102.75
Convert in ₹ (102.75 $ × ₹ 36.40)	₹ 3740.10

Borrowing should be made in $ as outflow at maturity is more in ₹ borrowing.

(ii.) **Theoretical (Fair) FRA Rate :-**

[Concept in IRRM Chapter, Concept Notes P.N. 164]

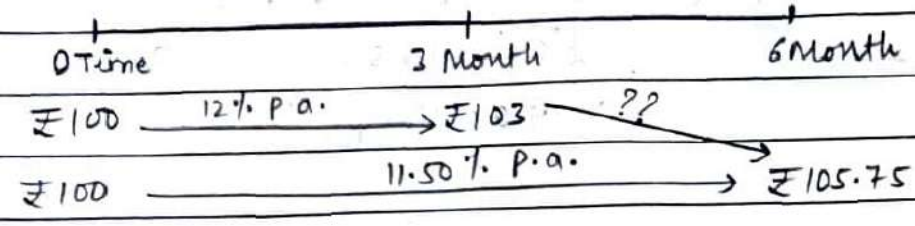
(a.) **Rupee Borrowing :**

Total Period = 6 Months ; 1st Period = 3 Months

∴ 3 × 6 FRA Theoretical Rate $= \frac{1 + 0.115 \times 6/12}{1 + 0.12 \times 3/12} - 1$

$= 0.0267$ or 2.67% for 3 Months

Annualised $= 2.67\% \times \frac{12}{3} = 10.68\%$ p.a.



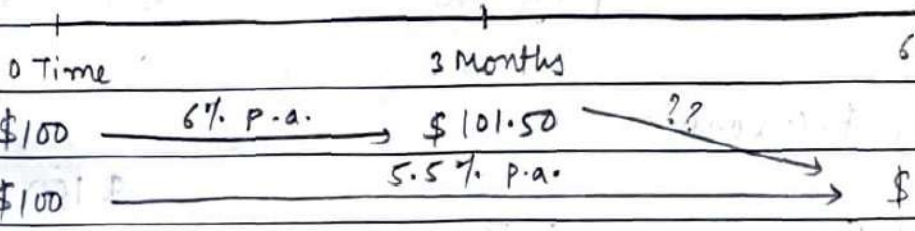
(b.) **Dollar Borrowing**

Total Period = 6 Months ; 1st Period = 3 Months

∴ 3 × 6 FRA Theoretical Rate $= \frac{1 + 0.055 \times 6/12}{1 + 0.06 \times 3/12} - 1$

$= 0.01232$ or 1.232% for 3 Months

Annualised $= 1.232\% \times \frac{12}{3} = 4.93\%$ p.a.



Answer (66) * (Important)

Sun Ltd. ⇒ H.C. ⇒ ₹ Loan ⇒ ¥ 3400 Lakh (F.C.)

Loan
- ₹ → 18% p.a. quarterly compounding
- ¥ → 2% p.a.

(i) Cal^{n} of Outflow in H.C. Loan :-

Equivalent Amount	$\left[¥\ 3400\ \text{lakh} \times \frac{₹\ 100}{340}\right]$	₹ 1000 Lakh
(+) Interest	$1000\ \text{Lakh}\left[\left(1+0.18\times\frac{3}{12}\right)^{2}-1\right]$	₹ 92.03 Lakh
	Repayment	₹ 1092.03 lakh

Alternatively,

Eq. Amt.	₹ 1000 Lakh
(+) Int. for 1st Quarter (₹1000 Lakh × 18% × 3/12)	₹ 45 lakh
(+) Int. for 2nd Quarter ((1000+45) Lakh × 18% × 3/12)	₹ 47.03 lakh
Repayment	₹ 1092.03 lakh

(ii) Cal^{n} of Outflow in F.C. Loan :-

Amount Borrowed		¥ 3400 Lakh
(+) Interest	$\left(¥\ 3400\ \text{Lakh} \times 2\% \times \frac{180}{365}\right)$	¥ 33.53 lakh
	Outflow in F.C.	¥ 3433.53 lakh
	Convert in ₹ $\left(¥\ 3433.53 \times \frac{₹\ 100}{345}\right)$	₹ 995.23 lakh
	Outflow in H.C. on Maturity	₹ 995.23 lakh
(+)	L.C. charges in ₹	
	charges (3400 lakh ¥ × 2% × 6/12)	¥ 34 lakh
	Convert in ₹ (¥ 34 lakh / ₹ 100/340)	₹ 10 lakh
(+)	Int. on LC Charges @ 18% for 10 Lakh $\left[(1+0.18\times 3/12)^{2}-1\right]$	₹ 0.92 lakh ₹ 10.92 lakh
	Repayment	₹ 1006.15 lakh

Advice:- Offer from foreign should be accepted [option (ii)] as it is cheaper by (₹1092.03 - ₹1006.15) lakh = ₹85.88 lakh

Answer (67.)

USA Company ⇒ H.C. ⇒ $

Fund Requirement ⇒ 1000 $ (H.C.) ; Fund Invest ⇒ 1000$ (H.C.)

(i.) Where to Borrow :-

Cal^{n} of Outflow in H.C. Loan :-

Principal	1000 $
(+) Interest (1000 $ × 4% × 90/360)	10 $
Repayment	1010 $

Cal^{n} of Outflow in F.C. Loan :-

Equivalent Amount (1000 $ × Can $ 1.240)	1240 Can $
(+) Interest (1240 Can $ × 4.5% × 90/360)	13.95 Can $
Outflow in F.C.	1253.95 Can $
Convert in $ [1253.95 Can $ / 1.255 Can $]	999.16 $

Advice:- Borrowing should be made in Can $ as outflow at maturity is more in $ borrowing.

(ii.) Where to Invest :-

Cal^{n} of Inflow in H.C. Investment :-

Principal	1000 $
(+) Interest [1000 $ × 2.5% × 90/360]	6.25 $
Inflows.	1006.25 $

Cal^{n} of Inflow in F.C. Investments :-

Equivalent Amount (1000 $ × Can $ 1.235)	Can $ 1235
(+) Interest (Can $ 1235 × 3.5% × 90/360)	Can $ 10.81
Inflow in F.C.	Can $ 1245.81
Convert in US$ (Can $ 1245.81 / Can $ 1.260)	988.74 $

Advice:- Investment should be made in US$ as Inflow at maturity is less in Can $ Investment.

Thus, Borrow → Can $ and Invest/Lend → US $

Answer (68.)

Loan from Germany (H.C.) :-

Interest	5%
(+) Additional loan servicing	0.25%
Net Cost	5.25% p.a.

Loan from US (f.C.) :-

Effective Interest Rate (EIR) [4% / 1 − 0.08]	4.35%
(+) Premium [5% − 4% / 1 + 4%]	0.96%
	5.31%

Loan from Swiss Bank (F.C.) :-

EIR [3% / 1 − 0.08]	3.26%
(+) Premium [5% − 3% / 1 + 3%]	1.94%
	5.20%

Decision:- Loan from Swiss Bank is the best option as Total Outflow including Interest is less [i.e. (€100000 × (1 + 0.0520) ⇒ €105200]

Answer (9.) UK ⇒ £ ⇒ H.C.

Fund ⇒ £ 200 Million < JPY / US$

Cal^{n} of Inflow in JPY Investment (Equity):-

	¥
Invest £ 200 Million	
Equivalent Amt. i.e. Convert in JPY (£200 Mill. × ¥148.0002)	29600.04 Million
(+) Dividend	1182 Million
(+) Stock lending	10 Millions
(-) Discount (¥ 29600.04 Million × 2%.)	(592.0008 Million)
	30200.0392 Million
Convert in £ [¥30200.0392 Million / ¥150]	£ 201.3336 Million

Gain ⇒ £ 201.3336 - £ 200 ⇒ £ 1.3336 Million

Cal^{n} of Inflow in US$ Investment:-

	$
Equivalent Amt. (£200 Million × $1.28)	256 Million
(+) Interest @ 5%. [256 Million × 5% × 6/12]	6.4 Million
	262.4 Million
Convert in £ [$262.4 Million / $1.30331]	201.3335 Million

Gain ⇒ £ 201.3335 - £ 200 ⇒ £ 1.3335 Million

Decision:- Gain at Maturity in terms of '£' is almost same. The Bank can go for any options.

However, from Risk perspective ⇒ Investment in US$ is more beneficial as chances of variation is less

Answer (70.) India → ₹ → H.C.

Fund → ₹400 Billion × 1/2 = ₹200 Billion → JPY / US$

Cal^{n} of Inflow in JPY Investment (Index Fund) :-

	(in Billion)
Equivalent Amt. (₹200 Billion × ¥JPY 1.58)	JPY 316
(+) Dividend	JPY 25
(+) stock lending	JPY 11.9276
(-) Discount (JPY 316 × 2%.)	(JPY 6.32)
	JPY 346.6076
Convert in ₹ [JPY 364.6076 Billion / JPY 1.57]	₹220.7692

Gain → ₹220.7692 − ₹200 = ₹20.7692 Billion

Cal^{n} of Inflow in US$ Investment :-

	(in Billion)
Equivalent Amt. (₹200 Billion × $0.014)	$ 2.8
(+) Interest @ 5%. [$2.8 Billion × 5% × 6/12)	$ 0.07
	$ 2.87
Convert in ₹ [$2.87 Billion / $0.013]	₹220.7692

Gain → ₹220.7692 − ₹200 = ₹20.7692 Billion

Since, Amt. of gain at maturity is same under both the option in ₹ terms, ICL is indifferent.

However, Investment in US$ is suggested as Treasury Bills are Risk Free.

Answer (71.)* £ → H.C.

Surplus → $500000 for 3 Months → Cost 4% p.a.

If Invest in London :-

Equivalent Amount	[$500000 / $1.5390]	£324886.29
(+) Interest	[£324886.29 × 5% × 3/12]	£4061.08
	Inflow →	£328947.37

Repay Borrowing :-

Principal		$500000
(+) Interest @4%	[500000 × 4% × 3/12]	$5000
		$505000
Convert in £	[$505000 / $1.5430]	£327284.51
	Net Gain (Inflow - Outflow)	£1662.86

If Invest in New York ($) :-

Principal		$500000
(+) Interest @5%	[$500000 × 8% × 3/12]	$10000
		$510000
→ Repay Borrowing		($505000)
	Net Gain	$5000
Convert in £	[$5000 / $1.5475]	£3231.02

If Investment in frankfurt (€) :-

Equivalent Amount	(500000 $ × 1.1865 €)	€593250
(+) Interest	(€593250 × 3% × 3/12)	€4449.38
		€597699.38

Convert in £ [€597699.38 / €1.8150] — £329310.95

→(-)Outflow — (£327284.51)

Net Gain — £2026.44

Workings (Cross Rate):-

1$ = € ??

1£ = $ 1.5390

1£ = € 1.8260

1$ = 1/1.5390 × 1.8260 → € 1.1865

∴ €/$ = €1.1865

Decision— Since out of three options the maximum profit is in ~~case~~ Investment in New York ($). Hence it should be opted.

Answer (Q2.)

Exchange Position :-

	Purchase of Sw. Frs.	Sale of Sw. Frs.
Opening Balance Overbought	50000	–
Purchased a Bill	80000	–
Forward Sale	–	60000
Forward Purchase Cancel	–	30000
Remittance by TT	–	75000
Draft Cancelled	30000	
	160000	165000
Closing Balance (B.F.) (oversold)	5000	–
	165000	165000

Cash Position (Nostro A/c) :-

	Credit (Purchase)	Debit (Sale)
Opening Balance (Credit)	100000	-
Remittance by TT	-	75000
	100000	75000
Closing Balance (B.F.) (Cr.)	-	25000
	100000	100000

Requirement ← Cash Position → 30000 Credit
Exchange Position → 10000 overbought

Spot Purchase Sw. Frs. 5000, it would bring oversold position To Nil.
Forward Purchase SFW. Frs. 10000.

