CHAPTER 2
RISK MANAGEMENT

Question 1

On Tuesday morning (before opening of the capital market) an investor, while going through his bank statement, has observed that an amount of ₹7 lakhs is lying in his bank account. This amount is available for use from Tuesday till Friday. The Bank requires a minimum balance of ₹1000 all the time. The investor desires to make a maximum possible investment where Value at Risk (VaR) should not exceed the balance lying in his bank account. The standard deviation of market price of the security is 1.5 per cent per day. The required confidence level is 99 per cent.

Given

Standard Normal Probabilities										
z	0.00	.01	.02	.03	0.04	.05	.06	.07	.08	.09
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9998	.9801	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9923	.9925	.9929	.9931	.9932	.9934	.9936

You are required to determine the maximum possible investment.

Nov 20 (4 Marks)

Answer:

Particulars	Amount (₹)
Amount available in bank account	7,00,000
Minimum balance to be kept	1,000
Available amount which can be used for potential investment for 4days	6,99,000
Maximum Loss for 4 days at 99% level	6,99,000
Maximum Loss for 1 day at 99 % level = Maximum Loss for 4 days / $\sqrt{\text{No. of days}}$ = 699000/$\sqrt{4}$	3,49,500
Z Score at 99% Level	2.33
Volatility in terms of Rupees (Maximum Loss/ Z Score at 99% level) = 349500/ 2.33	1,50,000
Maximum Possible Investment (Volatility in Rupees/ Std. Deviation) = 150000/.015	**1,00,00,000**

Question 2

Mr. Bull is a rational risk taker. He takes his position in a single stock for 4 days in a week. He does not take a position on Friday to avoid weekend effect and takes position only for four days in a week i.e. Monday to Thursday. He transfers the amount on Monday morning and withdraws the balance on Friday

morning. He desires to make a maximum investment where Value At Risk (VAR) should not exceed the balance lying in his bank account. The position by his manager, as per standing instructions, is taken on the free balance lying in the bank account in the morning on each Monday.

On Monday morning (before opening of the capital market) he has transferred an amount of ₹11 Crore to his bank account. A fixed deposit also matured on this Monday. The maturity amount of ₹63,42,560 was also credited to his account by the bank in the morning of the Monday. However, Mr. Bull received the intimation of the same in the evening. The bank needs a minimum balance of ₹1,000 all the time. The value of Z score, at the required confidence level of 99 percent is 2.33.

The other information with respect to stocks X and Y, which are under consideration for this week, is as under:

X		Y	
Return	Probability	Return	Probability
6	0.10	4	0.10
7	0.25	6	0.20
8	0.30	8	0.40
9	0.25	10	0.20
10	0.10	12	0.10

You are required to recommend a single stock, where maximum investment can be made.

May 23 (8 Marks)

Answer:

(a) Working Notes:

(1) Security X

Return (1)	Prob. (2)	(1) × (2)	Dev.	Dev.^{2}	Dev.^{2} × Prob.
6	0.10	0.60	-2	4	0.40
7	0.25	1.75	1	1	0.25
8	0.30	2.40	0	0	0
9	0.25	2.25	1	1	0.25
10	0.10	1.00	2	4	0.40
		8.00			**1.30**

Expected Return (R_x) = 8.00%

Variance (σ_X^2) = 1.30

Standard Deviation (σ_X) $= \sqrt{1.30} = \mathbf{1.14}$

(2) Security Y

Return (1)	Prob. (2)	(1) × (2)	Dev.	Dev.^{2}	Dev.^{2} × Prob.
4	0.10	0.40	-4	16	1.60
6	0.20	1.20	-2	4	0.80
8	0.40	3.20	0	0	0
10	0.20	2.00	2	4	0.80
12	0.10	1.20	4	16	1.60
		8.00			**4.80**

Expected Return (R_Y) = 8.00%

Variance (σ_Y^2) = 4.80

Standard Deviation (σ_Y) = $\sqrt{4.80} = 2.19$

	No. of days	X	Y
Amount Transferred		₹110000000	₹110000000
Maturity Proceeds of Fixed Deposit		₹6342560	₹6342560
Amount available in bank account		₹116342560	₹116342560
Minimum balance to be kept		₹1000	₹1000
Available amount which can be used for potential investment for 4 days		₹116341560	₹116341560
Maximum loss for 4 days at 99% Level	4	₹116341560	₹116341560
Maximum loss for 1 day at 99% level			
=			
Maximum loss for 4 days/ $\sqrt{\text{No. of days}}$ = 116341560/ $\sqrt{4}$	1	₹58170780	₹58170780
Z Score at 99% level		2.33	2.33
Volatility in terms of ₹		₹24966000	₹24966000
(Maximum Loss/Z Score at 99% Level)			
Standard Deviation		0.0114	0.0219
Maximum Investment (Volatility in terms of ₹ / SD)		**₹2190000000**	**₹1140000000**

Recommendation: Position should be taken in X.

CHAPTER 5
SECURITY VALUATION

Question 1

NM Ltd. (NML) is aspiring to enter the capital market in a three years' time. The Board wants to attain the target price of ₹70 for its shares at the end of three years. The present value of its shares is ₹52.03. The dividend is expected to grow at a rate of 15% for the next three years.

