



A positive NPV Training Center

CA Final

Strategic Financial Management (SFM)

May 2015 Examination Suggested Answers

by Sanjay Saraf Sir



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Question No.1 is Compulsory. Attempt any 5 Questions of the remaining 6 Questions.

Notes: This is a detailed review & analysis to be use by students for fuutre preparation. Answer given below may not exactly match with the Institute's solution however, these are based on Sanjay Saraf's judgement

QUESTION 1(A) (6 Marks)

EFD Ltd is an Export Business House. The Company prepares Invoice in customers' currency. Its Debtors of US\$ 10,000,000 is due on 1st April 2015.

Market Information as at 1st January 2015 is:

Exchange Rates US\$ / INR		Currency Futures US\$ / INR	
Spot	0.016667	Contract Size: ₹ 24,816,975	
1 – month forward	0.016529	1 – month	0.016519
3 – months forward	0.016129	3 – months	0.016118

	Initial Margin	Interest rates in India
1 – month	₹ 17,500	6.5%
3 – months	₹ 22,500	7%

On 1st April 2015, the Spot Rate US\$ / INR is 0.016136 and Currency Future Rate is 0.016134. Which of the following methods would be most advantageous to EFD Ltd?

- (i) Using Forward Contract
- (ii) Using Currency Futures
- (iii) Not hedging the Currency Risk

***Sanjay Saraf Sir's Comments:** This is a question from past papers. It has been done in class in the derivatives chapter under the heading – "Hedging through Currency Futures" There is no alibi in not being able to do this sum correct and score full marks.*

SOLUTION 1(A)

Indian firm has USD 10 Mn receivable (a transaction exposure) and is therefore afraid of USD falling. There are 3 alternatives:

(i) FORWARD-COVER :

The firm sells USD 10 Mn 3 month forward at \$0.016129/INR.

Therefore, inflow on 1st April, 2015 = USD 10Mn/0.016129 = ₹ 620,001,240

(ii) FUTURES-COVER :

Step - 1 Indian Firm has USD receivable due on 1st April, 2015. It is afraid of USD falling i.e. Rupee rising. So it should buy April Rupee Futures at 0.016118 [F⁺]

Step - 2 No. of Futures Contract =

$$\begin{aligned} & (\text{INR equivalent exposure based on future price}) / \text{lot size} \\ & = [10 \text{ Mn} / (0.016118 * 24,816,976)] \\ & = 25 \text{ F}^+ @ 0.016118 \end{aligned}$$

Step - 3 On 1st April, 2015 :

- Square-off Futures at 0.016134.
Therefore, Profit on Future = [(.016134 - 0.016118) * 24,816,976 * 25] = USD 9,926.79
- Total amt. of USD available = 10Mn + 9926.79 = USD 10,009,926.79
This is sold spot on 1st April at .016136 getting 10,009,926.79/.016136
= ₹ 620,347,470
- Opportunity Cost of Margin Blocked = 7% * (22,500 * 25) * 3/12 = 9,844
Therefore, Net Rupee Inflow = 620,347,470 – 9,844 = 620,337,626

(iii) NO-COVER :

The firm keeps the position open and sells USD spot on 1st April @ 0.016136

Therefore, Rupee Inflow = 10 Mn/0.016136 = 619,732,276

CONCLUSION: Since Rupee inflow is highest under (ii), FUTURE COVER has turned out to be the best.

QUESTION 1(B)

(4 Marks)

TUV Ltd has invested in three Mutual Fund Schemes as per the details given below:

	Scheme X	Scheme Y	Scheme Z
Date of Investment	01-10-2014	01-01-2015	01-03-2015
Amount of Investment (₹)	15,00,000	7,50,000	2,50,000
Net Asset Value at Entry Date	₹ 12.50	₹ 36.25	₹ 27.75
Dividend received up to 31st March 2015	₹ 45,000	₹ 12,500	Nil
Net Asset Value as at 31st March 2015	₹ 12.25	₹ 36.45	₹ 27.55

What will be the Effective Yield (per annum basis) for each of the above three schemes upto 31st March 2015?

Sanjay Saraf Sir's Comments: I am surprised as to how many times this sum will be repeated in the examination – Not only in SFM but also in Financial Reporting – What on Earth is so great about this sum??? There's monotonous calculation of effective yield and in fact the term effective from a finance perspective has been disrespected in the past solutions as the suggested answers provide money market yield (MMY) in stead of EAY and therefore we as teachers are forced to do the same to hedge our students – anyways all students must have enjoyed this BONUS!!!!!!

SOLUTION 1(B)

Particulars	Scheme - X	Scheme - y	Scheme - Z
A. NAV at Entry Date (beginning NAV)	12.5	36.25	27.75
B. Investment Amount	15,00,000	7,50,000	2,50,000
C. No. of Units Purchased (Investment Amt/Beg.NAV)	1.2Lac	20690	9009
D. Dividend per unit (dividend rcvd./units purchased)	.375	.604	0
E. NAV at 31.03.05 (Ending NAV)	12.25	36.45	27.55

Particulars	Scheme - X	Scheme - y	Scheme - Z
F. Rupee Ret. per unit [D + E – A]	.125	.804	–0.2
G. Holding Period Yield [F/A × 100]	1	2.22	–0.72
H. Holding Period (n days)	182	90	31
I. Effective Annual Yield [HPY × 365/n]	2.01%	9%	–8.49%

QUESTION 1(c)

(6 Marks)

PQR Ltd has credit sales of ₹ 165 Crores during the Financial Year 2014–2015 and its Average Collection Period is 65 days. The past experience suggest that Bad Debt Losses are 4.28% of Credit Sales.

Administration Cost incurred in collection of its Receivables is ₹ 12,35,000 p.a. A Factor is prepared to buy the Company's Receivables by charging 1.95% Commission. The Factor will pay advance on Receivables to the Company at an interest rate of 16% p.a. after withholding 15% as Reserve.

Estimate the Effective Cost of Factoring to the Company assuming 360 days in a year.