Answer (73.)

Exchange Position :-

	Purchase of £	Sale of £
Opening Balance overbought	35000	-
DD purchased	12500	-
Purchased a Bill	40000	-
Sold fwd. TT	-	30000
Fwd. Purchase cancel	-	15000
Remittance by TT	-	37500
Draft Cancelled	15000	-
	102500	82500
Closing Balance (overbought) (B.F.)	-	20000
	102500	102500

Cash Position (Nostro) :-

	Credit (Purchase)	Debit (Sale)
Opening Balance (Credit)	65000	-
Remittance by TT	-	37500
	65000	37500
Closing Balance (Credit) (B.F.)	-	27500
	65000	65000

Requirement
- Cash Position → £7500 Credit Balance
- Exchange Position → £7500 overbought

Spot sale £20000, it would bring overbought Position to Nil.
Fwd: Purchase £7500.

Answer (74.)

Cross Rate :- ₹ Sell JPY Buy

1 JPY = ₹ ??

Spot	Settlement
1 $ = ₹66	1 $ = ₹69.25
1 $ = ¥115	1 $ = ¥105
∴ ₹/JPY = ₹ 66/115	∴ ₹/JPY = ₹ 69.25/105

Profit / Loss on spot :-		₹
Sales	[200 units x $200 x ₹65]	2600000
less :-	Direct Material [200 units x ¥6000 x 66/115]	(688696)
	Labour [200 units x ₹1300]	(260000)
	Variable OH [200 units x ₹650]	(130000)
	Profit	1521304

Profit / Loss on Settlement Date :-

		₹
Sales	[200 Units × $200 × ₹68.90]	2756000
Less:-	Direct Material [200 Units × ¥6000 × 69.25/105]	(791429)
	Labour [200 Units × ₹1300]	(260000)
	Variable OH [200 Units × ₹650]	(130000)
	Net Profit	1574571

∴ Profit due to Transaction Exposure → ₹1574571 - ₹1521304
→ ₹53267

Answer (75.)**

(1.) Gain / Loss due to Txn. Exposure :-

(a.) Spot :-

		₹
	Sale (2400 × €500 × ₹51.50)	61800000
Less:-	Direct Materials (2400 × S$800 × ₹27.25)	(52320000)
	Fixed Cost (2400 × ₹1000)	(2400000)
	Variable Cost (2400 × ₹1500)	(3600000)
	Profit	3480000

(b.) Settlement :-

		₹
	Sale (2400 × €500 × ₹52)	62400000
Less:-	Direct Material (2400 × S$800 × ₹27.75)	(53280000)
	Fixed cost (2400 × ₹1000)	(2400000)
	Variable Cost (2400 × ₹1500)	(3600000)
	Profit	3120000

Loss due to Transaction Exposure → ₹3480000 - ₹3120000
→ ₹360000

(29) Transaction Exposure :-

(a.) Spot :-

		₹
	Sales (2400 × ₹25000)	60000000
Less :-	Direct Material (2400 × S$800 × ₹27.15)	(52128000)
	Fixed Cost (2400 × ₹1000)	(2400000)
	Variable Cost (2400 × ₹1500)	(3600000)
	Profit	1872000

(b.) Settlement Date :-

		₹
	Sales (2400 × ₹25000)	60000000
Less :-	Direct Material (2400 × S$800 × ₹27.75)	(53280000)
	Fixed Cost (2400 × ₹1000)	(2400000)
	Variable Cost (2400 × ₹1500)	(3600000)
	Profit	720000

Loss due to Txn. Exposure → ₹1872000 − 720000
→ ₹1152000

Operating Exposure :-

Old Price (Spot Rate at the Start) → $\frac{₹25000}{₹51.50}$ = €485.44

New Price (Change Spot Rate) → $\frac{₹25000}{₹51.75}$ = €483.09

Demand Increase → 1.5 × 0.48%* → 0.72%

[As price of AC decreased for Importer]

* Decrease in Price → $\frac{€485.44 - €483.09}{€485.44} \times 100$ → 0.48%

Increase in Units → 2400 × 0.72% = 17 units

Profit / Loss on Increased Units on Settlement Date :-	₹
Sale (17 units × ₹25000)	425000
less:- Direct Material (17 Units × $5 800 × ₹27.75)	(377400)
Variable Cost (17 Units × ₹1500)	(25500)
Fixed Cost* (Nothing Extra)	-
Profit Due to Operating Exposure	22100

* There is no change in fixed cost due to increased units as fixed cost remains unchanged irrespective of no. of units sold.

∴ Net Loss due to Transaction & Operating Exposure

Loss	₹ 1152000
Profit	(₹ 22100)
Net Loss	₹ 1129900

Answer (76.)

(i.) US $

Spot :-

	₹
Sale (40 million $ × ₹48.01)	1920.40 million
(-) Cost (20 million $ × ₹48.01)	(960.20 million)
Profit	960.20 million

Settlement :-

	₹
Sale (40 million $ × ₹48.82)	1952.80 million
(-) Cost (20 million $ × ₹48.82)	(976.40 million)
Profit	976.40 million

Profit due to Txn. Exposure ⇒ 976.40 million - 960.20 million
⇒ ₹ 16.20 million

Self Note:- We can calculate Txn. Exposure for each currency as done above for US$ but it will be a time consuming process so we will solve Ques. as below because Inflow & Outflow are given in same currency.

(i.)
Alternatively.

~~(₹ in millions)~~

Currency	Inflow (Million)	Outflow (Million)	Net (Million)	Spot (SR)	Fwd. Rate (FR)	Diff. in FR & SR	Diff. in Rate × Net (in ₹ millions)
US$	40	20	20	48.01	48.82	0.81	16.20
FFr	20	8	12	7.45	8.12	0.67	8.04
UK£	30	20	10	75.57	75.98	0.41	4.10
Japanese ¥	15	25	-10	3.20	2.40	-0.80	8

(ii.) The exposure of Japanese ¥ (i.e. -10 Million ¥) is offset by a better forward Rate.

Answer (77.) [This Ques. was not solved by Ajay Sir in Class. Solution as per me]

[A Inc.]

Borrow $200000 in ¥ for B Inc.

Convert in ¥ = $200000 × ¥120 ⇒ ¥24000000

Interest @5% = ¥1200000
(24000000 × 5% × 12/12)

Interest on $200000 swap @9% to B Inc.

Cal^n of Net Interest Cost in $:-

Int. on Borrowings [¥24000000 × 5% × 12/12]	¥1200000	
Convert in $ [¥1200000 / ¥120]		$10000
Int. to ~~Lender~~ B Inc. [$200000 × 9% × 12/12]		$18000
Int. Receipt from B Inc. [¥24000000 × 6% × 12/12]	¥1440000	
Convert in $ [¥1440000 / ¥120]		($12000)
Net Interest Cost		$16000

∴ Net Int. cost (%) = $\frac{\$16000}{\$200000} \times 100 \Rightarrow 8\%$

Int. Rate if ~~loan~~ currency swap not opted → 9%
→ Saving in Interest (%) = 9% − 8% = 1%

B Inc.

Borrow $200000 @ 10% for A Inc.

Interest = $\$200000 \times 10\% \times \frac{12}{12} \Rightarrow \$20000$

Convert in ¥ [$20000 × ¥120] → ¥2400000

Interest on ¥24000000 swap @ 6% [5%+1%] to A Inc.

Cal^{n} of Net Interest Cost in ¥ :—

Int. on Borrowing	¥2400000
Int. to A Inc. (¥24000000 × 6% × 12/12)	¥1440000
Int. Receipt from A Inc. ($200000 × 9% × 12/12) $18000	
Convert in ¥ [$18000 × ¥120]	(¥2160000)
Net Interest Cost	¥1680000

∴ Net Interest Cost (%) = $\frac{¥1680000}{¥24000000} \times 100 \Rightarrow 7\%$

Int. Rate if currency swap not opted → 8%
→ Saving in Interest (%) = 8% − 7% = 1%

Answer (78) [Soln as per other teacher on Youtube (CA Abhinav Sekhri) as Ajay Sir not solved]

Home Currency = $ Foreign Currency = ₹

Initial Investment = ₹500 Crore Payable Today

Sold After 1 Year = ₹740 Crore Receivable after 1 year

Amount will be received in ₹

[Q is Typical since Info. is NOT clearly given]

Spot :-

1$ = ₹50

Expected Spot Rate after 1 Year :-

1$ = ₹54

$ loan available @ 8% p.a.

(a.) Swap Construction

Swap Rate ⇒ 1$ = ₹50

Receive ₹500 Crore today	Pay $ today (To be borrowed) [₹500 Crore / ₹50 = $ 10 Crore]
Pay ₹500 Crore after 1 year	Receive $ after 1 year $10 Crore

(Self note :- Be careful. Rate will be ₹50/$ & not ₹54/$)

[Self Note - The swap is entered to cover US company from Transaction Exposure]

Amount Covered in Swap	=	₹500 Crore
Amount Receivable	=	₹740 Crore
Amount Not covered (will have to sell spot @ ₹54/$)		₹240 Crore

(b) (i.) ~~Contract~~ Swap :-

		$ Inflow after 1 year
Swap	[500 crore ₹ / 50 ₹]	10 crore
Spot sale ₹240 crore	[₹240 crore / ₹54]	4.44 crore

Less :- Loan Repayment :-

Principal	$10 crore	
(+) Int. @ 8%	$0.8 crore	(10.8 crore)
	Net Inflow	3.64 crore

(ii.) No swap :-

Spot sale ₹740 crore	[₹740 crore / ₹54]	13.7037 crore
(-) Loan Repayment :-		
Principal	$10 crore	
(+) Interest @ 8%	$0.8 crore	(10.8 crore)
	Net Inflow	2.9037 crore

Decision :- Since, Inflow under swap is higher. Hence, Swap is recommended.

Advanced Capital Budgeting Decisions

Answer (9.) [P.N. 11.15 Q.B. – Question in Chapter 1 FM]

Cal^n of Base NPV :-

step 1: Initial Investment = USD 250 lakhs

step 2: Cash Inflow for the Project :

* Depreciation → $\frac{\text{USD 250 lakh}}{\text{10 years}}$ ⇒ USD 25 lakh p.a. for 10 years

Cash Inflows	Year 1 to 10	(USD lakh) Year 11 to 20
EBITDA	33	33
(–) Dep^n	(25)	–
EBIT	8	33
(–) Tax @ 30%	(2.4)	(9.9)
NOPAT	5.6	23.1
(+) Dep^n	25	–
Cash Inflows	30.6	23.1

step 3: PV of Cash Inflows using ke

Year	CF	PVAF @12%	PV (USD lakh)
1 to 10	30.6	5.650	172.89
11 to 20	23.1	7.469 – 5.650 = 1.819	42.019
			214.909

step 4: Base NPV =	214.909 – 250	⇒	–35.091 USD lakh
(+) Effect of Debt*		⇒	23.109 USD lakh
	Adjusted NPV	⇒	–11.982 USD lakh

* Cal^n of Effect of Debt :-

Int. on Debt → USD 150 lakh × 6% = USD 9 lakh p.a. for 15 years

Tax shield on Interest = USD 9 Lakh × 30% = USD 2.7 Lakh p.a. for 15 years

P.V. using Pre Tax Cost of Debt [Cost of Debt → 5.6% / 100% − 30% → 8%]

Year	CF	PVAF @ 8%	PV
1 – 15	2.7 Lakh	8.559	USD 23.109 Lakh

Advise: Project NOT viable as APV is Negative

Answer (1.)