NML uses dividend growth model for its projections.

The required rate of return is 15%.

You are required to calculate the amount of dividend to be declared by the board in the base year so as to achieve the target price.

Period (t)	1	2	3
PVIF (15%, t)	0.8696	0.7561	0.6575

July 21 (5 Marks)

Answer:

PV of Share = PV of Dividends upto 3 years + PV of Target price of share after 3 years

₹52.03 = PV of Stream of Dividend upto 3 years + 70.00 × 0.6575

PV of Stream of Dividend upto 3 years = ₹52.03 – ₹ 46.03 = ₹6

Let Base Dividend is D_0, then

₹6 = D_0 (1+g) × PVIF (15%,1) + D_0 $(1 + g)^2$ PVIF (15%,2) + D_0 $(1+g)^3$ PVIF(15%,3)

₹6 = D_0 (1.15) × 0.8696 + D_0 $(1.15)^2$ × 0.7561 + D_0 $(1.15)^3$ ×0.6575

₹6 = D_0 + D_0 + D_0 = 3D_0

D_0 = ₹2

Thus, Company should declare a dividend of ₹ 2 in base year.

Question 2

Aggressive Ltd., is proposing to fund its expansion plan of ₹12 crore by making a rights issue. The current market price (CMP) is ₹40. The Board is willing to offer a discount of 20% on the CMP for the rights issue. The Board is also desirous that the fall in Ex – right price of the shares be restricted to 10% of CMP.

You are required to calculate:

(i) The number of new equity shares to be offered for each rights held,

(ii) Theoretical value of right and

(iii) The total number of equity shares to be issued.

July 21 (4 Marks), MTP Oct 22 (8 Marks)

Answer:

(i) Number of new equity shares to be offered for each rights head

Subscription Price

= ₹40 × 0.80

= ₹32 per share

Ex Right Price to be restricted to

= ₹40 × 0.90

= ₹36

Let R be the ratio in which right share to be issued then

$$₹36 = \frac{₹40 + ₹32 \times R}{1 + R}$$

36 + 36R = ₹40 + 32R

R = 1

Thus, 1 equity share be offered for each share held.

(ii) Theoretical Value of right = ₹36 – ₹ 32 = ₹4

(iii)

$$\text{No. of equity share to be issued} = \frac{₹12 \text{ Crore}}{₹32} = 37,50,000 \text{ or } 0.375 \text{ shares}$$

Question 3

Find the current market price of a bond having face value ₹1,00,000 redeemable after 6 year maturity with YTM at 16% payable annually and duration 4.3202 years. Given $1.16^6 = 2.4364$.

Answer:

The formula for the duration of a coupon bond is as follows:

$$\mathbf{D = \frac{1+YTM}{YTM} - \frac{(1+YTM)+t(c-YTM)}{c[(1+YTM)^t-1]+YTM}}$$

Where YTM = Yield to Maturity

c = Coupon Rate

t = Years to Maturity

Accordingly, since YTM = 0.16 and t = 6

$$4.3202 = \frac{1.16}{0.16} - \frac{1.16+6(c\ 0.16)}{c[(1.16)^6-1]+0.16}$$

$$4.3202 = 7.25 - \frac{1.16+(6c-\ 0.96)}{1.4364c+0.16}$$

$$\frac{1.16+6c-\ 0.96}{1.4364c+0.16} = 2.9298$$

0.2 + 6c = 4.20836472 c + 0.468768

1.79163528c = 0.268768

c = 0.150012674

c = 0.15

Where c = Coupon rate

Therefore, current price

= ₹(1,00,000/- × 0.15 × 3.685 + 1,00,000/- × 0.410) = ₹96,275/-

Alternatively, it can also be calculated as follows:

Let x be annual coupon payment. Accordingly, the duration (D) of the Bond shall be

Year	CF	PVIF 16% PV (CF)	PV (CF)	PV(CF) x year
1	X	0.862	0.862x	0.862x
2	X	0.743	0.743x	1.486x
3	X	0.641	0.641x	1.923x
4	X	0.552	0.552x	2.208x
5	X	0.476	0.476x	2.38x
6	X +100000	0.410	0.410x + 41000	2.46x + 246000
			3.684x + 41000	11.319x +246000

$$4.3202 = \frac{11.319x+246000}{3.684x+41000}$$

x = ₹14,983 i.e. 14.98% say 15%

Accordingly, current price of the Bond shall be:

= 1,00,000 × 0.15 × PVAF (16%, 6) + 1,00,000 × PVF (16%, 6)

= 15,000 × 3.685 + 1,00,000 × 0.410

= ₹96,275

Question 4

A bond is held for a period of 45 days. The current discount yield is 6 per cent per annum. It is expected that current yield will increase by 200 basis points and current market price will come down by ₹2.50. Calculate:

(i) Face value of the Bond and

(ii) Bond Equivalent Yield

May 18 (4 Marks)

Answer:

(i) Face Value of the Bond

(a)	Current Market Price*	45 days	6	0.9925
(b)	Current Market Price*	45 days	8	0.9900
(c)	Difference in Price Per Unit (a) – (b)			0.0025
(d)	Difference in Price			₹2.50
(e)	Face Value of Bond (d)/ (c)			₹ 1,000
(f)	Current Market Price (a) × (e)		6	₹992.50