SOLUTION 1(c)

- **Step - 1** Calculation of Net Amount advanced by Factor —

Particulars	Amt (Lacs)
A) Receivables [16,500 × 65/360]	2,979.16
B) Less: Factor Reserve [2,979.16 × 15%]	446.87
C) Less: Periodic Factor Comm. [2,979.16 × 1.95%]	58.09
Amt. available for advance	2,474.2
Less: Periodic Interest Charged Upfront [16% × 2474.2 × $\frac{65}{360}$]	73.16
Therefore, Net Amount Financed	2,401.04

• **Step - 2 Annual Cost-Benefit Analysis:**

Particulars	Amt (Lacs)
Factoring Comm. $[58.09 \times 360/65]$	321.73
ADD: Annual Interest Cost $[73.16 \times 360/65]$	405.19
LESS: Administrative Exp. saved	12.35
LESS: Bad debt saved $[4.28\% \times 16,500]$	706.2
Therefore, Net Annual Cost	8.37

• **Step - 3 Effective Annual Cost of Factoring:**

$$= 8.37/2401.04 \times 100$$

$$= .3485\%$$

Additional comment: The ultimate answer seems to be absurd – its because of the ridiculous figures given. We could perhaps play safe by supplementing this answer with Gross Cost of Factoring (a new word discovered ☺)

$$\text{Gross Cost of Factoring} = \left[\frac{(321.73 + 405.79)}{2,401.04} \right] \times 100 = 30.30\%$$

QUESTION 1(D)

(4 Marks)

The following information is collected from the Annual Reports of J Ltd.

Profit before Tax	₹ 2.50 Crores
Tax Rate	40 percent
Retention Ratio	40 percent
Number of Outstanding Shares	50,00,000
Equity Capitalization Rate	12 percent
Rate of Return on Investment	15 percent

What should be the Market Price per Share according to Gordon's Model of Dividend Policy?

Sanjay Saraf Sir's Comments: This is a plain vanilla sum on Dividend Policy – our age old favourite Gordon Model.

SOLUTION 1(D)

As per GORDON MODEL :

$$P_0 = E_1 (1 - b) / (K_e - br)$$

Where, P_0 = MPS,

E_1 = EPS next year

$1 - b$ = Pay out Ratio

r = Return on Investment

K_e = Cost of Capital

Therefore, we have $EPS_0 = PAT / \text{No. of outstanding shares} = (250 \text{ lacs} \times 60\%) / 50 \text{ lac} = ₹ 3$

Growth Rate (g) = $b * r = 40\% * 15\% = 6\%$

$$E_1 = 3 * (1.06) = ₹ 3.18$$

Therefore, substituting all the values in the formula, we get-

$$P_0 = [3.18 * (1 - .4)] / (0.12 - 0.06) = ₹ 31.8 \text{ (ANS.)}$$

QUESTION 2(A)

(8 Marks)

Mr. Shyam is holding the following Securities:

Particulars of Securities	Cost ₹	Dividend / Interest ₹	Market Price ₹	Beta
Equity Shares:				
Gold Ltd	10,000	1,725	9,800	0.6
Silver Ltd	15,000	1,000	16,200	0.8
Bronze Ltd	14,000	700	20,000	0.6
GOI Bonds	36,000	3,600	34,500	1

Average Return of the Portfolio is 15.7%.

Using Average Beta, calculate:

- Expected Rate of Return in each case, using the Capital Asset Pricing Model (CAPM).
- Risk Free Rate of Return.

Sanjay Saraf Sir's Comments: This is heights of stupidity. How many times will the Institute keep on repeating this most illogical sum on portfolio management on the face of this planet - EARTH. Let me count with you the number of mistakes in this sum:

- How come GOI Bonds have a $\beta = 1$? It defies the very foundation of CAPM.
- Why should we consider these 4 securities to be constituting market portfolio – just because we are supposed to mug up and vomit in the examination
- Why should we take β of portfolio as simple average although we know its weighted average - This is what has been done in the practice manual, RTP and past suggested answers

Genuinely, the only way that I can imagine to justify a $\beta = 1$, for GOI securities is by taking it to be Yield β i.e. the β resulting from price volatility owing to interest rate changes. If this were to be our thought process, R_f could be taken as the current yield i.e. $3600/36,000 = 10\%$ However, in my experience with the Institute, such intellect has been punished and I cannot take the risk of advocating the same to the student fraternity.

For the sake of formality and completeness, let me reproduce the suggested answer for your benefit.

SOLUTION 2(A)

- Step - 1** We consider this to be Market Portfolio and calculate R_m (Return on Market).

Security	Cost	Dividend / Interest	MP
Gold	10,000	1,725	9,800
Silver	15,000	11,000	16,200
Bronze	14,000	700	20,000
GOI Bonds	36,000	3,600	34,500
	75,000	7,025	80,500

$$\begin{aligned}
 \text{Therefore, } R_m &= \frac{\text{dividend} + \text{change in value}}{\text{Initial Cost}} \times 100 \\
 &= \frac{7,025 + (80,500 - 75,000)}{75,000} \times 100 \\
 &= 16.7\%
 \end{aligned}$$

- **Step - 2** β_p = Simple Average

$$= \frac{0.6 + 0.8 + 0.6 + 0.1}{4}$$

$$= 0.75$$

Note: I genuinely feel weighted average β should be used

Weighted average β =

$$\frac{10,000}{75,000} \times 0.6 + \frac{15,000}{75,000} \times 0.8 + \frac{14,000}{75,000} \times 0.6 + \frac{36,000}{75,000} \times 1 = 0.832$$

- **Step - 3** Calculation of R_f

As per CAPM, $E(R_p) = R_f + (R_m - R_f) \times \beta_p$

$$\text{Or, } 15.7 = R_f + (16.7 - R_f) \times .75$$

$$\text{Or, } R_f = 12.7\%$$

Note: If we take $\beta_p = 0.832$, we will obviously get a different R_f

Therefore, SML is given by —

$$E(R) = R_f + (R_m - R_f) \times \beta$$

$$\text{Or, } E(R) = 12.7 + 4\beta$$

- **Step - 4** Expected Return on Each Security—

$$\begin{aligned} \text{a) 1) GOLD} &= E(R) = 12.7 + 4\beta \\ &= 12.7 + 4(.6) \\ &= 15.1\% \end{aligned}$$

$$\begin{aligned} \text{2) SILVER} &= E(R) = 12.7 + 4(.8) \\ &= 15.9\% \end{aligned}$$

$$\begin{aligned} \text{3) BRONZE} &= E(R) = 12.7 + 4(.6) \\ &= 15.1\% \end{aligned}$$

$$\begin{aligned} \text{4) GOI} &= E(R) = 12.7 + 4(1) \\ &= 16.7\% \end{aligned}$$

$$\text{b) } R_f = 12.7\% \text{ (calculated above)}$$

QUESTION 2(B)
(8 Marks)

On 31st March 2013, the following information about Bonds is available:

Name of Security	Face Value ₹	Maturity Date	Coupon Rate	Coupon Date(s)
Zero Coupon	10,000	31 st March 2023	N.A.	N.A. N.A.
T-Bill	1,00,000	20 th June 2013	N.A.	31st March
10.71% GOI 2023	100	31 st March 2023	10.71	31st March &
10% GOI 2018	100	31 st March 2018	10.00	31st October

Calculate:

- If 10 years yield is 7.5% p.a., what price the Zero Coupon Bond would fetch on 31st March 2013?
- What will be the annualized yield if the T –Bill is traded @ 98500?
- If 10.71% GOI 2023 Bond having YTM is 8%, what Price would it fetch on 1st April 2013 (after Coupon Payment on 31st March)?
- If 10% GOI 2018 Bond having YTM is 8%, what Price would it fetch on 1st April 2013 (after Coupon Payment on 31st March)?