S.1) Initial Investment → ₹ 70 Lakhs

S.2) Cash Inflows (Nominal)

Year	C.F. (₹ Lakh)
1	30
2	40
3	30

S.3) P.V. of Cash Inflow [Nominal Rate]

∴ Nominal Rate = (1 + 0.10) × (1 + 0.05) − 1 → 15.50%

P.V.:

Year	CF (₹ Lakh)	PVF @ 15.50%	PV (₹ Lakh)
1	30	0.866	25.98
2	40	0.750	30
3	30	0.649	19.47
			75.45

S.4) NPV → ₹ 75.45 Lakh − ₹ 70 Lakh → ₹ 5.45 Lakh

∴ Project is Viable

Answer (2.)

S.1) Initial Investment ⇒ ₹72 lakh

S.2) Cash Inflows (Nominal)

Year	C.F. [₹ lakhs]
1	30
2	40
3	30

S.3) P.V. of Cash Inflow [Nominal Rate]

∴ Nominal Rate = $(1 + 0.10) \times (1 + 0.05) - 1 \Rightarrow 15.50\%$

P.V.:

Year	CF (₹ lakh)	PVF @ 15.50%	PV (₹ lakh)
1	30	0.866	25.98
2	40	0.750	30
3	30	0.649	19.47
			75.45

S.4) NPV ⇒ ₹75.45 lakh − ₹72 lakh ⇒ ₹3.45 lakh

∴ Project is viable

Answer (3.)

S.1) Initial Investment = ₹40000

S.2) Cash Inflows :-

	1	2	3	4
Revenue	33000	36300	39930	43923
(-) Cost	(11000)	(12100)	(13310)	(14641)
(-) Dep^n	(10000)	(10000)	(10000)	(10000)
EBIT	12000	14200	16620	19282
(-) Tax @ 50%	(6000)	(7100)	(8310)	(9641)
NOPAT	6000	7100	8310	9641
(+) Dep^n	10000	10000	10000	10000
Cash Inflows	16000	17100	18310	19641

W.N. :-

① Revenue (with Inflation)

year 1 → $30000 \times (1.10)^1$ → 33000
year 2 → $30000 \times (1.10)^2$ → 36300
year 3 → $30000 \times (1.10)^3$ → 39930
year 4 → $30000 \times (1.10)^4$ → 43923

② Cost (with Inflation)

year 1 → $10000 \times (1.10)^1$ → 11000
year 2 → $10000 \times (1.10)^2$ → 12100
year 3 → $10000 \times (1.10)^3$ → 13310
year 4 → $10000 \times (1.10)^4$ → 14641

③ Depⁿ p.a. → $\frac{40000}{4}$ → ₹10000

S.3) P.V. of Cash Inflows

Year	CF	PVF @ 12%	PV
1	16000	0.893	14288
2	17100	0.797	13629
3	18310	0.712	13037
4	19641	0.635	12472
			53426

S.4) NPV = 53426 − 40000 → ₹13426

Answer (5.)

5.1) Initial Investment = ₹1500000

5.2) Cash Inflows :-

	1	2	3
Revenue	1090000	1530360	1746965
(-) Cost	(550000)	(719400)	(833905)
(-) Dep^n	(500000)	(500000)	(500000)
EBIT	40000	310960	413060
(-) Tax @ 35%	(14000)	(108836)	(144571)
NOPAT	26000	202124	268489
(+) Dep^n	500000	500000	500000
Cash Inflows	526000	702124	768489

W.N.:-

① Revenue (with Inflation):-

Year

1 $1000000 \times (1.09)$ ~~$\times (1.08) \times (1.06)$~~ $\Rightarrow$ 1090000

2 $1300000 \times (1.09) \times (1.08) \Rightarrow$ 1530360

3 $1400000 \times (1.09) \times (1.08) \times (1.06) \Rightarrow$ 1746965

② Cost (with Inflation):-

year

1 $500000 \times (1.10) \Rightarrow$ 550000

2 $600000 \times (1.10)(1.09) \Rightarrow$ 719400

3 $650000 \times (1.10) \times (1.09) \times (1.07) \Rightarrow$ 833905

③ Dep^n p.a. $\Rightarrow$ ₹ 500000 p.a.

S4) P.V. of Cash Inflows

Year	CF	PVF @ 14%	PV
	526000		
	702124		
	768489		

S.3) P.V. of Cash Inflows :-

Year	CF	PVF @ 14%	PV
1	526000	0.877	461302
2	702124	0.769	539933
3	768489	0.675	518730
			1519965

S.4) NPV = 1519965 - 1500000 → ₹ 19965

Answer (4.)

C.1) Initial Investment → ₹ 800000

S.2) Cash Inflows :-

	1	2	3	4
Revenue	660000	839300	1035936	1108452
(-) Cost	(336000)	(492800)	(537152)	(580124)
(-) Dep^n	(200000)	(200000)	(200000)	(200000)
EBIT	124000	146500	298784	328328
(-) Tax @ 60%	(74400)	(87900)	(179270)	(196997)
NOPAT	49600	58600	119514	131331
(+) Dep^n	200000	200000	200000	200000
Cash Inflows	249600	258600	319514	331331

S-3) P.V. & NPV :-

Year	CF	PV F @ 10%	PV
1	249600	0.909	226886
2	258600	0.826	213604
3	319514	0.751	239955
4	331331	0.683	226299
			906744
	(-) Initial Investment		(800000)
		NPV	₹ 106744

W.N.:-

① Revenue (with Inflation):-

Year		
1	600000 × (1·10) =	660000
2	700000 × (1·10) × (1·09) =	839300
3	800000 × (1·10) × (1·09) × (1·08) =	1035936
4	800000 × (1·10) × (1·09) × (1·08) × (1·07) =	1108452

② Cost (with Inflation):-

Year		
1	300000 × (1·12) =	336000
2	400000 × (1·12) × (1·10) =	492800
3	400000 × (1·12) × (1·10) × (1·09) =	537152
4	400000 × (1·12) × (1·10) × (1·09) × (1·08) =	580124

Answer (6.)

(i.) on the basis of R_F:-

PV of cash Inflows:

Year	CF	PVF @ 7%	PV (₹ 'Lakh)
1	25	0.935	23.38
2	60	0.873	52.38
3	75	0.816	61.20
4	80	0.763	61.04
5	65	0.713	46.35
			244.34

NPV = ₹ 244.34 Lakh − ₹ 100 Lakh ⇒ ₹ 144.34 Lakh

(ii) On the basis of RADR :-

RADR = 7% + 7% ⇒ 14%

P.V. of Cash Inflows :-

year	CF	PVF@14%	PV (₹ in Lakh)
1	25	0.877	21.93
2	60	0.769	46.14
3	75	0.675	50.63
4	80	0.592	47.36
5	65	0.519	33.74
			199.79

NPV = ₹199.79 Lakh − ₹100 Lakh ⇒ ₹99.79 Lakh

Answer (7.)

Project 'x':

PV of Cash Inflows → ₹70000 × 3.274 ⇒ ₹229180

NPV = ₹229180 − ₹210000 ⇒ ₹19180

Project 'y':

PV of Cash Inflows → ₹42000 × 3.433 ⇒ ₹144186

NPV = ₹144186 − ₹120000 ⇒ ₹24186

Project 'z':

PV of Cash Inflows ⇒ ₹30000 × 3.605 ⇒ ₹108150

NPV = ₹108150 − ₹100000 ⇒ ₹8150

Answer (8.) (i) RADR :-

Project 1 ⇒ 10% + [15% − 10%] × 1.80 ⇒ 19%

Project 2 ⇒ 10% + [15% − 10%] × 1 ⇒ 15%

Project 3 ⇒ 10% + [15% − 10%] × 0.60 ⇒ 13%

(ii.) Calⁿ of NPV :-

P-I

PV of CI → 600000 × 2.639 → ₹1583400

NPV → ₹1583400 - ₹1500000 → ₹83400

P-II

PV of CI →

Year	CF	PVF @15%	PV
1	600000	0.870	522000
2	400000	0.756	302400
3	500000	0.658	329000
4	200000	0.572	114400
			1267800

NPV = ₹1267800 - ₹1100000 → ₹167800

P-III

PV of CI →

Year	CF	PVF @ 13%	PV
1	400000	0.885	354000
2	600000	0.783	469800
3	800000	0.693	554400
4	1200000	0.613	735600
			2113800

NPV = ₹2113800 - ₹1900000 → ₹213800

So, P-III has highest NPV. It should be accepted.

Answer (9)

P.V. of CI :-

Year	CI	CE	Certain CI	PVF@5%	PV
1	1000000	0.90	900000	0.9524	857160
2	1500000	0.85	1275000	0.9070	1156425
3	2000000	0.82	1640000	0.8638	1416632
4	2500000	0.78	1950000	0.8227	1604265
					5034482

NPV = ₹5034482 - ₹4500000

⇒ ₹534482

Answer (10.)

(i.) Project 'M':

PV of CI

Year	CF	CE	Certain CF	PVF @6%	PV
1	450000	0.8	360000	0.943	339480
2	500000	0.7	350000	0.890	311500
3	500000	0.5	250000	0.840	210000
					860980

NPV = ₹860980 - ₹850000 ⇒ ₹10980

Project 'N':

PV of CI

Year	CF	CE	Certain CF	PVF@6%	PV
1	450000	0.9	405000	0.943	381915
2	450000	0.8	360000	0.890	320400
3	500000	0.7	350000	0.840	294000
					996315

NPV = ₹996315 - ₹825000 ⇒ ₹171315

Decision :- So, NPV of Project N is higher. It should be accepted

(ii.) CE Co-efficient of Project M is 2 [0.8+0.7+0.5] and of Project N is 2.4 [0.9+0.8+0.7]

∴ Project M is more Risky. so it would be analysed with higher rate in RADR method.

Answer (ii.)

Project A :-

CI	Utility	Probability	Utility x Probability
-15000	-100	0.10	-10
-10000	-60	0.20	-12
15000	40	0.40	16
10000	30	0.20	6
5000	20	0.10	2
		Expected Utility	2

Project B :-

CI	Utility	Probability	Utility x Probability
-10000	-60	0.10	-6
-4000	-3	0.15	-0.45
15000	40	0.40	16
5000	20	0.25	5
10000	30	0.10	3
		Expected Utility	17.55

So, Project B is selected because its expected Utility is more.

Answer (12.)

S.1) Existing NPV:

P.V. of CI = 45000 × 3.169 ⇒ ₹142605

NPV = ₹142605 − ₹120000 ⇒ ₹22605

S.2) (a.) If Initial Investment is varied Adversely by 10%.

Revised II ⇒ 120000 + 10% ⇒ ₹132000

∴ Revised NPV = (45000 × 3.169) − 132000 ⇒ ₹10605

$$\% \text{ change in NPV} = \frac{22605 - 10605}{22605} \times 100 \Rightarrow 53.08\%$$

(b.) If Annual CI is varied Adversely by 10%.

Revised Annual CI = 45000 − 10% = ₹40500

∴ Revised NPV = (40500 × 3.169) − 120000 = ₹8345

$$\% \text{ change in NPV} = \frac{22605 - 8345}{22605} \times 100 \Rightarrow 63.08\%$$

(c.) If COC is varied Adversely by 10%.

Revised COC = 10% (1 + 0.10) ⇒ 11%.

∴ Revised NPV = [45000 × 3.103] − ₹120000 ⇒ ₹19635

$$\% \text{ change in NPV} = \frac{22605 - 19635}{22605} \times 100 \Rightarrow 13.14\%$$

S.3) Annual Cash Inflow is most sensitive as highest % change in NPV is 63.08% in this case.