(g)	Current Market Price (b) × (e)		8	₹990.00

* 1 – [(Discount Rate/ 100) × (45/360)]

(ii) Bond Equivalent Yield

At the rate of 6%	$\frac{1,000 - 992.50}{992.50} \times \frac{360}{45} \times 100$ †	6.05
At the rate of 8%	$\frac{1,000 - 990.00}{990.00} \times \frac{360}{45} \times 100$ †	8.08

Alternative Solution if 365 days a year are assumed

(i) Face Value of the Bond

			%	
(a)	Current Market Price*	45 days	6	0.9926
(b)	Current Market Price*	45 days	8	0.9901
(c)	Difference in Price Per Unit (a) – (b)			0.0025
(d)	Difference in Price			₹2.50
(e)	Face Value of Bond (d)/ (c)			₹1,000
(f)	Current Market Price (a) × (e)		6	₹992.60
(g)	Current Market Price (b) × (e)		8	₹990.10

* 1 – [(Discount Rate/ 100) × (45/365)]

(ii) Bond Equivalent Yield

At the rateof 6%	$\frac{1,000 - 992.60}{992.60} \times \frac{365}{45} \times 100$ †	6.05
At the rateof 8%	$\frac{1,000 - 990.10}{990.10} \times \frac{365}{45} \times 100$ †	8.11

† $\frac{FV-CV}{CV} \times \frac{365}{45} \times 100$

Question 5

The Bank BK enters into a Repo for 9 days with Bank NE in 6% Government bonds 2022 for an amount of ₹2 crore. The other relevant details are as follows:

First Leg Payment (Start Proceed)	₹2,00,06,750
Second Leg Payment (Repayment Proceed)	₹2,00,31,759
Initial Margin	1.25%
Days of accrued interest	240

Assume 360 days in a year.

You are required to calculate:

(i) Repo Rate

(ii) Dirty Price and

(iii) Clean Price July 21 (5 Marks), MTP Oct 22 (8 Marks)

Answer:

(i)

$$\text{Second Leg} = \text{Start Proceed} \times \left(1 + \text{Repo Rate} \times \frac{\text{No. of Days}}{360}\right)$$

$$₹2,00,31,759 = ₹2,00,06,750 \times \left(1 + \text{Repo Rate} \times \frac{9}{360}\right)$$

Repo Rate = 0.05 = 5%

(ii)

$$\text{First Leg (Start Proceed)} = \text{Nominal Value} \times \frac{\text{Dirty Price}}{100} \times \frac{\text{100-Initial Margin}}{100}$$

$$₹2,00,06,750 = ₹2,00,00,000 \times \frac{\text{Dirty Price}}{100} \times \frac{100-125}{100}$$

$$10003.375 = 98.75 \times \text{Dirty Price}$$

Dirty Price = ₹101.30

(iii) Dirty Price = Clean Price + Interest Accrued

$$101.30 = \text{Clean Price} + 100 \times \frac{240}{360} \times 6\%$$

Clean Price = ₹97.30

CHAPTER 6
PORTFOLIO MANAGEMENT

Question 1

On the basis of the given information, Mr. XLY wants to create a portfolio that is equally as risky as the market and has ₹20,00,000 to invest. The details of the assets are as follows:

Asset	Investment (₹)	Beta
Stock A	4,00,000	0.70
Stock B	5,00,000	1.10
Stock C	?	1.60
Debenture (D)	?	0

How do you recommend and interpret the risk scenario and investment in all the securities?

MTP Apr 24 (6 Marks), MTP Apr 23 (8 Marks)

Answer:

Let WA, WB, WC and WD be the weights of Stock A, B, C and Debenture respectively.

WA = 4,00,000 ÷ 20,00,000 = 0.20

WB = 5,00,000 ÷ 20,00,000 = 0.25

Now = WC + WD = 1 – WA – WB **= 0.55**

It is given in the question that Portfolio should be as risky as that of the market. It means Beta of the portfolio should be 1.

Hence,

WA (0.7) + WB (1.1) + WC (1.6) + WD (0) = 1

0.2 × 0.7 + 0.25 × 1.1 + 1.6WC + WD × 0 = 1

0.14 + 0.275 + 1.6WC + 0 = 1

1.6WC = 1 – 0.415

1.6 WC = 0.585

WC = 0.585 /1.6 **= 0.3656**

Weight of Debenture (WD) = 1- 0.2 – 0.25 – 0.3656 **= 0.1844**

Hence, Amount invested in Stock C = 0.3656 × 20,00,000 = ₹7,31,200

Amount invested in Debenture D = 0.1844 × 20,00,000 = ₹3,68,800

Thus, amount to be invested in Stock (C) is ₹ 7,31,200 and in Debenture is ₹3,68,800.

