NAV = 54.52

Holding Period Return (HPR) $= \frac{(P_1 - P_0) + \text{Income}}{P_0} \times 100$

$= \frac{(98.97 - 54.52) + 6}{54.52} \times 100$

$= 92.53\%$

Annual Return $= 92.53 \times \frac{1}{2} = 46.27\%$

It is assumed that there is no opening Cash.

(iv) Expenses Ratio

$$\text{Expenses Ratio} = \frac{\text{Expense Per Unit}}{\text{Average NAV per Unit}}$$

Expenses per Unit

Expenses [480 + 150 + 38]	= 6.68 Cr.
÷ No. of Units	= 4.20 Cr.
Expenses per Unit	= 1.59
Average NAV $\frac{54.52 + 98.97}{2}$	= 76.75
	$= \frac{1.59}{76.75} \times 100$
	= 2.07%

(2) RETURN CALCULATION

Question – 08

A mutual fund that had a net asset value of ₹ 20 at the beginning of month - made income and capital gain distribution of ₹ 0.0375 and ₹ 0.03 per share respectively during the month, and then ended the month with a net asset value of ₹ 20.06. Calculate monthly return.

(SM TYK – 03)

Solution:

$$\text{Monthly Return} = \frac{(20.06 - 20) + 0.0375 + 0.03}{20} \times 100$$

$$= 0.6375\% \text{ p.m.}$$

Or, $= 7.65\%$ p.a.

Question – 09

An investor purchased 300 units of a Mutual Fund at ₹ 12.25 per unit on 31st December, 2009. As on 31st December, 2010 he has received ₹ 1.25 as dividend and ₹ 1.00 as capital gains distribution per unit.

Required :

(i) The return on the investment if the NAV as on 31st December, 2010 is ₹ 13.00.

(ii) The return on the investment as on 31st December, 2010 if all dividends and capital gains distributions are reinvested into additional units of the fund at ₹ 12.50 per unit.

(SM TYK – 04)

Solution:

(1) Annual Return

$$= \frac{(13 - 12.25) + 1.25 + 1.00}{12.25} \times 100$$

$$= 24.49\%$$

(2) Dividend Reinvestment Plan

2009 — **2010**

300 @ 12.25 = 3,675

1.25 + 1.00 = 2.25

2.25 × 300 = 675

$\frac{675}{12.50}$ = 54 Units

NAV @ 13

354 × 13 = 4,602

Investment = 300 units × 12.25 = 3,675

Dividend & Capital Gain Income
(1.25 + 1) × 300 units = 675

Additional units $= \frac{675}{12.50}$ = 54 units

Ending value = [354 units × 13] = ₹ 4,602

Return $= \frac{4,602 - 3,675}{3,675} \times 100$ = 25.22%

Question – 10

The following information is extracted from Steady Mutual Fund's Scheme:

- Asset Value at the beginning of the month - ₹ 65.78

- Annualized return -15 %

- Distributions made in the nature of Income & Capital gain (per unit respectively). - ₹ 0.50 and ₹ 0.32

You are required to:

(i) Calculate the month end net asset value of the mutual fund scheme (limit your answers to two decimals).

(ii) Provide a brief comment on the month end NAV.

(SM TYK – 06)

Solution:

(i) Calculation of NAV at the end of month

Annualized Return $= HPR \times \frac{12}{1}$

$15 = HPR \times \frac{12}{1}$

$HPR = 15 \times \frac{1}{12}$

= 1.25%

$$1.25\% = \frac{(x - 65.78) + 0.50 + 0.32}{65.78}$$

$$0.82 = x - 65.78 + 0.82$$

$$x = 65.78$$

(ii) There is no change in NAV.

Question – 11

Mr. A has invested in three Mutual Fund Schemes as per details below:

Particulars	MF A	MF B	MF C
Date of investment	01/12/2009	01/01/2010	01/03/2010
Amount of investment	₹ 50,000	₹ 1,00,000	₹ 50,000
Net Assets Value (NAV) at entry date	₹ 10.50	₹ 10	₹ 10
Dividend received upto 31/03/2010	₹ 950	₹ 1,500	Nil
NAV as at 31/03/2010	₹ 10.40	₹ 10.10	₹ 9.80

Required:

What is the effective yield on per annum basis in respect of each of the three schemes to Mr. A upto 31/03/2010?