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Answer (14)

S.1) Existing NPV:

II = ₹10000

Cash Inflows:

	Year 1	Year 2
Savings	12000	14000
(-) Rec. Cost	(4000)	(5000)
	8000	9000

P.V. of C.I:

Year	CI	PVF @ 9%	PV
1	8000	0.917	7336
2	9000	0.842	7578
			14914

∴ NPV = ₹14914 - ₹10000

= ₹4914

S.2) (a.) If II varied adversely by 10%.

Revised II = 10000 + 10% ⇒ ₹11000

Revised NPV = ₹14914 - ₹11000 ⇒ ₹3914

∴ % change in NPV = $\frac{4914 - 3914}{4914} \times 100$ ⇒ 20.35%

(b.) If Recurring cost adversely vary by 10%.

Revised Recurring cost ⇒ Year 1 = 4000 + 10% = 4400

Year 2 = 5000 + 10% = 5500

Rvised NPV:-

Rev. Cash Inflows ⇒ Year 1 = 12000 - 4400 ⇒ 7600

Year 2 = 14000 - 5500 ⇒ 8500

P.V. of Revised CI :-

Year	CI	PVf @ 9%	PV
1	7600	0.917	6969
2	8500	0.842	7157
			14126

Revised NPV = ₹14126 - ₹10000 = ₹4126

∴ % change in NPV = $\frac{4914 - 4126}{4914} \times 100 = 16.04\%$

(c.) If savings varied adversely by 10%.

Revised Savings → Year 1 = 12000 - 10% → 10800

Year 2 = 14000 - 10% → 12600

Revised NPV :-

Revised CI → year 1 = 10800 - 4000 = 6800

year 2 = 12600 - 5000 = 7600

PV of Revised CI :-

Year	CI	PVF @ 9%	PV
1	6800	0.917	6236
2	7600	0.842	6399
			12635

Revised NPV = ₹12635 - ₹10000 = ₹2635

∴ % change in NPV = $\frac{4914 - 2635}{4914} \times 100 \rightarrow 46.38\%$

5.3) Savings is the most sensitive factor

Answer (13.)

S.1) Existing NPV :

II = ₹400 crore

CI →	Year 1 to 3
Sales p.u.	₹100 p.u.
(-) variable cost p.u.	₹(50) p.u.
Contribution p.u.	₹50 p.u.
Total contribution [5 crore × ₹50]	₹250 cr.
(-) fixed cost	(₹ 50 cr.)
Cash Inflow	₹200 cr.

P.V. of CI :-

Year	CI	PVAF @6%	PV
1 - 3	₹200 cr.	2.673	₹534.60 crore

∴ NPV → ₹534.60 - ₹400 = ₹134.60 crore

S.2) (a.) If II - 2.5% change

Revised II = ₹400 cr. + 2.5% = ₹410 crore

∴ Revised NPV = ₹534.60 - ₹410 ⇒ ₹124.60 crore

% change in NPV = $\frac{134.60 - 124.60}{134.60} \times 100 = 7.43\%$

(b.) If Annual Unit Sales (Sales Volume) - 2.5% change

Revised Sales Volume → 5 crore - 2.5% → 4.875 crore Units

Revised NPV :-

CI →	Year 1 to 3
Contribution p.u.	₹50 p.u.
Total contribution (4.875 crore × ₹50)	₹243.75 crore
(-) fixed cost	₹(50 crore)
Revised Cash Inflow	₹193.75 crore

Revised PV of CI → ₹193.75 crore × 2.673 → ₹517.89 crore
Revised NPV = ₹517.89 − ₹400 = ₹117.89 crore
% change in NPV = $\frac{134.60 - 117.89}{134.60} \times 100 = 12.41\%$

(c) If SP p.u. – 2.5% change
Revised S.P. p.u. → ₹100 − 2.5% → ₹97.50
Revised NPV :–

Revised CI →	Year 1 to 3
S.P. p.u.	₹97.50 p.u.
Variable cost p.u.	₹50 p.u.
Contribution p.u.	₹47.50 p.u.
Total contribution [5 cr. × ₹47.50]	₹237.50 crore
(–) fixed cost	(₹50 crore)
Rev. Cash Inflows.	₹187.50 crore

Revised PV of CI = ₹187.50 crore × 2.673 → ₹501.19 crore
Revised NPV = ₹501.19 − ₹400 → ₹101.19 crore
% change in NPV = $\frac{134.60 - 101.19}{134.60} \times 100 = 24.82\%$

(d) If V.C. p.u. – 2.5% change
Revised V.C. p.u. = ₹50 + 2.5% = ~~₹48.75~~ ₹51.25
Revised NPV :

Revised CI →	Year 1 to 3
S.P. p.u.	₹100 p.u.
V.C. p.u.	₹51.25 p.u.
Contribution p.u.	₹48.75 p.u.
Total Contribution [5 crore × ₹48.75]	₹243.75 crore
(–) fixed cost	(₹50 crore)
Revised Cash Inflows	₹193.75 crore

Revised PV of CI → ₹193.75 crore × 2.673 ⇒ ₹517.89 crore
Revised NPV = ₹517.89 − ₹400 ⇒ ₹117.89 crore
% change in NPV = $\frac{134.60 - 117.89}{134.60} \times 100$ = 12.41%.

(c) If fixed cost per year − 2.5% change
Revised fixed cost per year = ₹50 crore + 2.5%
= ₹51.25 crore

Revised NPV:

Revised CF ⇒	Year 1 to 3
Total Contribution	₹250 crore
(−) Rev. F.C.	(₹51.25 crore)
Rev. Cash Inflow	₹198.75 crore

Rev. PV of CI ⇒ ₹198.75 crore × 2.673 ⇒ ₹531.26 crore
Revised NPV = ₹531.26 − ₹400 ⇒ ₹131.26 crore
% change in NPV = $\frac{134.60 - 131.26}{134.60} \times 100$ ⇒ 2.48%.

S.3) Selling Price p.u. is the most sensitive factor having % change in NPV of 24.82%.

Answer (15.)

S.1) Existing NPV:
II = ₹1000000
CI ⇒

Sales	1200000 [20000×60]	1800000 [30000×60]	1800000 [30000×60]
(−) Variable Cost	(800000) [20000×40]	(1200000) [30000×40]	(1200000) [30000×40]
	400000	600000	600000

PV of CI

year	CI	PVF @ 10%	PV
1	400000	0.909091	363636
2	600000	0.826446	495868
3	600000	0.751315	450789
			1310293

NPV = ₹1310293 − ₹1000000 ⇒ ₹310293

5.2) (a.) Sales Price p.u. [Let S.P. p.u. be x for NPV to be '0']

Cash Inflows	Year 1	Year 2	Year 3
Sales	20000x	30000x	30000x
(-) Variable Cost	(800000)	(1200000)	(1200000)
	20000x − 800000	30000x − 1200000	30000x − 1200000

PV of CI

Year	CI	PVF @ 10%	P.V.
1	20000x − 800000	0.909091	18182x − 727273
2	30000x − 1200000	0.826446	24793x − 991736
3	30000x − 1200000	0.751315	22539x − 901578
			65514x − 2620586

Now

[65514x − 2620586] − 1000000 = 0

x = ₹55.26 p.u.

% Change in S.P. p.u. = $\frac{60 - 55.26}{60} \times 100 = 7.90\%$

(b.) Unit Cost [Let V.C. p.u. be x for NPV to be '0']

Cash Inflows			
Sales	1200000	1800000	1800000
(-) V.C.	20000x	30000x	30000x
	1200000 - 20000x	1800000 - 30000x	1800000 - 30000x

PV of CI

Year	CI	PVF @ 10%	P.V.
1	1200000 - 20000x	0.909091	1090909 - 18182x
2	1800000 - 30000x	0.826446	1487603 - 24793x
3	1800000 - 30000x	0.751315	1352367 - 22539x
			3930879 - 65514x

Now

$[3930879 - 65514x] - 1000000 = 0$

$x = ₹44.74$ p.u.

% change in V.C. p.u. $\Rightarrow \frac{44.74 - 40}{40} \times 100 \Rightarrow 11.85\%$

(c.) Sales Volume [Let S.V. be x for NPV to be '0']

Let S.V. of year 1 as x

∴ S.V. of year 2 $\Rightarrow x \times \frac{30000}{20000} \Rightarrow 1.5x$

∴ S.V. of year 3 $\Rightarrow x \times \frac{30000}{20000} \Rightarrow 1.5x$

Cash Inflows			
Sales	60x	90x	90x
	[60 x x]	[60 x 1.5x]	[60 x 1.5x]
(-) V.C.	(40x)	(60x)	(60x)
	[40 x x]	[40 x 1.5x]	[40 x 1.5x]
	20x	30x	30x

PV of CI :

Year	CI	PVF @ 10%	PV
1	20x	0.909091	18.18182 x
2	30x	0.826446	24.79339 x
3	30x	0.751315	22.53944 x
			65.51465 x

Now

$65.51465x - 1000000 = 0$

$\therefore x = 15264$ Units

% change in Sales Volume $= \frac{20000 - 15264}{20000} \times 100 = 23.68\%$

(We calculated it with the help of Year 1 data to calculate % change and we can take any year data but the change will remain same for all)

(d) Initial Outlay [Let II be x for NPV to be '0']

$1310293 - x = 0$

$x = 1310293$

% change in Initial Outlay $= \frac{1310293 - 1000000}{1000000} \times 100$

$\Rightarrow 31.03\%$

(e) Project life Time

Alternative 1 (as per me)

P.V. Table :-

Year	CI	PVF @ 10%	PV	Cum. PV.
1	400000	0.909091	363636	363636
2	600000	0.826446	495868	859504
3	600000	0.751315	450789	1310293

Discounted Pay Back Period $= 2 + \frac{1000000 - 859504}{450789} = 2.312$ years

or 2 year 112 day

so 2 years 112 days or 2.312 years are required to recover Initial Investment. That means for NPV to be 0, Project Life Time shall be 2 years + 112 days or 2.312 years

$$\% \text{ change in life} = \frac{3 - 2.312}{3} \times 100 = 22.97\%$$

Alternative 2 (as per Sir)

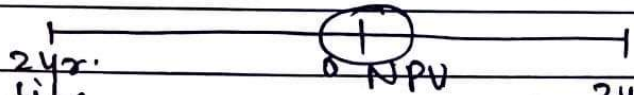
If Project life is 2 years, then

PV of CI

Year	CI	PVF @ 10%	PV
1	400000	0.909091	363636
2	600000	0.826446	495868
			859504

NPV = 859504 − 1000000 ⇒ − 140496

Interpolation



−140496 NPV 310293 NPV

$$\Rightarrow 2 + \frac{-140496 - 0}{-140496 - 310293} \times (3 - 2)$$

⇒ 2.311 years

Alternative 3 (as per Sir)

CF in 3 yr. → ₹600000

PV of 3rd yr. CF ⇒ 600000 × 0.751315 = ₹450789

Per day recovery in 3rd year ⇒ $\frac{450789}{360}$ ⇒ ₹1252 daily

Days to recover project in 3rd year ⇒ $\frac{140496}{1252}$ ⇒ 112 days or 0.311 years.

Total life of Project ⇒ 2.311 years

Answer (16.)

S.1) Existing NPV :-

II = ₹5000000

CI ⇒	Year 1 to 5
SP p.u.	₹30
V.C. p.u.	₹16.50
Contribution p.u.	₹13.50
Total Contribution (200000 x ₹13.50)	₹2700000
(-) Fixed Cost	(₹1000000)
	₹1700000

P.V. of CI →

Year	CI	PVAF @12%	P.V.
1 - 5	₹1700000	3.605	6128500

NPV = 6128500 - 5000000 ⇒ ₹1128500

S.2) (a.) Sales Price [let SP be x for NPV to be '0']

Revised Contribution p.u. ⇒ x - 16.50

Revised Total Contribution ⇒ 200000 x (x - 16.50)

⇒ 200000x - 3300000

CI →	Year 1 to 5
Rev. Total contribution	200000x - 3300000
(-) Fixed Cost	(1600000)
	200000x - 4300000

PV of CI ⇒

Year	CI	PVAF@12%	PV
1-5	200000x - 4300000	3.605	721000x - 15501500

[721000x - 15501500] - 5000000 ⇒ 0

x = ₹28.43 p.u.