Sanjay Saraf Sir's Comments: This is a new sum on Bond Valuation and Yield Calculation. This is what we do in the first two classes of Bond Valuation. However there is a mistake in the sum – the coupon date for 10% GOI 2018 should have been 30th September in stead of 31st October.

SOLUTION 2(B)

- (i) ZCB

$$P_0 = \frac{FV}{(1+i)^n} = \frac{10,000}{(1+0.075)^{10}} = \frac{10,000}{(1.075)^{10}} = \frac{10,000}{2.06103} = \text{INR } 4,851.95$$

- (ii) Annualised Yield on T-Bills =

$$\frac{F - P}{P} \times 100 \times \frac{365}{n} = \frac{1,00,000 - 98,500}{98,500} \times 100 \times \frac{365}{80} = 6.95\%$$

Note: Alternately, if we take 360 days: Annualised Yield

$$= \frac{6.95 \times 360}{365} = 6.85\%$$

$$\begin{aligned}
 \text{(iii) } P_0 &= \text{Coupon Amt} \times \text{PVAF} + \text{Redemption Amt} \times \text{PVIF} \\
 &= 10.71 \times \text{PVAF} (8\%, 10) + 100 \times \text{PVIF} (8\%, 10) \\
 &= 10.71 \times 6.7100 + 100 \times 0.463 \\
 &= 118.18
 \end{aligned}$$

(iv) 1 period = 6 months

So, Coupon Amount = 10% of 100 $\times \frac{1}{2}$ = 5

$$\text{Yield} = \frac{8\%}{2} = 4\% = 4\% \text{ [Assuming Bond Equivalent Yield]}$$

N = 5 $\times$ 2 = 10 Periods

$$\begin{aligned}
 \therefore P_0 &= 5 \times \text{PVAF} (4\%, 10) + 100 \times \text{PVIF} (4\%, 10) \\
 &= 5 \times 8.1109 + 100 \times 0.6756 \\
 &= 40.55 + 67.56 \\
 &= 108.11
 \end{aligned}$$

QUESTION 3(A)

(8 Marks)

R Ltd and S Ltd are Companies that operate in the same industry. The Financial Statements of both the Companies for the Current Financial Year are as follows:

Balance Sheet

Equity & Liabilities	R Ltd (₹)	S Ltd (₹)	Assets	R Ltd (₹)	S Ltd (₹)
1. Shareholders' Fund			1. Non-Current Assets	20,00,000	10,00,000
(a) Equity Capital (₹ 10 each)	20,00,000	16,00,000	2. Current Assets	28,00,000	20,00,000
(b) Retained Earnings	4,00,000	—			
2. Non-Current Liabilities: 16% Long Term Debt	10,00,000	6,00,000			
3. Current Liabilities	14,00,000	8,00,000			
Total	48,00,000	30,00,000	Total	48,00,000	30,00,000

Income Statement

Particulars	R Ltd (₹)	S Ltd (₹)
A. Net Sales	69,00,000	34,00,000
B. Cost of Goods Sold	55,20,000	27,20,000

Particulars	R Ltd (₹)	S Ltd (₹)
C. Gross Profit (A–B)	13,80,000	6,80,000
D. Operating Expenses	4,00,000	2,00,000
E. Interest	1,60,000	96,000
F. Earnings Before Taxes [C–(D+E)]	8,20,000	3,84,000
G. Taxes @ 35%	2,87,000	1,34,400
H. Earnings After Tax (EAT)	5,33,000	2,49,600

Additional Information :

No. of Equity Shares	2,00,000	1,60,000
Dividend Payment Ratio (D/P)	20%	30%
Market Price per Share	₹ 50	₹ 20

Assume that both Companies are in the process of negotiating a Merger through exchange of Equity Shares. You are required to:

- Decompose the Share Price of both the Companies into EPS & P/E components. Also segregate their EPS Figures into Return on Equity (ROE) and Book Value / Intrinsic Value per Share components.
- Estimate Future EPS Growth Rates for both the Companies.
- Based on expected operating synergies, R Ltd estimated that the Intrinsic Value of S Ltd Equity Share would be ₹ 25 per Share on its acquisition. You are required to develop a range of justifiable Equity Share Exchange ratios that can be offered by R Ltd to the Shareholders of S Ltd. Based on your analysis on parts (i) and (ii), would you expect the negotiated terms to be closer to the upper or the lower exchange ratio limits and why?

***Sanjay Saraf Sir's Comments:** This is one of the best sums on mergers that I have come across. It has been repeated from past papers. It has been done in our class notes. However earlier there were 5 parts to it and this time it has just 3 parts. Once again nobody should have missed out on this sum.*

SOLUTION 3(A)

• **DECOMPOSITION OF PRICE :**

Particulars	Firm-A	Firm-B
i) PAT	5.33lac	2,49,600
ii) No. of Shares[sh.cap/face value]	2lac	1.6lac
iii) EPS [i/ii]	2.67	1.56
iv) Price	50	20
v) P/E Ratio [iv / iii]	18.73times	12.82times

• **DECOMPOSITION OF EPS :**

Particulars	Firm-A	Firm-B
i) EPS	2.67	1.56
ii) NW [sh.cap.+ reserves]	24lac	16lac
iii) BVPS [NW / no.of shares]	12	10
iv) ROE [i / iii]	22.25%	15.6%

(ii)

Particulars	Firm-A	Firm-B
i) Retention Ratio [$b = 1 - \text{payout}$]	80%	70%
ii) ROE [r]	22.25%	15.6%
iii) $g = b \times r$	17.5%	10.92%

(iii)

Minimum Price reqd. by Share-holders of Firm-B = ₹ 20

Max. price that A can offer = ₹ 25

Price of A = ₹ 50

Therefore, Minimum Exchange Ratio = $\frac{20}{50} = 0.40$

Maximum Exchange Ratio = $\frac{25}{50} = 0.50$

The actual exchange ratio should lie closer to the lower limit i.e. 0.40 . This is justified on the ground that Firm-B is fundamentally weaker than Firm-A as reflected by lower P/E ratio, lower ROE & lower growth rate.