CHAPTER 8
MUTUAL FUNDS

Question 1

Mr. Y has invested in the three mutual funds (MF) as per the following details:

Particulars	MF 'X'	MF 'Y'	MF 'Z'
Amount of Investment (₹)	2,00,000	4,00,000	2,00,000
Net Assets Value (NAV) at the time of purchase (₹)	10.30	10.10	10
Dividend Received up to 31.03.2018 (₹)	6,000	0	5,000
NAV as on 31.03.2018 (₹)	10.25	10	10.20
Effective Yield per annum as on 31.03.2018 (percent)	9.66	-11.66	24.15

Assume 1 Year = 365 days

Mr. Y has misplaced the documents of his investment. Help him in finding the date of his original investment after ascertaining the following:

(i) Number of units in each scheme;

(ii) Total NAV;

(iii) Total Yield; and

(iv) Number of days investment held.

May 18 (8 Marks), MTP Apr 19 (8 Marks), MTP Oct 20 (8 Marks), MTP Oct 20 (8 Marks), StudyMat

Answer:

(i) Number of Units in each Scheme

MF 'X'	$\frac{2,00,000}{10.30}$	= 19,417.48
MF 'Y'	$\frac{4,00,000}{10.10}$	= 39,603.96
MF 'Z'	$\frac{2,00,000}{10.00}$	= 20,000.00

(ii) Total NAV on 31.03.2018

MF 'X'	= 19,417.48 × ₹ 10.25	₹1,99,029.17
MF 'Y'	= 39,603.96 × ₹ 10.00	₹3,96,039.60
MF 'Z'	= 20,000.00 × ₹10.20	₹2,04,000.00
Total		₹7,99,068.77

(iii) Total Yield

	Capital Yield	Dividend Yield	Total
MF 'X'	₹1,99,029.17- ₹2,00,000 = - ₹ 970.83	₹6,000	₹5,029.17
MF 'Y'	₹3,96,039.60 - ₹4,00,000 = - ₹3,960.40	Nil	- ₹3,960.40
MF 'Z'	₹2,04,000 - ₹2,00,000 = ₹4,000	₹5,000	₹9,000.00
		Total	**₹10,068.77**

$$\text{Total Yield} = \frac{10,068.77}{8,00,000} \times 100 = 1.2586\%$$

(iv) No. of Days Investment Held

	MF 'X'	MF 'Y'	MF 'Z'
Let No. of days be	X	Y	Z
Initial Investment (₹)	2,00,000	4,00,000	2,00,000
Yield (₹)	5,029.17	-3,960.40	9,000.00
Yield (%)	2.5146	- 0.9901	4.5
Period of Holding (Days)	$\frac{2.5146}{9.66} \times 365 = 95$ Days	$\frac{-0.9901}{-11.66} \times 365 = 31$ Days	$\frac{4.5}{24.15} \times 365 = 68$ Days
Date of Original Investment	**26.12.17**	**28.02.18**	**22.01.18**

Question 2

Mr. S has invested in 3 different Mutual Fund Schemes. The following are the details of the same:

Particulars	Scheme A	Scheme B	Scheme C
Date of Investment	01-06-2022	01-07-2022	01-08-2022
Net Asset Value at Entry Date	₹11.00	₹10.50	₹12.00
Dividend received upto 31-03-23 (₹)	12,500.00	17,000.00	4,000.00
Unit NAV at 31-03-23 (₹)	11.25	11.48	10.80
Increase / (Decrease) in NAV (₹)	22,727.27	93,333.33	(50,000.00)
Effective Rate of Yield per annum	4.2296%	14.6978%	(-) 13.8190%

Ignore Entry/Exit load expenditure.

Assume 365 days in a year. Round off the investment to nearest ₹100.

You are required to calculate:

i. The amount of investments made initially by Mr. S in these schemes.

ii. Number of units invested in the three schemes by Mr. S.

Advise also whether he can continue to hold this investment or can he redeem now.

Nov 23 (8 Marks)

Answer:

(i) Calculation of amount of investment made initially by Mr. S:

	Particulars	Scheme A	Scheme B	Scheme C
(a)	Period of Investment	304 days	274 days	243 days
(b)	Effective Yield p.a.	4.2296%	14.6978%	(-) 13.8190%
(c)	Effective Yield for holding period	3.5227%	11.0334%	(-) 9.2000%
(d)	Dividend Received	₹12,500	₹17,000	₹4000
(e)	Increase /Decrease of NAV	₹22,727.27	₹93,333.33	(₹50,000)
(f)	Total Yield (d+e)	₹35,227.27	₹1,10,333.33	(₹46,000)
(g)	Initial Investment (f/c)	₹10,00,000	₹10,00,000	₹5,00,000
(h)	NAV on date of Investment	₹11.00	₹10.50	₹12.00

(ii) Units invested in three schemes by Mr. S

Particulars	Scheme A	Scheme B	Scheme C
Initial Investment	₹10,00,000	₹10,00,000	₹5,00,000
NAV on date of Investment	₹11.00	₹10.50	₹12.00
Units of Investment	90,909.09	95,238.10	41,666.67
Or	90,909	95,238	41,667

Advise: He should continue to investment in Scheme B and get redeemed both schemes A and C and invest their proceeds in Scheme B.

Question 3

Mr. Kar has invested in three mutual fund schemes as per details below:

	MFX	MFY	MFZ
Amount of investment (₹)	5,50,000	4,20,000	1,00,000
Dividend received up to 31.03.2023 (₹)	10,000	6,000	Nil
NAV as on 31.03.2023 (₹)	11.50	11.00	9.50
Effective yield p.a. as on 31.03.2023	19.345%	22.59%	—36.50%
Holding period	120 days	100 days	50 days

You are required to calculate Net Asset Value (NAV) at the time of purchase assuming 365 days in a year.