% Change in S.P. ⇒ $\frac{30 - 28.43}{30} \times 100 = 5.23\%$

(b.) Sales volume [Let S.V. be x for NPV to be '0']

Rev. Total Contribution ⇒ x × ₹13.50 ⇒ 13.50x

CI →	Year 1 to 5
Total Contribution	13.50x
(-) Fixed Cost	(1000000)
	13.50x - 1000000

PV of CI = [13.50 x - 1000000] × 3.605

= 48.6675x - 3605000

[48.6675x - 3605000] - 5000000 = 0

x = 176812 units

% change in S.V. ⇒ $\frac{200000 - 176812}{200000} \times 100$ ⇒ 11.59%

(i.) Variable Cost [Let V.C. be x for NPV to be '0']

CI →	Year 1 to 5
SP p.u.	30
VC p.u.	(x)
Contri	30 - x
Total Contri [200000 × (30-x)]	6000000 - 200000x
(-) Fixed Cost	(1000000)
	5000000 - 200000x

P.V. of CI = [5000000 - 200000x] × 3.605

= 18025000 - 721000x

Now

[18025000 - 721000x] - 5000000 = 0

x = ₹18.07 p.u.

% change in V.C. ⇒ $\frac{18.07 - 16.50}{16.50} \times 100$ ⇒ 9.51%

(iii) Cal^{n} of NPV in Different Scenarios :-

Poor Economy

S.1) II ⇒ ₹5000000

S.2) CI ⇒

	Year 1 to 5
Sales [175000 × 30]	5250000
(-) V.C. [175000 × 16.50]	(2887500)
(-) fixed cost	(1000000)
	1362500

S.3) P.V. of C.I ⇒ 1362500 × 3.605 ⇒ ₹4911812

S.4) NPV = ₹4911812 − ₹5000000 = −₹88188

Normal Economy

CI ⇒

	Year 1 to 5
Sales [200000 × 30]	6000000
(-) V.C. [200000 × 16.50)	(3300000)
(-) fixed cost	(1000000)
	1700000

P.V. of C.I. ⇒ 1700000 × 3.605 ⇒ ₹6128500

NPV = 6128500 − 5000000 ⇒ ₹1128500

Good Economy

CI ⇒

	Year 1 to 5
Sales [225000 × 30]	6750000
(-) VC [225000 × 16.50)	(3712500)
(-) fixed cost	(1000000)
	2037500

P.V. of C.I. ⇒ 2037500 × 3.605 ⇒ ₹7345187

NPV = 7345187 − 5000000 ⇒ ₹2345188

Now, Expected NPV [ENPV] :-

Scenario	Probability	NPV	ENPV (Prob. x NPV)
Poor	0.30	- 88188	- 26456
Normal	0.60	1128500	677100
Good	0.10	2345188	234519
			885163

since, Acceptable level of Risk is 20% and there are 30% chance of Negative NPV [Poor Economy]. So, Project should not be accepted.

Answer (17.)

(i.) At IRR, PV of CI = Initial Investment

∴ Initial Inv. = ₹57500 x PVAF (16%, 5 years)

⇒ 57500 x 3.274 = ₹188255

(ii) NPV of Project :-

Cal^{n} of Discount Rate [Let assume it as x]

since IRR is the Rate at which NPV is zero

so, % change in Dis. Rate (Sensitivity)

$$\Rightarrow \frac{16\% - x}{x} \times 100 = 60\%$$

$$x = 10\%$$

PV of Cash Inflows ⇒ 57500 x 3.791 ⇒ 217982.50

NPV ⇒ 217982.50 - 188255 ⇒ ₹ 29727.50

(iii.) % change in F.C. for NPV to be '0'

$$\Rightarrow \frac{\text{change in F.C.}}{\text{Existing F.C.}} \times 100 = 7.8416\%$$

NPV = 29727.50
↓ ⇓
Zero Fixed Cost increase → future over five years

Let change in fixed cost Annually as 'x'

$x \times 3.791 = 29727.50$

$\therefore x = ₹ 7841.60$

$\Rightarrow \frac{7841.60}{\text{Existing F.C.}} \times 100 = 78.416\%$

∴ Existing F.C. ⇒ ₹ 100000

Alternatively,

CI → (as per me)

Let us assume Annual contribution as 'y' and Annual F.C. as 'x' (Year 1 to 5)

	Existing CI	F.C. Sensitive CI
Contribution	y	y
(-) Fixed cost	(x)	(1.078416x) [x × (1+0.078416)]
Profit/Annual CF	y - x = 57500 → Eq. (1)	y - 1.078416x = 188255 / 3.791 → 49658.40 – Eq (2)
PVAF @ 10% for 5 years	3.791	3.791
PV	217982.50	188255
(-) II	(188255)	(188255)
NPV	29727.50	0

[For NPV to be '0' P.V. of CI shall be equal to II. Hence, ACF = 188255/3.791 = 49658.40]

Solve Eq. ① & ②

$$y - 1.078416x = 49658.40$$
$$y - x = 57500$$
$$+ \quad -$$
$$-0.078416x = -7841.60$$
$$\therefore x = ₹100000$$

(iv) Annual Sales Unit [Sales Volume] :

Sales	100%	225000 ✓	
(-) V.C.	30%	(67500)	Calculated by doing reverse calculation
Contribution	70%	157500	
(-) fixed cost		(100000)	
Profit / (L)		57500	

Now, Sales price p.u. $\Rightarrow \frac{₹60}{30\%} \Rightarrow ₹200$ p.u.

$$\text{Sales} = \frac{\text{Contribution}}{70\%} = \frac{57500 + 100000}{70\%} \Rightarrow ₹225000$$

$$\therefore \text{Sales volume} \Rightarrow \frac{₹225000}{₹200} \Rightarrow 1125 \text{ units}$$

(v) Break Even Units ⇒ [Sales units where "Profit (CL) = 0"]

∴ Contribution = fixed cost ⇒ ₹100000

Cont. p.u = ₹200 − ₹60 ⇒ ₹140 p.u.
(S.P. p.u. ↓, V.C. p.u. ↓)

No. of Break Even Units = $\frac{₹100000}{₹140} \Rightarrow 714.285$ units

Answer (28)

(i) **Project K**

S.1 & S.2) Cal^{n} of ENPV, variance & S.D.

NPV (X)	Prob.	ENPV	(X - ENPV)	(X - ENPV)^2	(X - ENPV)^2 × P
11	0.1	1.1	-4	16	1.6
13	0.2	2.6	-2	4	0.8
15	0.4	6	0	0	0
17	0.2	3.4	2	4	0.8
19	0.1	1.9	4	16	1.6
		15		Variance (σ^2) =	4.8
				S.D. (σ) =	$\sqrt{4.8}$
					⇒ 2.19

Coefficient of Variance = $\frac{2.19}{15}$ ⇒ 0.15

Project S

S.1 & S.2) Cal^{n} of ENPV, variance & S.D.

NPV (X)	Prob.	ENPV	(X - ENPV)	(X - ENPV)^2	(X - ENPV)^2 × P
9	0.1	0.9	-8	64	6.4
13	0.25	3.25	-4	16	4
17	0.3	5.1	0	0	0
21	0.25	5.25	4	16	4
25	0.1	2.5	8	64	6.4
		17		Variance (σ^2) =	20.8
				S.D. (σ) =	$\sqrt{20.8}$
					⇒ 4.56

Coefficient of variance = $\frac{4.56}{17}$ ⇒ 0.27

(ii) Project 'S' is more riskier as coefficient of variance is higher

Answer (18.)

Project A

S.1 & S.2) ENPV, Variance & S.D. :-

NPV (X)	Probab.	ENPV	(X - ENPV)	(X - ENPV)²	(X - ENPV)² × P
8000	0.10	800	-4000	16000000	1600000
10000	0.20	2000	-2000	4000000	800000
12000	0.40	4800	0	0	0
14000	0.20	2800	2000	4000000	800000
16000	0.10	1600	4000	16000000	1600000
		ENPV = 12000		Variance (σ^2) ⇒	4800000
				S.D. (σ) ⇒	$\sqrt{4800000}$
					= 2190.90

Project B

S.1 & S.2) ENPV, variance & S.D. :-

NPV (X)	Prob.	ENPV	(X - ENPV)	(X - ENPV)²	(X - ENPV)² × P
24000	0.10	2400	8000	64000000	6400000
20000	0.15	3000	4000	16000000	2400000
16000	0.50	8000	0	0	0
12000	0.15	1800	-4000	16000000	2400000
8000	0.10	800	-8000	64000000	6400000
		ENPV = 16000		Variance (σ^2) =	17600000
				S.D. (σ) =	$\sqrt{17600000}$
					= 4195.24

Answer (19.) same as above two ques. Unnecessary time waste. Do only if you want to practice

Answer (21.)

Project A

S.1 & S.2) ENPV, Variance & S.D. :-

NPV (X)	Prob.	ENPV	(X - ENPV)	(X - ENPV)²	(X - ENPV)² × P
15000	0.2	3000	6000	36000000	7200000
12000	0.3	3600	3000	9000000	2700000
6000	0.3	1800	-3000	9000000	2700000
3000	0.2	600	-6000	36000000	7200000
		9000		Variance (σ^2)	19800000

S.D. (σ) = $\sqrt{19800000}$

= 4449.72

Project B

S.1 & S.2) ENPV, Variance & S.D. :-

NPV (X)	Prob.	ENPV	(X - ENPV)	(X - ENPV)²	(X - ENPV)² × P
15000	0.1	1500	6000	36000000	3600000
12000	0.4	4800	3000	9000000	3600000
6000	0.4	2400	-3000	9000000	3600000
3000	0.1	300	-6000	36000000	3600000
		9000		Variance (σ^2) =	14400000

S.D. (σ) = $\sqrt{14400000}$

= 3794.73

(i.) Expected NPV ⇒

Proj. A = 9000

Proj. B = 9000

(ii.) S.D :⟹

Proj. A = 4449.72 or 4450

Proj. B = 3794.73 or 3795

(iii.) Profitability Index [PI] = $\frac{\text{PV of CI from Proj.}}{\text{II}}$

Proj. A

NPV = PV of CI − II

9000 = PV of CI − 36000

PV of CI = 9000 + 36000 = 45000

$\therefore$ PI = $\frac{45000}{36000}$ ⇒ 1.25

Proj. B

NPV = PV of CI − II

9000 = PV of CI − 30000

PV of CI = 9000 + 30000 ⇒ 39000

$\therefore$ PI = $\frac{39000}{30000}$ ⇒ 1.30

(iv.) Project B is preferable as it is less risky.

Answer (22.) Very easy Ques. do it directly from Q.B. Useless to solve here.

Answer (23.) same as Q.25 that will be solved. Do solve only if you want to practice otherwise these are time waste

Answer (24.) same as Q.25. unnecessary time waste. Do only if Practice needed.

Answer (35.)