QUESTION 3(B)

(8 Marks)

Following are the details of a portfolio consisting of three Shares:

Share	Portfolio Weight	Beta	Expected Return in %	Total Variance
A	0.20	0.40	14	0.015
B	0.50	0.50	15	0.025
C	0.30	1.10	21	0.100

Standard Deviation of Market Portfolio Returns= 10%

You are given the following additional data: Covariance (A, B) = 0.030, Covariance (A, C) = 0.020, Covariance (B, C) = 0.040

Calculate the following:

- (i) The Portfolio Beta,
- (ii) Residual Variance of each of the three Shares,
- (iii) Portfolio Variance using Sharpe Index Model,
- (iv) Portfolio Variance (on the basis of Modern Portfolio Theory given by Markowitz).

Sanjay Saraf Sir's Comments: This is the best sum in this paper – I was just waiting as to when this part of portfolio management would once again be tested. Student should refer to their class notes – in the second part of portfolio management chapter – Capital Market Theory (CMT) – we do a portion right at the end named – quantification of Total Risk, Systematic Risk and Unsystematic Risk. This portion is formula oriented and students struggle. So I expect an average student would not be able to do this sum completely. The main challenge in this sum is that the variance and covariance figures are given in decimals. So please understand that variance and covariance are expressed in %². To move from decimal to %², we need to multiply the decimal figure with 100² i.e. 10,000. Those who would have picked up this stuff, would have been able to do the sum correctly. Those who haven't been able to do this sum, have no reasons to blame classes as you can very well open your class notes and see that we have done similar such sums.

SOLUTION 3(B)

$$\begin{aligned}
 \text{Portfolio Beta, i.e., } \beta_p &= \text{Weighted Average} \\
 &= 0.2 \times 0.4 + 0.5 \times 0.5 + 0.3 \times 1.1 \\
 &= 0.66
 \end{aligned}$$

(ii) Residual variance of each of the three shares

Particulars	A	B	C
(a) Total Risk, i.e., variance of stock	150	250	1000
(b) Systematic Risk = $\beta^2 \sigma_m^2$	16	25	121
(c) Unsystematic Risk (% ²), i.e. $\sigma_e^2 = \text{TR} - \text{SR}$	134	225	879

$$\begin{aligned}
 \text{(iii) (i) Systematic Risk} &= \beta^2 \sigma_m^2 \\
 &= (0.66)^2 \times 10^2 \\
 &= 43.56
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii) Unsystematic Risk} &= \sum W_i^2 \sigma_{ei}^2 \\
 &= (0.2)^2 \times 134 + (0.5)^2 \times 225 + (0.3)^2 \times 879 \\
 &= 140.72 \\
 \text{(iii) Total risk} &= \text{Systematic risk} + \text{Unsystematic Risk} \\
 &= 43.56 + 140.72 \\
 &= 184.28 \\
 \text{(iv) Portfolio variance, i.e., } \sigma^2 &= (-2)^2 \times 150 + (0.5)^2 \times 250 + (0.3)^2 \times 1000 \\
 &\quad + 2 \times 0.2 \times 0.5 \times 300 + 2 \times 0.5 \times 0.3 \times 400 + 2 \times 0.3 \times 0.2 \times 200 \\
 &= 6 + 62.50 + 90 + 60 + 120 + 24 \\
 &= 362.50
 \end{aligned}$$

QUESTION 4(A)

(7 Marks)

A manufacturing unit engaged in the production of automobile parts is considering a proposal of purchasing one of the two Plants, details of which are given below:

Particulars	Plant A	Plant B
Cost	₹ 20,00,000	₹ 38,00,000
Installation Charges	₹ 4,00,000	₹ 2,00,000
Life	20 years	15 years
Scrap Value after full life	₹ 4,00,000	₹ 4,00,000
Output per Minute (units)	200	400

The annual costs of the two Plants are as follows:

Particulars	Plant A	Plant B
Running Hours per annum	2,500	2,500
Costs: Wages	₹ 1,00,000	₹ 1,40,000
Indirect Materials	₹ 4,80,000	₹ 6,00,000
Repairs	₹ 80,000	₹ 1,00,000
Power	₹ 2,40,000	₹ 2,80,000
Fixed Costs	₹ 60,000	₹ 80,000

Will it be advantageous to buy Plant A or Plant B? Substantiate your answer with the help of comparative unit cost of the plants. Assume Interest on Capital at 10 percent. Make other relevant assumptions.

Note: 10 percent Interest Tables

	20 Years	15 Years
Present Value of ₹ 1	0.1486	0.2394
Annuity of ₹ 1 (Capital Recovery Factor with 10% Interest)	0.1175	0.1315

***Sanjay Saraf Sir's Comments:** In class we spent 13*3 i.e 39 hours in completing capital budgeting and what shows up in the examination is an IPCC level sum – choice of mutually exclusive plants with life disparity – you know we do it by the Annual Capital Charge approach (ACC approach). Hence I go on speaking again and again that basics are very important. There is no way we can game the examination. It is good that IPCC FM would be a full 100 marks paper in the new curriculum and I will have ample scope to build a strong base for those who chose SSEI as their education partner.*

SOLUTION 4(A)

Plant A

Initial cost including installation	24,00,000
Less: PV of salvage $[4,00,000 \times 0.1486]$	59,440
	<u>23,40,560</u>
Annualised Cost = $23,40,560 \times \text{Capital Recovery Factor}$ $= 23,40,560 \times 0.1175 =$	2,75,016
Add: Annual Operating Cost	9,60,000
	<u>12,35,016</u>
Annual Production : $2,500 \times 60 \times 200$	3,00,00,000
Hence, Annual Capital Charge (ACC)/unit : $12,35,016 / 3,00,00,000$	0.0412

Plant B

Initial cost including installation	40,00,000
Less: PV of salvage $[4,00,000 \times 0.2394]$	95,760
	<u>39,04,240</u>
Annualised Cost = $39,04,240 \times \text{Capital Recovery Factor}$	

	= 39,04,240 × 0.1315 =	5,13,407
Add: Annual Operating Cost		12,00,000
Annual Capital Charge		17,13,407
Annual Production : 2500 × 60 × 400		6,00,00,000
Hence, Annual Capital Charge (ACC)/unit :		0.0286
17,13,407 / 60000000		

Conclusion: Since, ACC per unit is lower for Plant B, the same should be chosen.