(SM TYK – 10)

Solution:

Effective Yield

		MFA	MFB	MFC
(a)	Investment	50,000	1,00,000	50,000
(b)	NAV	10.50	10	10
(c)	No of units $\left(\frac{a}{b}\right)$	4,761.90	10,000	5,000
(d)	NAV (31.03.2010)	10.40	10.10	9.80
(e)	Ending value (c × d)	49,524	1,01,000	49,000
(f)	Dividend	950	1500	0
	HPR = $\frac{(e-a)+f}{a} \times 100$	0.95%	2.5%	-2%
	No. of days	121 days	90 days	31 days
	E.Y. = HPR × $\frac{365}{N}$	2.87%	10.14%	-23.55%

Question – 12

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

Particulars	Scheme X	Scheme Y	Scheme Z
Amount of Investment (₹)	2,00,000	4,00,000	2,00,000
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.

(SM TYK – 12, MTP Oct – 2020 & Exam May – 2018) (8 Marks)

Solution:

(i) Number of Units

$$\text{Mutual Fund X} = \frac{2,00,000}{10.30} = 19,417.47$$

$$\text{Mutual Fund Y} = \frac{4,00,000}{10.10} = 39,603.96$$

$$\text{Mutual Fund Z} = \frac{2,00,000}{10} = 20,000$$

(ii) Total NAV

Mutual Fund X	= [19,417.47 × 10.25]	= 1,99,029
Mutual Fund Y	= [39,603.96 × 10]	= 3,96,040
Mutual Fund Z	= [20,000 × 10.20]	= 2,04,000
		= 7,99,069

(iii) Total Yield

$$= \frac{(7,99,029 - 8,00,000) + 11,000}{8,00,000} \times 100$$

$$= 1.25\%$$

(iv) Number of Days

Mutual Fund X

$$HPR = \frac{(1,99,019 - 2,00,000) + 6,000}{2,00,000} \times 100 = 2.51\%$$

$$E.Y. = HPR \times \frac{365}{n}$$

$$9.66 = 2.51 \times \frac{365}{n}$$

$$n = \frac{2.51 \times 365}{9.66}$$

$$= 95 \text{ days}$$

Mutual Fund Y

$$HPR = \frac{(3,96,040 - 4,00,000) + 0}{4,00,000} \times 100 = -0.99\%$$

$$E.Y. = -0.99 \times \frac{365}{n}$$

$$-11.66 = -0.99 \times \frac{365}{n}$$

$$n = \frac{-0.99 \times 365}{-11.66}$$

$$= 31 \text{ days}$$

Mutual Fund Z

$$HPR = \frac{(2,04,000 - 2,00,000) + 5,000}{2,00,000} \times 100 = 4.5\%$$

$$E.Y. = HPR \times \frac{365}{n}$$

$$24.15 = 4.5 \times \frac{365}{n}$$

$$n = \frac{4.5 \times 365}{24.15}$$

$$= 68 \text{ days}$$

Date of Investment [31.03.2018]

Mutual Fund X = 31.03.2018 – 95 days

= 26.12.2017

Mutual Fund Y = 31.03.2018 – 31 days

= 28.02.2018

Mutual Fund Z = 31.03.2018 – 68 days

= 22.01.2018

Question – 13

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

Particulars	MF 'A'	MF 'B'	MF 'C'
Amount of Investment	2,00,000	5,00,000	4,00,000
NAV at the time of purchase	10.00	25.00	20.00

Dividend Yield up to 31.03.2022	3%	5%	4%
NAV as on 31.03.2022	10.50	22.80	20.80
Annualized Yield as on 31.03.2022	9.733%	-11.185%	15%

Assume 1 Year = 365 Days.

Mr. D has misplaced the documents of his investments.