(i) S.1 & S.2) ENCF & σ_{CF}

Year 1

CF (X)	Prob.	ENCF	(X - ENCF)	(X - ENCF)^2	(X - ENCF)^2 x P
14	0.1	1.4	-13	169	16.9
18	0.2	3.6	-9	81	16.2
25	0.4	10	-2	4	1.6
40	0.3	12	13	169	50.7
	$ENCF_1$ =	27		Variance ($\sigma^2_{CF_1}$) =	85.4
				S.D. (σ_{CF_1}) =	$\sqrt{85.4}$ = 9.241

Year 2

CF(X)	Prob.	ENCF	(X - ENCF)	(X - ENCF)^2	(X - ENCF)^2 x P
15	0.1	1.5	-14.3	204.49	20.449
20	0.3	6	-9.3	86.49	25.947
32	0.4	12.8	2.7	7.29	2.916
45	0.2	9	15.7	246.49	49.298
	$ENCF_2$ =	29.3		Variance ($\sigma^2_{CF_2}$) =	98.61
				S.D. (σ_{CF_2}) =	$\sqrt{98.61}$ = 9.930

Year 3

CF(X)	Prob.	ENCF	(X - ENCF)	(X - ENCF)^2	(X - ENCF)^2 x P
18	0.2	3.6	-9.9	98.01	19.602
25	0.5	12.5	-2.9	8.41	4.205
35	0.2	7	7.1	50.41	10.082
48	0.1	4.8	20.1	404.01	40.401
	$ENCF_3$ =	27.9		Variance ($\sigma^2_{CF_3}$) =	74.29
				S.D. (σ_{CF_3}) =	$\sqrt{74.29}$
				=	8.619

S.3) ENPV :-

P.V. of ENCF

year	ENCF	PVF @ 6%	P.V.
1	27	0.943	25.461
2	29.3	0.890	26.077
3	27.9	0.840	23.436
	P.V. of ENCF		74.974
	(-) Initial Investment		(50)
		ENPV	24.974

(ii.) S.4) S.D. of Project (σ_p) :

year	SD of CF (σ_{CF})	PVF @ 6%	(σ_{CF} × PVF)	(σ_{CF} × PVF)^2
1	9.241	0.943	8.714	75.938
2	9.930	0.890	8.838	78.105
3	8.619	0.840	7.240	52.417
			Variance (σ_p^2) =	206.460
			S.D. (σ_p) =	$\sqrt{206.460}$
			=	14.369

(iii.) S.D. is used to identify which of the project is least risky

Answer (26.)

Project 'x' :

Year 1

CF(X)	Prob.	ENCF	(X - ENCF)	(X - ENCF)^2	(X - ENCF)^2
30	0.3	9	-18.5	342.25	102.68
50	0.4	20	1.5	2.25	0.9
65	0.3	19.5	16.5	272.25	81.68
	$ENCF_1$ =	48.5		Variance (σ_{CF1}^2) =	185.25
				S.D. (σ_{CF1}) = $\sqrt{185.25}$ =	13.61

Year 2

CF (x)	Prob.	ENCF	(x - ENCF)	(x - ENCF)²	(x-ENCF)² x P
30	0.3	9	-11.5	132.25	39.68
40	0.4	16	-1.5	2.25	0.9
55	0.3	16.5	13.5	182.25	54.68
	$ENCF_2$ = 41.5			Variance ($\sigma^2_{CF_2}$) = 95.25	
				S.D. (σ_{CF_2}) = $\sqrt{95.25}$ = 9.76	

Year 3

CF (x)	Prob.	ENCF	(x - ENCF)	(x - ENCF)²	(x-ENCF)² x P
30	0.3	9	-8.5	72.25	21.68
40	0.4	16	1.5	2.25	0.9
45	0.3	13.5	6.5	42.25	12.68
	$ENCF_3$ = 38.5			Variance ($\sigma^2_{CF_3}$) = 35.25	
				S.D. (σ_{CF_3}) = $\sqrt{35.25}$ = 5.94	

ENPV :-

P.V. of ENCF

Year	ENCF	PVF @ 10%	P.V.
1	48.5	0.909	44.09
2	41.5	0.826	34.28
3	38.5	0.751	28.91
	P.V. of ENCF		107.28
	(-) Initial Investment		(70)
		ENPV	37.28

S.D. of Project 'x' [σ_x] :

year	σ_{CF}	PVF @ 10%	(σ_{CF} x PVF)	(σ_{CF} x PVF)²
1	13.61	0.909	12.37	153.02
2	9.76	0.826	8.06	64.96
3	5.94	0.751	4.46	19.89
			Variance (σ_x^2) =	237.87

S.D. (σ_x) = $\sqrt{237.87}$ = 15.42

Project 'Y'

Year 1 to 3

CF(X)	Prob.	ENCF	(X − ENCF)	(X − ENCF)²	(X − ENCF)² × P
40	0.2	8	−5.5	30.25	6.05
45	0.5	22.5	−0.5	0.25	0.13
50	0.3	15	4.5	20.25	6.08
	ENCF =	45.5		Variance (σ^2_{CF}) =	12.25
				S.D. (σ_{CF}) = $\sqrt{12.25}$	
				=	3.5

ENPV :–

P.V. of ENCF = 45.5 × 2.486 (→ PVAF(10%, 3 years)) = 113.11

(−) Initial Investment (80)

ENPV 33.11

S.D. of Project 'Y' (σ_Y) :–

Year	σ_{CF}	PVF@10%	(σ_{CF} × PVF)	(σ_{CF} × PVF)²
1	3.5	0.909	3.18	10.12
2	3.5	0.826	2.89	8.36
3	3.5	0.751	2.63	6.91
			Variance (σ_Y^2) =	25.39
			S.D. (σ_Y) = $\sqrt{25.39}$	
			=	5.04

(a.) On the basis of NPV → Project 'X' is better

(b.) On the basis of S.D. → Project 'Y' is better

Answer (27.) same as Q. 26. Solve if you want to practice

Answer(28):

Cal^n of NPV in each scenario :-

[Worst Case] ₹'000

Year	CF	PVF @ 9%	PV
1	450	0.917	412.65
2	400	0.842	336.8
3	700	0.772	540.4
	PV of CI		1289.85
	(-) II		(1400)
		NPV =	-110.85

[Most likely Case] ₹'000

NPV = [(550 × 0.917) + (450 × 0.842) + (800 × 0.772)] - 1400
P.V. of CI — II

= 100.85

[Best case] (₹'000)

NPV = [(650 × 0.917) + (500 × 0.842) + (900 × 0.772)] - 1400 = 311.85
P.V. of CI — II

Cal^n of NPV if Most likely case in first 2 yrs. & worst case in 3rd year-

Year	CF	PVF @ 9%	P.V. (₹'000)
1	550	0.917	504.35
2	450	0.842	378.9
3	700	0.772	540.4
	P.V. of CF		1423.65
	(-) II		(1400)
		NPV	23.65

Answer (30.) [Self Note* - Till no hint / info. is given about nature of CF (Dependent or Independent) till (i.) requirement in the Question] so, Assume it as perfectly Independent Cash Flow

(i.)

S.1) Calⁿ of ENCF

ENCF of year 1 to 5

CF(x)	Probability	ENCF
100000	0.3	30000
110000	0.5	55000
120000	0.2	24000
		109000

Additional CF at 5th Year end

Salvage Value CF	Prob.	Exp. CF
20000	0.3	6000
50000	0.5	25000
60000	0.2	12000
		43000

Year 1 to 4 [ENCF] ⇒ 109000

Year 5 [ENCF] ⇒ 109000 + 43000 ⇒ 152000

S.2) Not Needed

S.3) Calⁿ of ENPV of Project

P.V. of ENCF

Year	ENCF	PVF @ 10%	P.V.
1 - 4	109000	3.169	345421
5	152000	0.621	94392
			439813

ENPV = ₹439813 - ₹400000 ⇒ ₹39813

(ii.) Now, CFs are perfectly dependent:

Best case NPV ⇒

Year	CF	PVF@10%	P.V.
1 - 4	120000	3.169	380280
5	120000 + 60000 = 180000	0.621	111780
		P.V. →	492060

NPV = 492060 - 400000 = ₹92060

Worst Case NPV →

year	CF	PVF@10%	P.V.
1-4	100000	3.169	316900
5	100000 + 20000 = 120000	0.621	74520
		PV	391420
		(-) II	(400000)
		NPV	-₹8580

(iii.) Probability of worst CFs :

If CFs are Independent → 0.30 × 0.30 × 0.30 × 0.30 × 0.30 = 0.00243 or 0.243%

If CFs are Dependent → 0.30 or 30%.
[0.30 × 1 × 1 × 1 × 1]

(iv) S.D. & C.V. of Project [Dependent CF] :-

NPV of worst case = -8580

NPV of Most likely case = 47950*

NPV of Best case = 92060

* NPV of Most likely case →

year	CF	P.VF @ 10%	P.V.
1-4	110000	3.169	348590
5	110000 + 50000 = 160000	0.621	99360
	P.V.		447950

NPV = 447950 - 400000 = ₹47950

Cal^n of ENPV & S.D. of Project

NPV (X)	Prob.	ENPV	(X - ENPV)	(X - ENPV)^2	(X - ENPV)^2 × P
-8580	0.3	-2574	-48393	2341882449	702564734.7
47950	0.5	23975	8137	66210769	33105384.5
92060	0.2	18412	52247	2729749009	545949801.8
		ENPV = 39813		Variance (σ^2) =	1281619921
				S.D. (σ) =	$\sqrt{1281619921}$ = 35800

C.V. = 35800 / 39813 ⇒ 0.90

(v.) Since C.V. calculated above (i.e. 0.90) is less than 0.95 to 1.0. Therefore, New Reqd. Rate of Return = 10% - 1% - 9%
(100 BP)

[Self Note - since no hint given in part (v.) about CF, to assume Independent CFs]

ENPV :-

PV of ENCF :-

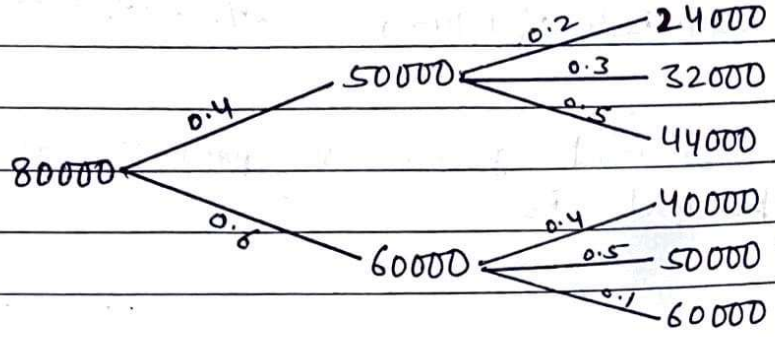
Year	ENCF	PVF@9%	P.V.
1-4	109000	3.240	353160
5	152000	0.650	98800
		P.V.	451960
		(-) II	(400000)
		ENPV	51960

So, Project should be accepted

Answer (29.) Same as Q. 30 as above. Useless to solve. Practice it if you think needed.

Answer (31.) (i.)