QUESTION 4(B)	(9 Marks)
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An Importer booked a Forward Contract with his Bank on 10th April for USD 2,00,000 due on 10th June @ ₹ 64.4000. The Bank covered its position in the market at ₹ 64.2800.

The Exchange Rates for Dollar in the Inter-Bank Market on 10th June and 20th June were:

	10th June	20th June
Spot USD 1	₹ 63.8000/8200	₹ 63.6800/7200
Spot / June	₹ 63.9200/9500	₹ 63.8000/8500
July	₹ 64.0500/0900	₹ 63.9300/9900
August	₹ 64.3000/3500	₹ 64.1800/2500
September	₹ 64.6000/6600	₹ 64.4800/5600

Exchange Margin 0.10% and interest on Outlay of Funds @12%. The Importer requested on 20th June for extension of contract with due date on 10th August.

Rates rounded to 4 decimal in multiples of 0.0025.

On 10th June, Bank Swaps by selling spot and buying one month forward.

Calculate the following:

- | | |
|------------------------------------|--|
| (i) Cancellation Rate | (iv) Interest on Outlay of Funds, if any |
| (ii) Amount Payable on \$ 2,00,000 | (v) New Contract Rate |
| (iii) Swap Loss | (vi) Total Cost |

Sanjay Saraf Sir's Comments: This is the most difficult and devastating sum in the paper. In the past, we have had lollipop sums on cancellation of forward contract wherein customer simply enters into a reverse contract. Even extension of a forward contract is very simple – customer cancels the old contract and enters into a fresh forward contract for the revised maturity. However, this sum involves extension of a contract after defaulting on the old contract. These are real practical life issues that foreign exchange dealers face and deal with it in accordance with RBI Guidelines and FEDAI Regulations. So, it is difficult for teachers to imagine such a sum coming in the examination and I openly discuss that I had not done similar sum in the class.

Add to all this, the data in the problem is not clear – if customer doesn't turn up on the due date, there is a three days window as per RBI guidelines – so why on Earth would the bank enter into a one month swap. Also, when exchange rates are given for a month, the entire world reads them as end of the month rates. However, this would land us in odd date contracts and proportionate adjustment of swap points – a big ask for students given the time constraints.

A certain warm-up in terms of additional background is required to comprehend the solution that follows –

1. Swap Transaction:

It is a special type of transaction in the FOREX market where there is a spot transaction and a reverse forward transaction. The exchange rates in a swap transaction are chosen in a different manner.

Example: Spot → Rs/\$ 61.30/61.90
3m → Swap pts 80/100

Buy-Sell Swap → Buy Spot at 61.90
Sell 3 months forward @ $61.90 + 0.80 = 62.70$
Sell-Buy Swap → Sell Spot at 61.30 and buy 3 months forward at

$$61.30 + 1 = 62.30$$

2. Odd Date Contracts:

Suppose in the above data we need to enter into a 40 days buy-sell swap.

Spot → Rs/\$ → 61.30/61.90

Swap points on the sell side = 80
for 90 days

$$\therefore \text{Swap points for 40 days} = \frac{80}{90} \times 40 = 35$$

$$\therefore \text{The forward selling rate for swap} = 61.90 + 0.35 = 62.25$$

3. Extension after default

If the customer entered into a forward purchase contract, the bank must have covered itself at a lower rate in the inter-bank market. However, the customer does not turn up on the maturity date. However, the bank has to honour its inter-bank contract.

The bank, therefore, enters into a sell-buy swap – swap gain, if any, is retained while swap loss is charged from the customer.

When the customer later wakes up (after 5-7 days), his contract is cancelled. If this results in a profit to the customer, it is not allowed to be enjoyed by him. Loss, however, is charged to him. Also, if he wants to extend the contract, a fresh forward contract is entered into.

Finally : If the bank has a cash outflow on the maturity date, it will charge interest on the same from the customer.

SOLUTION 4(B)

- (i) Cancellation rate on 20th June would be: $63.6800 - 0.1\% \text{ of } 63.6800$
 $= 63.6163$
 $= 63.6175 \text{ (rounded off)}$
- (ii) The customer has to pay for loss on cancellation $= [64.40 - 63.6175] \times 2,00,000$
 $= \text{Rs } 1,56,500$
- (iii) Swap loss 10th
June

Spot rate $\rightarrow 63.8000 / 63.8200$

Forward rate for July end $\rightarrow 64.0500 / 64.0900$

$\therefore$ Swap points for 50 days $\rightarrow 0.2500 / 0.2700$

Hence, in a sell-buy swap:

Spot rate for selling = 63.8000

Swap points on buy side for 30 days $= 0.2700 \times \frac{30}{50}$

$= 0.1620$

$= 0.1625 \text{ (rounded off)}$

So, the bank bought one month

forward at : $63.8000 + 0.1625$

$$= 63.9625$$

$$\text{Swap loss} = 2,00,000 [63.9625 - 63.8000]$$

$$= \text{Rs } 32,500$$

(iv) Interest on outlay

$$\text{Net cash outflow for the Bank on 10th June} = (64.28 - 63.8000) \times 2,00,000$$

$$= 96,000$$

The bank will charge interest on this amount @12% for 10 days, i.e.

$$96,000 \times 12\% \times 10/365 = 315.60$$

$$= 316.00$$

(v) New Contract Rate

$$20^{\text{th}} \text{ June Spot ask rate} = 63.7200$$

$$30^{\text{th}} \text{ August ask rate} = 64.2500$$

$$\text{So, Swap points for 70 days} = 0.5300$$

$$p \text{ for 50 days} = 0.3786$$

$$= 0.3775$$

$$\text{So, new forward rate booked for the customer} : 63.7200 + 0.3775 = 64.0975$$

$$\text{Add: Commission : } 64.0975 \times 1\% = 0.645$$

$$64.7425$$

(vi) Total Cost

$$\text{Purchase Cost} : 2,00,000 \times 64.7425 = 12,94,8,500$$

$$\text{Add: Swap loss} = 32,500$$

$$\text{Interest on Outlay} = 316$$

$$\text{Loss on cancellation} = 1,56,500$$

$$1,31,37,816$$

Note for Alternate Solution:

If the Institute considers all exchange rates to be for the 10th or 20th of each month respectively, solution will change. We would not be required to calculate any swap points and the entire solution would become considerably easy. Also, you never know they may cancel the contract on the 10th June itself – which I believe is totally wrong. They may even go to the extent of cancelling the forward leg of the swap contract on the 20th June and charge the client for the loss thereon. Students are recommended to the follow the solution that the Institute finally comes up with.