May 24 (4 Marks)

Answer:

Formula

The formula to calculate the NAV at the time of purchase is derived from the effective yield formula:

$$\text{Effective Yield} = \left(\frac{\text{Closing NAV} + \text{Dividend Received} - \text{Opening NAV}}{\text{Opening NAV}}\right) \times \left(\frac{365}{\text{Holding Period}}\right) \times 100$$

Rearranging this formula to solve for the Opening NAV gives:

$$\text{Opening NAV} = \frac{\text{Closing NAV} + \text{Dividends Received}}{1 + \left(\frac{\text{Effective Yield}}{100} \text{x} \frac{\text{Holding Period}}{365}\right)}$$

Calculations

1. Mutual Fund MFX

- Amount of Investment: ₹5,50,000
- Dividends Received: ₹10,000
- NAV on 31.03.2023: ₹11.50
- Effective Yield: 19.345% - Holding Period: 120 days

$$\text{Opening NAV} = \frac{11.50 + \frac{10000}{550000/11.50}}{1 + \left(\frac{19.345}{100} \text{x} \frac{120}{365}\right)}$$

Calculating the dividends per unit:

Dividends per Unit = 10,000 / (5,50,000 / 11.50) = 0.209

NAV at Purchase for MFX = (11.50 + 0.209) / (1 + 0.0635) = 11.01

2. Mutual Fund MFY

- Amount of Investment: ₹4,20,000
- Dividends Received: ₹6,000
- NAV on 31.03.2023: ₹11.00
- Effective Yield: 22.59%
- Holding Period: 100 days

Using the formula:

$$\text{Opening NAV} = \frac{11.00 + \frac{6000}{420000/11.00}}{1 + \left(\frac{22.59}{100} \times \frac{100}{365}\right)}$$

Calculating the dividends per unit:

Dividends per Unit = 6,000 / (4,20,000 / 11.00) = 0.157

Plug in the values:

NAV at Purchase for MFY = (11.00 + 0.157) / (1 + 0.0619) = 10.51

3. Mutual Fund MFZ

- Amount of Investment: ₹1,00,000
- Dividends Received: Nil
- NAV on 31.03.2023: ₹9.50
- Effective Yield: -36.50%
- Holding Period: 50 days

$$\text{Opening NAV} = \frac{9.50}{1 + \left(\frac{-36.50}{100} \text{ x } \frac{50}{365}\right)}$$

NAV at Purchase for MFZ = 9.50 / 0.95 = 10.00

Summary

- NAV at Purchase for MFX: ₹11.01

- NAV at Purchase for MFY: ₹10.51

- NAV at Purchase for MFZ: ₹10.00

Question 4

M/s. Enterprise, an Asset Management Company (AMC) on 1.04.2016 has floated a scheme "Dividend Plan". Mr. X, an investor, has invested in the scheme. Dividend is given in the form of units. The details (except the issue price) are as follows:

Date	Dividend (%)	NAV
1.04.2016		?
31.03.2018	20	48
31.03.2019	25	50
31.03.2020	30	45
31.03.2021	-	49
Initial Investment (₹)	₹18,40,000	
Average Profit (₹) over 5 years	₹54,576	

You are required to calculate the issue price of the scheme as on 01.04.2016 to ascertain the capital appreciation. Assume face value of units as ₹10/-

Dec 21 (5 Marks)

Answer:

Particulars	₹
(a) Amount invested by Mr. X	18,40,000
(b) Gains during 5 year [₹54,576 × 5]	2,72,880
(c) Value of investment as on 31/3/21 (a) + (b)	21,12,880
(d) NAV as on 31.03.21	₹49 per unit
(e) Total Number of units as on 31.03.21	₹43,120 units

Let us as assume N, be the no. of units on 31.03.2020 then

$$= \frac{₹10 \times N_1 \times 0.30}{45} + N_1 = 43,120$$

$$\frac{N_1}{15} + N_1 = 43,120$$

N_1=40,425

Now let us assume N2 be number of units on 31.03.19, then

$$=\frac{₹10\times N_2\times 0.25}{50}+N_2=40,425$$

$$\frac{N_2}{20}+N_2=40,425$$

N_2=38,500

Now let us assume N3 be number of units on 31.03.18, then

$$=\frac{₹10\times N_3\times 0.20}{48}+N_3=38,500$$

$$\frac{N_3}{24}+N_3=38,500$$

N_3=36,960

$$\text{NAV as on } 1.04.16=\frac{18,40,000}{36,960}=₹49.78$$

Thus, issue price of unit is ₹49.78

Question 5

M/S. Promising, an AMC, on 01.04.2018 has floated two schemes viz. Dividend Reinvestment Plan and Bonus Plan. Mr. X, an investor has invested in both the schemes. Mr. X, while submitting the tax papers, returned a capital loss on both the plans. Tax officials, suspicious on the claim of Mr. X, decided to launch an investigation and were able to collect the following details (except the issue price):

Date	Dividend (%)	Bonus Ratio	NAV (₹)	
			Dividend Reinvestment Plan	Bonus Plan
01.04.2018			?	?
31.12.2019		1:5	58	70
31.03.2020	12		60	72
31.03.2021	10		68	75
31.03.2022	15		75	66
31.12.2022*		1:3	70	60
31.03.2023			80	71

* In question paper this row got typed before the row of values of 31.03.2022.