You are required to help Mr. D to find out the following:

(i) Number of units allotted in each scheme,

(ii) Value of his investments as on 31.03.2022,

(iii) Holding period of his investments in number of days as on 31.03.2022

(iv) Dates of original investments

(v) Total Return on investments,

(vi) Assuming past performance of all three schemes will continue for next one year, what action the investor should take? What will be the expected return for the next one year after the above action?

(vii) Will your answer as above point no. (vi) changes if the Mutual fund charges exit load of 5% if the investment is redeemed within one year? If so, advise the investor what and when the action to be taken to optimize the returns.

(Exam May – 2022) (8 Marks)

Solution:

(i) No. of Units

$$A = \frac{2,00,000}{10} = 20,000$$

$$B = \frac{5,00,000}{25} = 20,000$$

$$C = \frac{4,00,000}{20} = 20,000$$

(ii) Value of investment as on 31st March 2022

A = [20,000 × 10.50] = 2,10,000

B = [20,000 × 22.80] = 4,56,000

C = [20,000 × 20.80] = 4,16,000

= 10,82,000

(iii) No. of days

	MFA	MFB	MFC
No. of unit	20,000	20,000	20,000
NAV (31/03/2022)	10.50	22.80	20.80
Investment (31/03/2022)	2,10,000	4,56,000	4,16,000
Dividend	6,000	25,000	16,000
HPR	8%	-3.8%	8%
E.Y.	9.733%	-11.185%	15%
$E.Y. = HPR \times \frac{365}{n}$	300 days	124 days	195 days

(iv) Dates of Original Investment

Mutual Fund A = 31/03/2022 – 300 days = 04/06/2021

Mutual Fund B = 31/03/2022 – 124 days = 27/11/2021

Mutual Fund C = 31/03/2022 – 195 days = 17/09/2021

(v) Total Return

$$\text{Total Return} = \frac{(10,82,000 - 11,00,000) + 47,000}{11,00,000} \times 100$$

= 2.64%

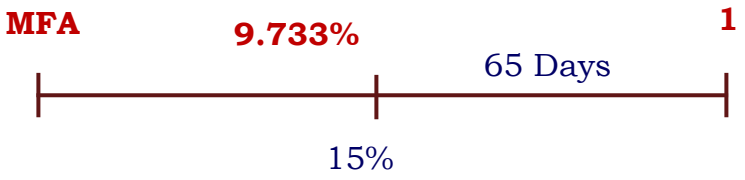
(vi) Unit of Mutual Fund A & Mutual Fund B should be redeemed & invested in Mutual Fund C.

Expected Return of next year = 15% p.a.

(vii)

Extra Return = 15 – (-11.85) = 26.185%

Extra Return for 241 days = $26.185 \times \frac{241}{365}$ = 17.29%



Extra Return = 15 – 9.733 = 5.267%

Extra Return for 65 days = $5.267 \times \frac{65}{365}$ = 0.94%

If Mutual Fund charges exit load 5% then of Mutual Fund B should be redeemed now & unit of Mutual Fund A should be redeemed after 65 days.

Question – 14

Sun Moon Mutual Fund (Approved Mutual Fund) sponsored open-ended equity oriented scheme "Chanakya Opportunity Fund". There were three plans viz. 'A' – Dividend Re-investment Plan, 'B' – Bonus Plan & 'C' – Growth Plan.

At the time of Initial Public Offer on 1.4.1999, Mr. Anand, Mr. Bacchan & Mrs. Charu, three investors invested ₹ 1,00,000 each & chosen 'B', 'C' & 'A' Plan respectively.

The History of the Fund is as follows:

Date	Dividend%	Bonus Ratio	Net Asset Value per Unit (F.V. ₹ 10)		
			Plan A	Plan B	Plan C
28.07.2003	20		30.70	31.40	33.42
31.03.2004	70	5 : 4	58.42	31.05	70.05

31.10.2007	40		42.18	25.02	56.15
15.03.2008	25		46.45	29.10	64.28
31.03.2008		1 : 3	42.45	20.05	60.12
24.03.2009	40	1 : 4	48.10	19.95	72.40
31.07.2009			53.75	22.98	82.07

On 31st July all three investors redeemed all the balance units.