QUESTION 5(A)

(11 Marks)

Bank 'R' was established in 2005 and doing banking in India. The Bank is facing a DO OR DIE situation. There are problems of Gross NPA (Non-Performing Assets) at 40% & CAR/CRAR (Capital Adequacy Ratio/ Capital Risk Weight Asset Ratio) at 4%. The Net Worth of Bank is not good. Shares are not traded regularly. Last week, it was traded @ ₹ 8 per Share.

RBI Audit suggested that Bank has either to liquidate or to merge with other Bank.

Bank 'P' is a professionally managed Bank with low Gross NPA of 5%. It has Net NPA as 0% and CAR at 16%. Its Share is quoted in the market @ ₹ 128 per Share. The Board of Directors of Bank 'P' has submitted a proposal to RBI for takeover of Bank 'R' on the basis of Share Exchange Ratio.

The Balance Sheet details of both the Banks are as follows:

(Amt in ₹ Lakhs)

Liabilities	Bank 'R'	Bank 'P'	Assets	Bank 'R'	Bank 'P'
Paid up Share Capital	140	500	Cash in Hand & with RBI	400	2,500
Reserves & Surplus	70	5,500	Balance with Other Banks	—	2,000
Deposits	4,000	40,000	Investments	1,100	15,000
Other Liabilities	890	2,500	Advances	3,500	27,000
			Other Assets	100	2,000
Total Liabilities	5,100	48,500	Total Assets	5,100	48,500

It was decided to issue Shares at Book Value of Bank 'P' to the Shareholders of Bank 'R'. All Assets and Liabilities are to be taken over at Book Value.

For the Swap Ratio, Weights assigned to different parameters are as follows:

Gross NPA	CAR	Market Price	Book Value
30%	20%	40%	10%

- What is the Swap Ratio based on above Weights?
- How many Shares are to be issued?
- Prepare the Balance Sheet after merger.
- Calculate CAR & Gross NPA % of Bank 'P' after Merger

Sanjay Saraf Sir's Comments: This is a surprising sum involving merger in the banking sector – perhaps influenced by the recent acquisition of ING Vysya Bank by Kotak Mahindra Bank. I always believed that a Chartered Accountant should have tremendous understanding of the nuances in the banking sector like Asset Liability Management, Basel III norms and so on. If, Institute really shares my thought I am obliged and would like to see more questions being asked on the banking sector.

SOLUTION 5(A)

(i)

Particulars	Bank P	Bank R	Swap Ratio
Gross NPA	5%	40%	0.125
Capital Adequacy Ratio	16%	4%	0.25
Market Price	128	8	0.0625
Book Value(BVPS)*	120	15	0.125

$$\text{Weighted Average Swap Ratio} = 0.3 \times 0.125 + 0.2 \times 0.25 + 0.4 \times 0.0625 + 0.1 \times 0.125 = 0.125$$

i.e. 0.125 shares of Bank P for every share of Bank R.

$$* \text{BVPS} = \frac{\text{Paid up Share Capital} + \text{Reserves}}{\text{No. of Shares}}$$

Assuming face value of Rs 10:

$$\text{BVPS of Bank P} = \frac{500 + 5,500}{500 / 10} = ₹ 120$$

$$\text{BVPS of Bank R} = \frac{140 + 70}{140 / 10} = ₹ 15$$

(ii) No. of shares to be issued = $14 \times 0.125 = 1.75$ lakh shares

(iii) Balance Sheet (After Merger)

Paid up Share Capital	517.5
Reserves & Surplus (Bal fig.)	5,092.5
Deposits	44,000
Other Liabilities	3,390
Total Liabilities	53,600
 Cash in hand	 2,900

Balance with bank	2,000
Investments	16,100
Advances	30,500
Other Assets	2,100
	53,600

(iv)

We know that Capital Adequacy Ratio (CAR) =

$$\frac{\text{Tier 1 Cap} + \text{Tier 2 Cap}}{\text{Risk Weighted Assets (RWA)}}$$

$$\text{CAR} = \frac{\text{Capital}}{\text{RWA}}$$

$$\text{RWA} = \frac{\text{Capital}}{\text{CAR}}$$

Bank P – RWA	:	60,00/0.16	=	37,500 lakhs
Bank R – RWA	:	210/0.04	=	<u>5,250</u> „
Combined RWA				<u>42,750</u> „
Capital after Merger			=	6210
∴ CAR after Merger			=	$\frac{6,210}{42,750} \times 100 = 14.53\%$

Gross NPA of Bank R :	3,500 × 40%	1,400
Gross NPA of Bank R :	27,000 × 5%	<u>1,350</u>
Combined NPA		<u>2,750</u>
Combined Advance		30,500
∴ Gross NPA%	$= \frac{2,750}{30,500} \times 100$	= 9.02%

QUESTION 5(B)

(5 Marks)

DEF Ltd has imported goods to the extent of US\$ 1 Crore. The payment terms are 60 days Interest-free Credit. For additional credit of 30 days, Interest at the rate of 7.75% p.a. will be charged.

The Banker of DEF Ltd has offered a 30 days Loan at the rate of 9.5% p.a. Their quote for the Foreign Exchange is as follows:

Spot Rate INR/US\$	62.50
60 days Forward Rate INR/US\$	63.15
90 days Forward Rate INR/US\$	63.45

Which one of the following options would be better?

- (i) Pay the Supplier on 60th day and avail Bank Loan for 30 days
- (ii) Avail the Supplier's offer of 90 days credit.

Sanjay Saraf Sir's Comments: This is a repeated sum on leading and lagging from past papers. Every one should have got it right.

SOLUTION 5(B)

Alt-1) PAY THE SUPPLIER IN 60 DAYS:

- **Step - 1** Amt.payable = \$1crore
- **Step - 2** Buy \$ 60days fwd.requireing = \$1crore * 63.15
= ₹ 6315lac
- **Step - 3** Borrow Rs6315lac after 60days for 30days @ 9.5%pa ie.,.79 % for 1 Month .So.outflow after 90days from now = ₹ 6315lac * 1.0079 = ₹ 63,64,88,850

Alt-2) AVAIL THE SUPPLIER'S OFFER OF 90 DAYS CREDIT:

- **Step - 1** Amt.payable after 90days = \$1crore + 7.75% of \$1crore * 1/12 = \$ 1,00,64,583
- **Step - 2** Buy \$ 90days fwd.@ 63.45.So Rupee outflow after 90days = \$ 1,00,64,583 * 63.45 = ₹ 63,85,97,812.50

CONCLUSION: Hence, the firm should pay in 60days as payable amt is lower in Alt-1 than in Alt-2.