Additional details	Dividend Reinvestment Plan	Bonus Plan
Investment (₹)	₹10,80,000	₹10,00,000
Average Profit (₹)	₹1,21,824	
Average Yield (%)		8.40%

Assume face value of unit as ₹10.

You are required to assist the tax officials to calculate the issue price of both the schemes as on 01.04.2018.

May 23 (8 Marks), Nov 20 (10 Marks), RTP May 23

Answer:

i. Dividend Plan

(a)	Average Annual gain over a period of 5 Years	₹1,21,824
(b)	Total gain over a period of 5 years (a*5)	₹6,09,120
(c)	Initial Investment	₹10,80,000
(d)	Total value of investment (b+c)	₹16,89,120
(e)	NAV as on 31.3.2023	₹80
(f)	Number of units at the end of the period as on 31.03.2022 (d/e)	21114

	1	2	3	4 = (2*3)	5	6 = [1/(4+5)]*4	7
Period	Units Held	Rate	Unit value	Dividend	NAV	New Units*	Balance Units Pre Dividend
31.03.2022	21114	0.15	10	1.50	75	414	20700
31.03.2021	20700	0.10	10	1.00	68	300	20400
31.03.2020	20400	0.12	10	1.20	60	400	20000

Issue Price as on 01.04.2018

Investment 1080000/ Units purchased 20000 (c/i) = ₹54

* Let the units issued be X

X = (Closing Units/NAV + Dividend) × Dividend

Alternatively, it can also be computed as follows:

Dividend Plan

Average Profit = ₹121,824

Total Gain = ₹121,824 × 5 = ₹6,09,120

Cost of Acquisition = ₹10,80,000

Maturity Value = ₹16,89,120 (₹6,09,120 + ₹10,80,000)

On 31.03.23 since the NAV of the Fund is ₹80 the units redeemed are:

$$\frac{16,89,120}{80} = 21114$$

Let X be the NAV on 01.04.18

$$\text{Thus, units acquired on } 01.04.18 = \frac{1080000}{X}$$

$$\text{Units added on } 31.03.2020 = \frac{\left\lfloor \frac{1080000}{X} \times 1.2 \right\rfloor}{60} = \left\lfloor \frac{21600}{X} \right\rfloor$$

$$\text{Units added on } 31.03.2021 = \frac{\left\lfloor \frac{1080000}{X} + \frac{21600}{X} \right\rfloor}{68} = \frac{16200}{X}$$

$$\text{Units added on } 31.03.2022 = \left\lfloor \frac{1080000}{X} + \frac{21600}{X} + \frac{16200}{X} \right\rfloor \times \frac{1.5}{75} = \frac{22356}{X}$$

Thus, total units can be shown as follows:

$$\left[\frac{1080000}{X}+\frac{21600}{X}+\frac{16200}{X}+\frac{22356}{X}\right]=21114$$

X = 54, Thus, the issue Price of units under Dividend Plan shall be ₹54

ii. Bonus Plan

(a)	Average Yield	0.084
(b)	Investment	₹10,00,000
(c)	Gain over a period of 5 years (a*b*5)	₹4,20,000
(d)	Market Value as on 31.03.2023 (b + c)	₹14,20,000
(e)	NAV as on 31.03.2023	71
(f)	Total units as on 31.03.2023 (d/e)	20000
(g)	No of units as on 31.03.2022 Pre bonus = 20000*3/ (3 + 1)	15000
(h)	No of units as on 31.12.2019 Pre bonus = 15000*5/ (5 + 1)	12500
(i)	Issue Price as on 01.04.2019	
	Investment ₹10,00,000/ Units purchased 12500 (b/h)	₹80

Alternatively, it can also be computed as follows:

Units on 01.04.2018	X
Units after bonus on 31.12.2019 (1:5)	1.20X
Units after bonus on 31.12.2022 (1:3)	1.60X
Average yield	0.084
Investment	₹10,00,000
Gain for 5 years (10,00,000 × 0.084 × 5)	₹4,20,000
Total Value (₹10,00,000 + ₹4,20,000)	₹14,20,000

Where, 1.6X × ₹71 = ₹14,20,000

Therefore, X = 12,500 units

Issue Price on 01.04.2018 = ₹10,00,000 / 12,500 units = ₹80

Alternatively, it can also be computed as follows:

Average Yield = 8.40%

Investment = ₹10,00,000

Gain over a period of 5 years = ₹10,00,000*0.084*5 = ₹4,20,000

Thus, Maturity Value on 31.03.23 shall be ₹14,20,000

$$\text{No. of units } =\frac{14,20,000}{71}=20,000$$

Now let B be the NAV on 01.04.18 then

$$\text{Units acquired on } 01.04.18 \ =\frac{10,00,000}{B}$$

$$\text{Units added on } 31.12.19=\frac{10,00,000}{B}\times\frac{1}{5}=\frac{2,00,000}{B}$$

$$\text{Units added on } 31.12.21 = \frac{12,00,000}{B} \times \frac{1}{3} = \frac{4,00,000}{B}$$

Thus, total units can be shown as follows:

$$\left[\frac{1000000}{B} + \frac{200000}{B} + \frac{400000}{B}\right] = 20000$$

B = ₹80

Thus, the issue Price of units under Bonus Plan shall be ₹80

Question 6

M/s. Strong an AMC has floated a dividend bonus plan on 1st April, 2016 at a certain net asset value (NAV). The fund has a robust growth and has declared a bonus of 1: 5 (1 bonus unit for 5 right units held) on 30th September 2017 and a second bonus of 1 : 4 (1 bonus unit for 4 right units held) on 30th September 2019.The fund, as on 31st March 2021, has generated an average yield of 17.5%.