Step 1: Decision Tree & Joint Probabilities



Year 0 [Investment]	Year 1 [Cash Inflow]	Year 2 [Cash Inflow]	Path	Joint Prob.
			1	0.08
			2	0.12
			3	0.20
			4	0.24
			5	0.30
			6	0.06
				1.00

Step 2: NPV of each Path

Path 1 = [50000 × 0.909 + 24000 × 0.826] − 80000 ⇒ −14726

Path 2 = [50000 × 0.909 + 32000 × 0.826] − 80000 ⇒ −8118

Path 3 = [50000 × 0.909 + 44000 × 0.826] − 80000 ⇒ 1794

Path 4 = [60000 × 0.909 + 40000 × 0.826] − 80000 ⇒ 7580

Path 5 = [60000 × 0.909 + 50000 × 0.826] − 80000 ⇒ 15840

Path 6 = [60000 × 0.909 + 60000 × 0.826] − 80000 ⇒ 24100

Step 3: ENPV :−

NPV (x)	Joint Prob.	ENPV
−14726	0.08	−1178.08
−8118	0.12	−974.16
1794	0.20	358.8
7580	0.24	1819.2
15840	0.30	4752
24100	0.06	1446
	ENPV =	622376

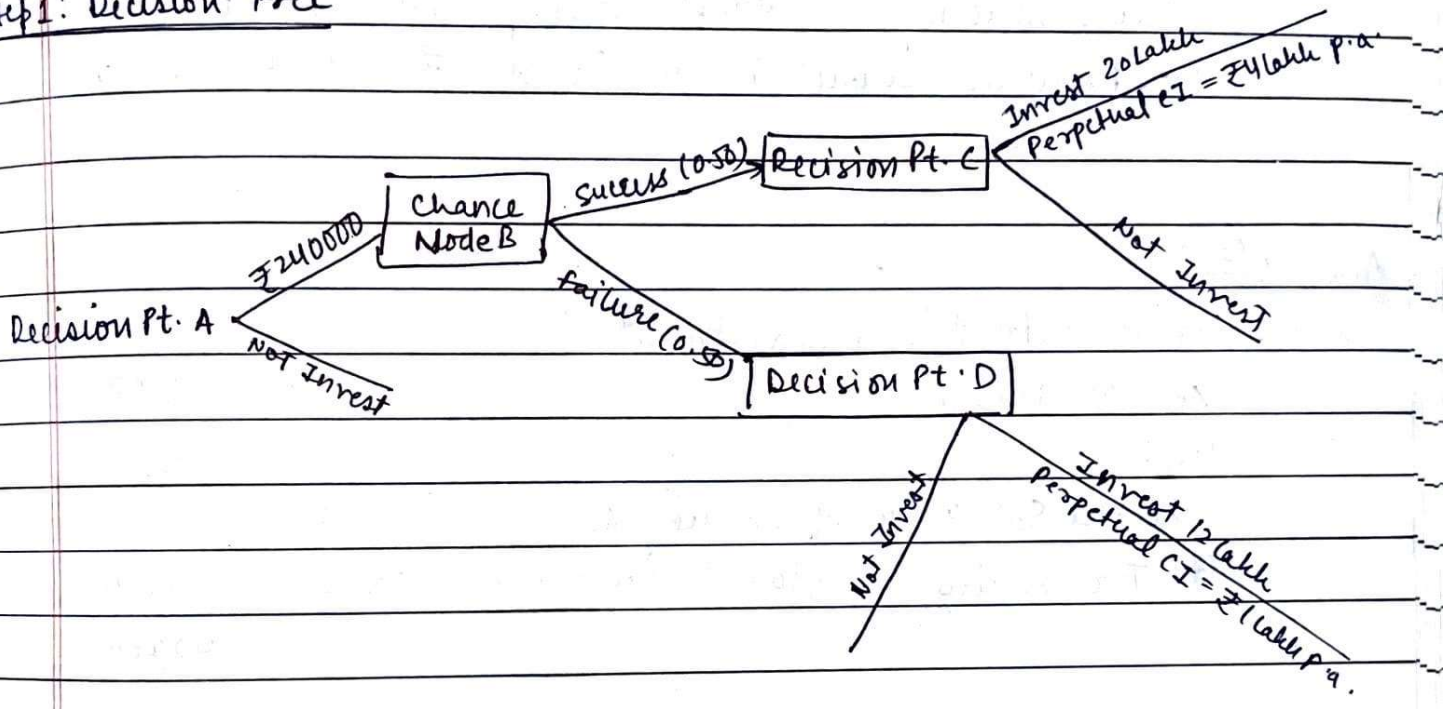
(ii.) Worst NPV ⇒ −14726 [Path 1]. Probability of this NPV is 0.08 or 8% with expected loss of ₹1178.08.

(iii.) Best Outcome is NPV = 24100 [Path 6]. Prob. of this NPV is 0.06 or 6% with expected gain / profit of ₹1446.

(iv.) Yes because ENPV is positive.

Answer (32.)

Step 1: Decision Tree



Step 2:

NPV at Decision Pt. C

P.V. of CI ⇒ ₹4 Lakh / 10% ⇒ ₹40 Lakh

NPV = ₹40 Lakh − ₹20 Lakh ⇒ ₹20 Lakh

∴ Beneficial to Invest

NPV at Decision Pt. D

P.V. of CI ⇒ ₹1 Lakh / 10% ⇒ ₹10 Lakh

NPV = ₹10 Lakh − ₹12 Lakh = −₹2 Lakh

∴ Not Beneficial To Invest

Step 3: EMV at Node 'B'

Outcome	Prob.	Benefit [NPV]	Prob. × Benefit
Success	0.50	20 Lakh	10 Lakh
Failure	0.50	0 (Since '-'ve)	0
		EMV	10 Lakh

Step 4: Decision making at Decision Pt. 'A':

Since, investing ₹240000 will provide benefit of ₹10 lakhs. so, Preferred choice is to invest ₹240000 for testing.

Answer (33.)

Step 1: Incremental Initial Investment

Cost of New Asset		50000
Less:		
Current Sal. value of Existing Asset	5000	
(+) Tax saving [Inflow] (W.N.)	2250	(7250)
		42750

W.N. Tax Effect on Sale of Existing Asset

Sales	5000
(-) Book Value $\left[25000 - \left[\frac{25000-0}{10}\right)\times 5\right]$	(12500)
Capital loss	(7500)
Tax saving @ 30% [Inflow]	2250

Step 2: Incremental CI:

CI during life of New Asset [Year 1 to 5] → Method 1

Increase in sales (100000 × 10%)	10000
(+) Saving in cost	5000
(-) Increase in Dep^{n} $\left[\left(\frac{50000-1000}{5\text{ yrs.}}\right)-\left(\frac{25000-0}{10\text{ yrs.}}\right)\right]$	(7300)
	7700

	7700
(-) Tax @ 30%	(2310)
	5390
(+) Inc. in Depⁿ	7300
	12690

→ Additional Incremental CI at end of Year 5 [last year end]

Salvage Value of New Asset	1000
(-) Salvage Value of Existing Asset at last yr end if it is continued	-
	1000

N.

→ Tax effect on Sale of new Asset

Sales	1000
(-) Book Value $\left[50000 - \left\{\left(\frac{50000-1000}{5\text{ yrs.}}\right) \times 5\right\}\right]$	(1000)
	Nil

∴ No tax effect

PV of Incremental CI

Year	Inc. CI	PVF @ 10%	P.V.
1 - 5	12690	3.791	48108
5	1000	0.621	621
			48729

Incremental NPV

⇒ 48729 − 42750 ⇒ ₹5979

∴ Replace the Existing system now

Answer(34.)

If Existing Machine is Upgraded →

S.1) Inc. II

Cost of Upgradation 1000000

* Since existing old machine is upgraded; hence, no salvage value will be realised from old machine.

S.2) Inc. CI

Dep^n if old machine is continued = 0 [Nil]

* Since its Book value is already '0'.

Dep^n if Upgraded Machine is used = $\frac{1000000 - Nil}{5 \text{ years}}$

⇒ ₹200000 p.a.

Year	CF from Upgraded Machine [NOPAT of Upgraded machine + Dep^n (200000)]	CF from Existing Machine [NOPAT of Old Machine + Dep^n (0)]	Incremental CF
(1)	(2)	(3)	(2) - (3)
1	550000 + 200000 = 750000	500000	250000
2	590000 + 200000 = 790000	540000	250000
3	610000 + 200000 = 810000	580000	230000
4	650000 + 200000 = 850000	620000	230000
5	700000 + 200000 = 900000	660000	240000

S.3) P.V. of Incremental CI →

= (250000 × 0.870) + (250000 × 0.756) + (230000 × 0.658) + (230000 × 0.572) + (240000 × 0.497)

= 217500 + 189000 + 151340 + 131560 + 119280 ⇒ 808680

S.4) Incremental NPV = 808680 − 1000000 = − ₹ 191320

∴ Upgrading Machine should NOT be done

If Replaced by New Machine

S.1) Inc. II

Cost of New Machine [2000000 + 50000]		2050000
less:		
Salvage Value of Existing Asset (Current)	50000	
(-) Tax	(20000)	(30000)
		2020000

* W.N. Tax effect on sale of Existing Asset

Sale	50000
(-) Book Value	0
Capital Gain	50000
Tax @ 40%. (Outflow)	20000

S.2) Incremental CI

Dep^n if existing continued = 0 [Nil]

Dep^n if New Machine is used = $\frac{2050000 - Nil}{5 \text{ years}}$ ⇒ ₹410000 p.a.

year	CF from New Asset [NOPAT of + Dep^n New Asset (410000)]	CF from Existing Machine [NOPAT of + Dep^n Old Machine (0)]	Incremental CF
(1)	(2)	(3)	(2) - (3)
1	500000 + 410000 = 910000	500000	410000
2	540000 + 410000 = 950000	540000	410000
3	690000 + 410000 = 1100000	580000	520000
4	740000 + 410000 = 1150000	620000	530000
5	800000 + 410000 = 1210000	660000	550000

S.3) P.V. of Inc. CI ⇒ (510000 × 0.870) + (510000 × 0.756) + (520000 × 0.658) + (530000 × 0.572) + (550000 × 0.497) = ₹1747930

S.4) Incremental NPV = 1747930 − 2020000 ⇒ − 272070

∴ Incremental NPV is negative in both Proposals. So, company should continue with existing Asset

Answer (3c)

Existing Asset	Year 0	Year 1	Year 2
Cash Inflow	-	40000	40000
Salvage value	80000	70000	

↓

Replace now or after 1 Year

S.1) NPV of new Asset

II ⇒ 150000

PV of CI ⇒ 80000 × 2.486 ⇒ 198880

NPV = 198880 − 150000 ⇒ 48880

S.2) Total NPV

If Replaced Now ⇒

Current Salvage Val. of existing	80000
(+) NPV of new	48880
	128880

If Replaced after 1 year ⇒

Cash Inflow of existing in year 1 (40000 × 0.90909)	36364
(+) Salvage Value of existing after year 1 (70000 × 0.90909)	63636
(+) NPV of new [48880 × 0.90909]	44436
	144436

S.3) Since total NPV is higher in case of replacement after 1 year, so, machine should be replaced after 1 year.

Answer (38)

S.1) NPV of new machine

II = 90000

PV of CI

Year	CI	PVF@15%	P.V.
1-8	(10000)	4.487	(44870)
8	20000	0.327	6540
			(38330)

NPV ⇒ −38330 − 90000 ⇒ −128330

S.2) Total NPV

→ If Replaced now

Current S.V. of existing	40000
(-) NPV of new asset	(128330)
	(88330)

→ If Replaced after 1 Year

Cash Outflow of existing in Year 1 (10000 × 0.870)	(8700)
(+) S.V. of Existing in Year 1 (25000 × 0.870)	21750
(-) NPV of New Asset (128330 × 0.870)	(111647)
	(98597)

→ If Replaced after 2 year

Cash outflow of existing in Year 2 (20000 × .756)	(15120)
(+) S.V. of Existing in year 2 (15000 × 0.756)	11340
(-) Cash Outflow of existing in year 1 (10000 × 0.870)	(8700)
(-) NPV of New Asset (128330 × 0.756)	(97017)
	(109497)

→ If Replaced after 3 years

Cash Outflow of existing in Year 1 (10000 × 0.870)	(8700)
(-) Cash outflow of existing in Year 2 (20000 × 0.756)	(15120)
(-) Cash Outflow of existing in Year 3 (30000 × 0.658)	(19740)
(+) S.V. of Existing in Year 3 (10000 × 0.658)	6580
(-) NPV of New Asset (128330 × 0.658)	(84441)
	(121421)

→ If Replaced after 4 year

Cash Outflow of existing in year 1 (10000 × 0.870)	(8700)
(-) Cash Outflow of existing in year 2 (20000 × 0.756)	(15120)
(-) Cash Outflow of existing in year 3 (30000 × 0.658)	(19740)
(-) Cash Outflow of existing in year 4 (40000 × 0.572)	(22880)
(+) S.V. of existing in year 4 (0 × 0.572)	0
(-) NPV of new asset (128330 × 0.572)	(73405)
	(139845)

5.3) Advise: Machine should be replaced now since Total NPV (in cost terms) is least.