QUESTION 6(A)

(8 Marks)

R Ltd requires a machine for 5 years. There are two alternatives either to take in on lease or buy. The Company is reluctant to invest initial amount for the project and approaches their Bankers. Bankers are ready to finance 100% of its initial required amount at 15% rate of interest for any of the alternatives.

Under Lease Option, upfront Security Deposits of ₹ 5,00,000 is payable

to the Lessor which is equal to the Cost of the Machine. Out of which, 40% shall be adjusted equally against Annual Lease Rent. At the end of life of the machine, expected Scrap Value will be at Book Value after providing Depreciation @ 20% on Written Down Value as is.

Under Buying Option, Loan payment is in equal annual installments of principal amount, which is equal to Annual Lease Rent charges. However in case of Bank Finance for Lease Option, repayment of principal amount equal to Lease Rent is adjusted every year, and the balance at the end of 5th year.

Assume Income Tax Rate is 30%, Interest is payable at the end of every year and Discount Rate is @ 15% p.a. The following Discounting Factors are given:

Year	1	2	3	4	5
Factor	0.8696	0.7562	0.6576	0.5718	0.4972

Which option would you suggest on the basis of Net Present Value?

***Sanjay Saraf Sir's Comments:** This is a challenging sum on leasing – hitherto, we have done sums on lease vs buy. This is a sum on borrow & buy vs borrow & lease. Of course, the language is tough and given the stress during examination, it could be difficult to solve.*

SOLUTION 6(A)

Option 1: Borrow & Buy

Note: Loan Amount = INR5,00,000, repayable in 5 equal Annual Instalments i.e. 1,00,000 p.a. along with Interest at 15% p.a.

Year	1	2	3	4	5
1. Loan Opening Balance	5,00,000	4,00,000	3,00,000	2,00,000	1,00,000
2. Loan Principal Repayment	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
3. Interest at 15% on Opening Balance (15%×1)	75,000	60,000	45,000	30,000	15,000
4. Depreciation at 20% on opening WDV	1,00,000	80,000	64,000	51,200	40,960
5. Tax Deductible Expense = Interest + Depreciation(3+4)	1,75,000	1,40,000	1,09,000	81,200	55,960
6. Tax shield @ 30% (30% × 6)	52,500	42,000	32,700	24,360	21,288

7. Cash Outflow (2+3-6)	1,22,500	1,18,000	1,12,300	1,05,640	93,712
8. Salvage Value	Nil	Nil	Nil	Nil	1,63,840
9. Net Cash Outflow (7-8)	1,22,500	1,18,000	1,12,300	1,05,640	(70,128)
10. PV @ 15%	1,06,526	89,231	73,848	60,404	(34,867)

Therefore, cost of borrow & buy = INR 295,143

Option 2: Borrow & Lease

Year	1	2	3	4	5
1. Annual Lease Rent (= Loan Principal)	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
2. Adjusted against Deposit (5,00,000×40%)/5	40,000	40,000	40,000	40,000	40,000
3. Net Lease Rent Paid (1-2)	60,000	60,000	60,000	60,000	60,000
4. Loan Opening Balance	5,00,000	4,40,000	3,80,000	3,20,000	2,60,000
5. Loan Principal Repayment*	60,000	60,000	60,000	60,000	2,60,000
6. Interest at 15% on Opening Balance (15%×1)	75,000	66,000	57,000	48,000	39,000
7. Tax Deductible Expense = Lease Rent + Interest (1+7)	1,75,000	1,66,000	1,57,000	1,48,000	1,39,000
8. Tax shield @ 30% (30%* 7)	52,500	49,800	47,100	44,400	41,7000
9. Cash Outflow (3+5+6-7)	1,42,500	1,36,200	1,29,900	1,23,600	3,17,300
10. Refund of Security Deposit	Nil	Nil	Nil	Nil	3,00,000
11. Net Cash Outflow (10-11)	1,42,500	1,36,200	1,29,900	1,23,600	17,300
12. PV @ 15%	1,23,918	1,02,994	85,422	70,674	8,601

*We have to repay loan equivalent to net lease rent paid i.e. 60,000 each year. Also, the remainder amount at the end of 5th year has to be paid to close the loan. Therefore amount repaid at the close of 5th year is INR 60,000 + INR 200,000 = INR 260,000

Therefore, cost of borrow & lease = INR 391,610

Conclusion: Since, alternative 1 has a lower cost, the firm should borrow & buy the asset.

QUESTION 6(B)

(8 Marks)

There are two Mutual Funds, viz. D Mutual Funds Ltd and K Mutual Fund Ltd, each having close-ended Equity Schemes.

NAV as on 31-12-2014 of Equity Schemes of D Mutual Fund Ltd is ₹ 70.71 (consisting 99% Equity and remaining cash balance) and that of K Mutual Fund Ltd, is ₹ 62.50 (consisting 96% Equity and balance in cash). Following is the other information for the Equity Schemes.

Particulars	D Mutual Fund Ltd	K Mutual Fund Ltd
Sharpe Ratio	2	3.3
Treynor Ratio	15	15
Standard Deviation	11.25	5

There is no change in portfolios during the next month and Annual Average Cost is ₹ 3 per unit for the Schemes of both the

Mutual Funds. If Share Market goes down by 5% within a month, calculate expected NAV after a month for the schemes of both the Mutual Funds. For calculation, consider 12 months in a year and ignore number of days for particular month.

Sanjay Saraf Sir's Comment: This is a new but simple sum on mutual fund. If students do not know the basic formulae of Sharpe Ratio and Treynor Ratio nobody can help.

SOLUTION 6(B)

$$\text{Sharp Ratio} = \frac{R_p - R_f}{\sigma_p} = 2$$

$$\Rightarrow R_p - R_f = 2 \times 11.25 = 22.50$$

$$\text{Treynor Ratio} = \frac{R_p - R_f}{\beta_p} = 15$$

$$\frac{22.50}{\beta_p} = 15$$

$$\beta_p = \frac{22.50}{15} = 1.5$$

This is the β of entire portfolio including cash.

This means that if market falls by 1%, portfolio will fall by 1.5%.

So, for a fall of 5% in the market portfolio, NAV falls by $5 \times 1.5\% = 7.5\%$.