Mr. Optimistic has made an investment of ₹15 lakhs in the plan before the declaration of the first bonus and remain invested thereafter.

The following information is also available:

Period (t)	01.04.2016	30.09.2017	30.09.2019	31.03.2021
NAV (₹)	?	85	92	100

You are required to advice to Mr. Optimistic the opening NAV, which is required by him to calculate the capital appreciation.

July 21 (4 Marks), MTP Oct 22 (4 Marks)

Answer:

Particulars	
(a) Amount invested by Mr. Optimistic as on 01/04/2016	₹15,00,000
(b) Gain during 5 years (15,00,000 × 17.5% × 5 years)	₹13,12,500
(c) Value of investment as on 31/03/2021 (a + b)	₹28,12,500
(d) NAV as on 31/03/2021	₹100 per Unit
(e) Total number of units as on 31/03/2021 (c/d)	28125 Units
Total units before second bonus = 28125× 4/5	22500 Units
Total units before first bonus = 22500 × 5/6	18750 Units
NAV as on 01/04/2016 = 15,00,000/18750	₹80 per Unit

Question 7

The Asset Management Company of the mutual fund (MF) has declared a dividend of 9.98% on the units under the dividend reinvestment plan for the year ended 31st March, 2021. The investors are issued additional units for the dividend at the rate of closing Net Asset Value (NAV) for the year as per the conditions of the scheme. The closing NAV was ₹24.95 as on 31st March, 2021. An investor Mr. X who is having 20,800 units at the year-end has made an investment in the units before the declaration of the

dividend and at the rate of opening NAV plus an entry load of ₹0.04. The NAV has appreciated by 25% during the year.

Assume the face value of the unit as ₹10.00.

You are required to calculate:

(i) Opening NAV,

(ii) Number of the units purchased,

(iii) Original amount of the investment. July 21 (5 Marks), MTP Oct 22 (4 Marks)

Answer:

(i) Let N be the opening NAV, then

N (1 + 0.25) = ₹24.95

N = ₹19.96

i.e., beginning NAV = ₹19.96

(ii) Let X be the number of units purchased

Then ending units = 20,800

Accordingly,

$$20800 = X + \frac{0.998X}{24.95}$$

$$20800 = \frac{24.05X + 0.998X}{24.95}$$

X = 20000

Thus, number of units to be purchased = 20,000

(iii) Original amount of investment

Initial NAV	₹19.96
Entry Load	₹0.04
	₹20.00
Number of funds purchased	20,000
Amount of Investment	**₹4,00,000**

CHAPTER 9
DERIVATIVES ANALYSIS & VALUATION

Question 1

Mr. SG sold five 4-Month Nifty Futures on 1st February 2020 for ₹9,00,000. At the time of closing of trading on the last Thursday of May 2020 (expiry), Index turned out to be 2100. The contract multiplier is 75.

Based on the above information calculate:

(a) The price of one Future Contract on 1st February 2020.

(b) Approximate Nifty on 1st February 2020 if the Price of Future Contract on same date was theoretically correct. On the same day Risk Free Rate of Interest and Dividend Yield on Index was 9% and 6% p.a. respectively.

(c) The maximum Contango/ Backwardation.

(d) The pay-off of the transaction.

Note: Carry out calculation on month basis.

RTP Nov 20

Answer:

(i) The price of one Future Contract

Let X be the Price of Future Contract. Accordingly,

No. of Contracts = Contract Value / Price of one Future Contract

$$5 = \frac{₹9,00,000}{X}$$

X (Price of One Future Contract) = ₹1,80,000

(ii)

$$\text{Current Future price of the index} = \frac{₹1,80,000}{75} = 2400$$

Let Y be the current Nifty Index (on 1st February 2020) then

$$\text{Accordingly, } Y+Y(0.09-0.06)\frac{4}{12} = 2400$$

$$\text{and } Y = \frac{2400}{1.01} = 2376.24$$

Hence Nifty Index on 1st February 2020 shall be approximately 2376.

(iii) To determine whether the market is in Contango/ Backwardation first we shall compute Basis as follows:

Basis = Spot Price - Future Price

If Basis is negative the market is said to be in Contango and when it is positive the market is said to be Backwardation.

Since current Spot Price is 2376 and Nifty Futures is 2400, the Basis is negative and hence there is Contango Market and maximum Contango shall be 24 (2400 – 2376).