Answer (35)

Cal^{n} of PV of Cash Outflow of Asset :-

Machine A		Machine B	
Initial Inv.	150000	Initial Inv.	100 000
(+) P.V. of Ann. Running Cost [40000 × 2.486]	99440	(+) P.V. of Ann. Run. Cost [60000 × 1.735]	104100
	249440		204100

EAC :-

Machine A → $\frac{249440}{2.486}$ → 100338

Machine B → $\frac{204100}{1.735}$ → 117637

Since EAC is less of Machine A.

∴ Company should buy Machine A.

Answer (39.)

S.1) EAC in various scenarios:

(i.) If Asset is used for 1 year :-

P.V. of Cash Outflows →	
II	60000
(+) PV of Annual Costs [Repair + Maintenance]	13914

Year	Cash Outflow	PVF @15%	PV
1	16000	0.8696	13914

(-) PV of Salvage Value [32000 × 0.8696]	(27827)
	46087

EAC ⇒ 46087 / 0.8696 = 52997

(ii.) If Asset is used for 2 years

P.V. of Cash Outflows ⇒	
II	60000
(+) P.V. of Annual Run. Cost	30548

Year	Cash Outflow	PVF@15%	PVF
1	16000 to = 16000	0.8696	13914
2	18000+4000 = 22000	0.7561	16634
			30548

(-) PV of Salvage Value [24000 × 0.7561]	(18146)
	72402

EAC = 72402 / 1.6257 = 44536

(iii.) If Asset is used for 3 years

P.V. of Cash Outflows →	
II	60000
(+) P.V. of Annual Run. Cost.	48958

Year	Cash Outflow	PVF@15%	PV
1	16000+0=16000	0.8696	13914
2	18000+4000=22000	0.7561	16634
3	20000+8000=28000	0.6575	18410

(-) PV of Salvage Value [16000 × 0.6575]	(10520)
	95438

$$EAC = \frac{95438}{2.2832} \Rightarrow 43114$$

(iv) If Asset is replaced after 4 years :

PV of Cash Outflows →

II	60000
(+) P.V. of Annual Run. Cost	69543

Year	Cash Outflow	PVF@15%	PV
1	16000	0.8696	13914
2	22000	0.7561	16634
3	28000	0.6575	18410
4	20000+16000 = 36000	0.5718	20585
			69543

(-) P.V. of Salvage Value (8000 X 0.5718)	(4574)
	124969

$$EAC = \frac{124969}{2.8550} \Rightarrow 43772$$

S.2)

Since, EAC is least in 3 year cycle. So, optimum Running cycle (ORC) is every 3 years.

Answer (40.)

S.1) EAC in various scenarios :

(i.) If Asset is used for 1 Year :-

P.V. of Cash Outflows →

II	55000
(+) P.V. of Annual Run. Cost	29997

Year	Cash Outflow	PVF@10%	P.V.
1	3000+30000 = 33000	0.909	29997

(-) P.V. of salvage Value [35000 X 0.909]	(31815)
	53182

EAC = 53182 / 0.9090 = ₹58506

(ii.) If Asset is used for 2 year :-

PV of Cash Outflows →

II		55000
(+) P.V. of Annual Run. Cost		61385

Year	Cash Outflow	PVF@10%	P.V.
1	33000	0.909	29997
2	3000 + 35000 = 38000	0.826	31388
			61385

(-) P.V. of Salvage Value [21000 × 0.826] (17346)

99039

EAC = 99039 / 1.7350 = ₹57083

(iii.) If Asset is used for 3 year :-

PV of Cash Outflows →

II		55000
(+) P.V. of Annual Run. Cost		95931

Year	Cash Outflow	PVF@10%	P.V.
1	33000	0.909	29997
2	38000	0.826	31388
3	3000 + 43000 = 46000	0.751	34546
			95931

(-) P.V. of Salvage Value [9000 × 0.751] (6759)

144172

EAC = 144172 / 2.4860 = ₹57994

5.2) Since, EAC is least in 2 year cycle. So, ORC is every 2 years.

Answer (37.)

S.1) EAC in various scenarios :-

(i.) If Asset is used for 1 year:

P.V. of Cash Outflow:

II	400000
(+) P.V. of Annual Run. Cost (180000 × 0.909)	163620
(-) P.V. of Salvage Value (280000 × 0.909)	(254520)
	309100

$EAC = \frac{309100}{0.909} \Rightarrow ₹340044$

(ii.) If Asset is used for 2 years:

P.V. of Cash Outflow:

II	400000
(+) P.V. of Annual Run. Cost [180000 × 0.909 + 210000 × 0.826]	337080
(-) P.V. of Salvage Value (230000 × 0.826)	(189980)
	547100

$EAC = \frac{547100}{1.7350} \Rightarrow ₹315331$

(iii.) If Asset is used for 3 years:

P.V. of Cash Outflow:

II	400000
(+) P.V. of Annual Run. Cost [180000 × 0.909 + 210000 × 0.826 + 238000 × 0.751]	515818
(-) P.V. of Salvage Value [168000 × 0.751]	(126168)
	789650

$EAC = \frac{789650}{2.4860} = ₹317639$

S.2) Since, EAC is lowest in 2 year cycle. So, ORC is every 2 yr.

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Answer (42)

S.1) Value of Timing Option [NPV if wait for 1 year]:

Binomial Model Apply

0 time ⇒ P.V. of CI ⇒ $\frac{21 \text{ lakh}}{10\%}$ ⇒ 2.10 crore

1st year ⇒ P.V. of CI (Higher) = $\frac{35 \text{ lakh}}{10\%}$ ⇒ 3.5 crore

⇒ P.V. of CI (Lower) = $\frac{12 \text{ lakh}}{10\%}$ ⇒ 1.2 crore

Strike Price = Investment Amt ⇒ 2.50 crore

→ Binomial Tree

0 time	1 Year	Pay off [NPV]
2.10 crore	3.50 crore	3.5 − 2.5 = 1 crore
	1.20 crore	1.2 − 2.5 = −1.3 crore

[since '-'ve ⇒ It is considered as zero (0)]

→ Risk Neutral Probability

$$P = \frac{(1 + R \times T) - d}{u - d}$$

$u = \frac{3.50}{2.10} = 1.667$; $d = \frac{1.2}{2.1} = 0.571$

$$P = \frac{(1 + 0.08 \times 12/12) - 0.571}{(1.667 - 0.571)} \Rightarrow 0.464$$

$1 - P = 1 - 0.464 \Rightarrow 0.536$

→ Pay off (already Calculated)

→ Value of Timing Option [NPV if wait for 1 year] = $\frac{[1 \text{ crore} \times 0.464] + [0 \times 0.536]}{1 + 0.08 \times 12/12}$

= 0.4296 or 0.430 crore

S.2) NPV if Accept now

PV of CI = 2.10 crore

∴ NPV = 2.10 crore − 2.50 crore ⇒ −0.40 crore

S.3) So advisable to wait and see NPV to be positive after 1 year.

Answer (41.)

Abondonment ⇒ Put option ⇒ Apply Binomial Model

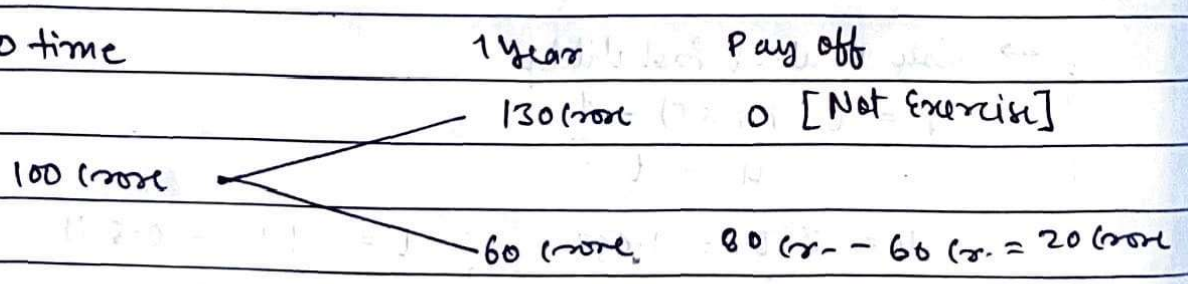
S.1) Decision Tree / Binomial Tree

0 time ⇒ PV of CI ⇒ 100 crore

1 year ⇒ PV of CI (High) = 100 + 30% ⇒ 130 crore

PV of CI (low) = 100 − 40% ⇒ 60 crore

Strike Price = 80 crore [Dispose off Price]



S.2) Risk Neutral Probability

$$P = \frac{(1 + R \times T) - d}{u - d}$$

$$u = \frac{130}{100} = 1.3 \quad ; \quad d = \frac{60}{100} = 0.6$$

$$P = \frac{(1 + 0.08 \times 12/12) - 0.6}{1.3 - 0.6} \Rightarrow 0.686$$

$$1 - P = 1 - 0.686 = 0.314$$

5.3) Pay off [Already calculated in (5.1)]

5.4) Value of Abondonment option

$$\Rightarrow \frac{(0 \times 0.686) + (20 \text{ crore} \times 0.314)}{1 + 0.08 \times 12/12} \Rightarrow 5.815 \text{ crore}$$

Answer (43.)

Growth option ⇒ Call option [Black Scholes Model]

Current Price of Underlying ⇒ $16.7 Million

Strike Price = $12.5 Million

R = 7.8% p.a. ⇒ 0.078

T = 15 years

$$D = \frac{1}{15} = 0.0667$$

σ^2 = 26.8% or 0.268

$\sigma = \sqrt{0.268} = 0.5177$

$$d_1 = \frac{\ln \frac{16.7}{12.5} + [(0.078 - 0.0667) + 0.5 \times 0.268] \times 15}{0.5177 \times \sqrt{15}}$$

$$= \frac{\ln(1.336) + [(0.0113 + 0.134) \times 15]}{2.0050}$$

$$= \frac{0.2897 + 2.1795}{2.0050} \Rightarrow 1.2315$$

$d_2 = d_1 - \sigma\sqrt{T} = 1.2315 - 0.5177 \times \sqrt{15}$

⇒ 1.2315 − 2.0050 = − 0.7735

$N(d_1) = 0.8910$ $N(d_2) = 0.2196$

Value of Growth option ⇒

$$= \frac{\$16.7 \text{ Million} \times 0.8910}{e^{0.0667 \times 15}} - \frac{\$12.5 \text{ Million} \times 0.2196}{e^{0.078 \times 15}}$$

$$= \frac{\$16.7 \text{ Million} \times 0.8910}{e^{1.0005}} - \frac{\$12.5 \text{ Million} \times 0.2196}{e^{1.17}}$$

$= (\$16.7 \text{ Million} \times e^{-1.0005} \times 0.8910) - (\$12.5 \text{ Million} \times e^{-1.17} \times 0.2196)$

$= (\$16.7 \text{ Million} \times 0.3677 \times 0.8910) - (\$12.5 \text{ Million} \times 0.3104 \times 0.2196)$

$= \$ 4.6192 \text{ Million}$