Hence, NAV after a month before expenses :

70.71 – 7.5% of 70.71	65.41
Less: Monthly cost (3/12)	<u>0.25</u>
	<u>65.16</u>

QUESTION 7	(4 × 4 = 16 Marks)
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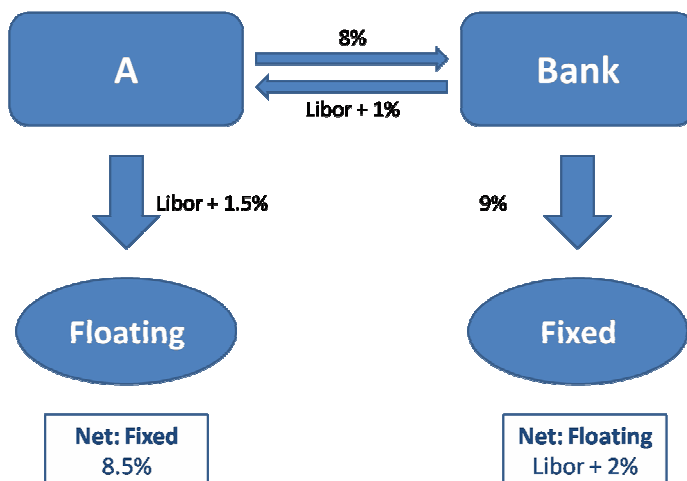
- (a) Explain the meaning of the following relating to Swap transactions:
 - (i) Plain Vanilla Swaps
 - (ii) Basis Rate Swaps
 - (iii) Asset Swaps
 - (iv) Amortising Swaps
- (b) Distinction between Open ended Schemes and Closed ended Schemes.
- (c) State any four assumptions of Black Scholes Model.
- (d) Give the meaning of Caps, Floors and Collar options with respect to Interest.
- (e) Global Depository Receipts.

***Sanjay Saraf Sir's Comments:** I repeatedly announce in class that SFM is predominantly a practical subject and all theory questions would be covered through my normal class notes. Here we need to answer 4 out of 5 questions. Except A – ii iii and iv all are covered in my class notes. So if you leave 7A you can attempt 7B, 7C, 7D and 7E and you are through*

SOLUTION 7

- (A)
- i. **PLAIN VANILLA SWAP** — A swap is a cash-settled OTC derivative under which two counterparties exchange two streams of cash flows. Fixed-for-floating swaps are swaps under which cash flows of a fixed rate loan are exchanged for those of a floating rate loan. Its Floating and Fixed Swap with notional principal and Netting feature.

Example:



The above diagram is explained herein: A has exposure to floating rate liability and is apprehensive of the rate rising, which would in turn increase his cost. Hence, to hedge himself against the risk of rise in interest rate, he enters into a fixed-floating swap with a Bank. As explained in the diagram, A pays floating Libor + 1.5% to meet his liability. On the swap leg, A receives Libor + 1% from Bank and pays 8% to the Bank. Thus, through this swap effectively, A has converted his floating rate liability.

- (ii) **Basis Rate Swap:** A basis swap is a floating-floating interest rate swap. A simple example is a swap of 1-month USD Libor for 6-month USD Libor. A bank that lends at prime but finances itself at Libor would be a natural user of a prime-Libor basis swap. The bank would be using the swap to eliminate basis risk.
- (iii) **Asset Swaps:** An asset swap involves the exchange of interest payments between a real bond position against a floating rate notional position. An asset swaps allows a bond holder to change the cash flow characteristics of its bond position. The long side (the bond holder) of an asset swap pays fixed and receives floating from the short counterparty.

Asset swaps can help hedge different risks, such as credit risk. If A Ltd. own a risky fixed-rate bond position and swap it out for a floating rate cash flow, A Ltd. continues to receive that cash flow even if the bonds default. The price of this insurance is that A Ltd. receive a floating amount based on an interest rate that is discounted from LIBOR.

(iv) **Amortizing Swaps:** Amortising swap is an interest rate swap in which the notional principal for the interest payments declines during the life of the swap for eg. at a rate tied to the prepayment of a mortgage or to an interest rate benchmark such as the London Interbank Offered Rate (Libor).

(B) Differences Between :

OPEN-ENDED	CLOSED-ENDED
• Unit Capital is not fixed	• Unit Capital is fixed
• Fund provides liquidity	• Exchange provides liquidity
• Not listed on any exchange	• Listed on one or more stock exchanges
• Price=NAV subject to Load Feature	• Price is determined by Demand & Supply & therefore, Price is not equal to NAV
• It cannot be traded like a Share as NAV is once in a day affair	• Due to Stock Exchange Listing, it can be traded like a Share

(C) BLACK-SCHOLES MODEL IS BASED ON THE FOLLOWING ASSUMPTIONS :

BSM is an elegant and one of the most celebrated models in finance. However, such elegance has been achieved on the back of the following assumptions:

- Markets are Perfect (ie. perfectly Competitive)
- OPTIONS are European (not American)
- Non-Dividend paying Stock
- The continuously compounded annualised risk-free interest rate denoted by “ r ” is known & Constant
- Annualised volatility of the Stock is known & constant
- Stock Price follows log Normal distribution. This means that the Natural log of the Stock price i.e. $\log_e S$ i.e. $\ln S$ follows Normal Distribution

(D) CAPS , FLOORS & COLLAR WITH RESPECT TO INTEREST :

- An Interest Rate CAP is a Portfolio of CALL Options on LIBOR- Each particular CALL Option being called a CAPLET. It is primarily used for hedging a floating rate borrowing.
- An Interest Rate FLOOR is a Portfolio of PUT Options on LIBOR-Each Particular PUT Option being called FLOOR-LET. It is primarily used to hedge a floating rate investment.

- A Combination of Cap & Floor is known as Collar. Thus, buying a Collar means buying a Cap $[C^+]$ & selling a Floor $[P^-]$. selling a Collar means selling a Cap $[C^-]$ & buying a Floor $[P^+]$. Its is primarily used to create a range within which borrowing cost / yield on investment should lie.

(E) GLOBAL DEPOSITORY RECEIPT (GDR) :

It is used in the case of issues in the Euromarket combined with private placement in US. The primary & secondary market is mainly in London while issues are formally required to be listed in London, most of the trading is on an over-counter basis.

A Global Depositary Receipt (GDR) is a negotiable instrument issued by a depositary bank in international markets typically in Europe and generally made available to institutional investors both outside and within the USA that evidences ownership of shares in a non-US company, enabling the company (issuer) to access investors in capital markets outside its home country. GDRs are often listed in the Frankfurt Stock Exchange, Luxembourg Stock Exchange, and the London Stock Exchange, where they are traded on the International Order Book (IOB).

Each GDR represents a specific number of underlying ordinary shares in the international company, on deposit with a custodian in the applicable home market. GDRs are quoted and traded in U.S. dollars, pay dividends in U.S. dollars and are subject to the trading and settlement procedures of the market in which they are transacted.