(iv) Pay off on the Future transaction shall be [(2400 – 2100) × 375] = ₹112500

The Future seller gains if the Spot Price is less than Futures Contract price as position shall be reversed at same Spot price. Therefore, Mr. SG has gained ₹1,12,500/- on the Short position taken.

Question 2

A future contract on BSE Index with 4 months maturity is used to hedge the value of the portfolio over the next 3 months. One future contract for delivery is 50 times of the index.

The following information is available:

Value of the portfolio	₹1,16,00,000
BSE Sensex on 1st January 2022 (Anticipated on 1st September 2021)	58580
BSE Sensex on 1st January 2022 (Anticipated on 1st December 2021)	56641.25
Dividend Yield of Index	6% p.a.
181 days' treasury bills offers a rate of interest	9% p.a.
Beta of the portfolio	1.5

You are required to calculate:

(i) The present value of the Sensex as on 1st September 2021

(ii) Turned out value of the Sensex as on 1st December 2021

(iii) The number of contracts to hedge the portfolio. Dec 21 (8 Marks)

Answer:

(i) Let X be the present value of the Sensex as the 1st September, 2021

$$58{,}580 = X + X[9\% - 6\%] \times \frac{4}{12}$$

$$58{,}580 = X + \frac{X}{100}$$

X = 58,000

Thus, the present value of Sensex as on 1st September 2021 is 58,000

(ii) Let turned out value of Sensex on 1st Dec. 2021 is Y, then

$$56{,}641.25 = Y + Y[9\% - 6\%] \times \frac{1}{12}$$

$$56{,}641.25 = Y + \frac{Y}{100}$$

Y = 56,500

Thus, turned out value of Sensex on 1st December 2021 is 56,500

(iii) No. of Contract to the Hedge Portfolio

$$= \frac{₹1,16,00,000 \times 1.50}{58,580 \times 50} = \textbf{5.95 Say 6 Contracts}$$

Question 3

Mr. Careless was employed with ABC Portfolio Consultants. The work profile of Mr. Careless involves advising the clients about taking position in Future Market to obtain hedge in the position they are holding. Mr. ZZZ, their regular client purchased 100,000 shares of X Inc. at a price of $22 and sold 50,000 shares of A plc for $40 each having beta 2. Mr. Careless advised Mr. ZZZ to take short position in Index Future trading at $1,000 each contract.

Though Mr. Careless noted the name of A plc along with its beta value during discussion with Mr. ZZZ but forgot to record the beta value of X Inc.

On next day Mr. ZZZ closed out his position when:

- Share price of X Inc. dropped by 2%
- Share price of A plc appreciated by 3%
- Index Future dropped by 1.5%

Mr. ZZZ, informed Mr. Careless that he has made a loss of $114,500 due to the position taken. Since record of Mr. Careless was incomplete, he approached you to help him to find the number of contracts of Future contract he advised Mr. ZZZ to be short to obtain a complete hedge and beta value of X Inc.

You are required to find these values. RTP May 15

Answer:

Let the number of contracts in Index future be y and Beta of X Inc. be x. Then,

$$\frac{100,000 \times 22 \times x - 50,000 \times 40 \times 2}{1,000} = -y^*$$

* Negative (-) sign indicates the sale (short) position

2,200,000x – 4,000,000 = -1,000y

Cash Outlay (Outflow)

Purchase of 100,000 shares of X Inc. at a price of $22(100,000 × 22)	2,200,000
Sale of 50,000 shares of A plc for $40 (50,000 × 40)	– 2,000,000
Short Position in Index Futures (1,000 × y)	-1,000y*
Net	**200,000 – 1,000y**

* Negative (-) sign indicates the inflow due to sale (short) position

Cash Inflow

Sale of 100,000 shares of X Inc. (100,000 × 22 × 0.98)	2,156,000
Purchase of 50,000 shares of A plc (50,000 × 40 × 1.03)	– 2,060,000
Long Position in Index Futures (1,000 × y × 0.985)	-985y
Net	**96,000 – 985y**

* Negative (-) sign indicates the outflow due to purchase (long) position

Position on Close Out

(200,000 - 1,000y) – (96,000 - 985y) = 114,500

y = -700

Thus, number of future contract short is 700

Beta of X Inc. can be calculated as follows:

2,200,000x – 4,000,000 = -1000 × 700

2,200,000x = 3,300,000

x = 1.5

Thus, Beta of X Inc. shall be 1.5

CHAPTER 13
BUSINESS VALUATION

Question 1

Fragrance Ltd. has reported a Net Operating Profit after Tax (NOPAT) to Capital Employed as 2.5% plus Weighted Average Cost of Capital (WACC) for the year 31st March 2021. Economic Value added is ₹4 crore as on 31st March 2021.

You are required to calculate:

(i) The amount of Capital Employed

(ii) NOPAT , if WACC is 10%

Dec 21 (4 Marks)

Answer:

(i) EVA = NOPAT - WACC × Capital Employed

₹4 Crore = NOPAT - WACC × Capital Employed

₹4 Crore = [WACC + 0.025] Capital Employed - WACC × Capital Employed

₹4 Crore = Capital Employed [0.025]

Capital Employed = ₹160 Crore

(ii) NOPAT if WACC is 10%

₹4 Crore = NOPAT – 0.10 × ₹160 core

NOPAT = ₹20 crore