Calculate annual rate of return to each of the investors.

Consider:

1. Long-term Capital Gain is exempt from Income tax.

2. Short-term Capital Gain is subject to 10% Income tax.

3. Security Transaction Tax 0.2 per cent only on sale/redemption of units.

4. Ignore Education Cass.

(SM TYK – 17)

Solution:

Plan A: Dividend Re-Investment Plan

Date	Dividend Rate	Dividend Amount	NAV	Additional Unit	Balance Unit
01/04/1999	-	-	10.00	-	10,000
28/07/2003	20%	20,000	30.70	651.47	10,651.47
31/03/2004	70%	74,560	58.42	1,276.28	11,927.75
30/10/2007	40%	47,711	42.18	1131.13	13,058.88
15/03/2008	25%	32,647	46.45	702.85	13,761.73
24/03/2009	40%	55,047	48.10	1144.43	14,906.16

Redemption (31/07/2009)

Redeemable Value (14,906.16 × 53.75)	8,01,206
(-) STT @ 0.2 %	1,602
Net Amount Received	7,99,604
(-) Short Term Capital Gain Tax 1,144.43 (53.64* – 48.10) × 10%	634

Net Amount 7,98,970

*53.64 = 53.75 – 0.2%

$$\text{HPR} = \frac{7,98,970 - 1,00,000}{1,00,000} \times 100 = 698.97\%$$

$$\text{Annual Return} = 698.97 \times \frac{12}{124} = 67.64\%$$

Plan B: Bonus

	Bonus Units	Balance
01/04/1999	---	10,000
31/03/2004	$10,000 \times \frac{5}{4} = 12,500$	22,500
31/03/2008	$22,500 \times \frac{1}{3} = 7,500$	30,000
24/02/2009	$30,000 \times \frac{1}{4} = 7,500$	37,500

Redemption on 31/7/2009

Sales (37,500 × 22.98) = 8,61,750

(-) STT @ 0.2 % = 1,724

= 8,60,026

(-) Short Term Capital Gain
7,500 (22.93 – 19.95) × 10% = 2,235

= 8,57,791

$$\text{HPR} = \frac{8,57,791 - 1,00,000}{1,00,000} \times 100 = 757.79\%$$

$$\text{Annual Return} = 757.79 \times \frac{12}{124} = 73.33\%$$

Plan C: Growth Plan

Sales Consideration (10,000 × 82.07)	8,20,700
(-) STT @ 0.2%	1,641
	8,19,059

$$\text{HPR} = \frac{8,19,059 - 1,00,000}{1,00,000} \times 100 = 719.06\%$$

$$\text{Annual Return} = 719.06 \times \frac{12}{124} = 69.59\%$$

Question – 15

A mutual fund company introduces two schemes i.e. Dividend plan (Plan-D) and Bonus plan (Plan-B). The face value of the unit is ₹ 10. On 1-4-2005 Mr. K invested ₹ 2,00,000 each in Plan-D and Plan-B when the NAV was ₹ 38.20 and ₹ 35.60 respectively. Both the plans matured on 31-3-2010.

Particulars of dividend and bonus declared over the period are as follows:

Date	Dividend	Bonus Ratio	Net Asset Value (₹)	
			Plan D	Plan B
30-09-2005	10		39.10	35.60
30-06-2006		1:5	41.15	36.25
31-03-2007	15		44.20	33.10
15-09-2008	13		45.05	37.25
30-10-2008		1:8	42.70	38.30
27-03-2009	16		44.80	39.10
11-04-2009		1:10	40.25	38.90
31-03-2010			40.40	39.70

What is the effective yield per annum in respect of the above two plans?

(SM TYK – 18)

Solution:

Dividend Reinvestment Plan

Date	Dividend Rate	Dividend Amt	NAV	Units	Balance Units
01/04/2005	-	-	-	-	5,235.60

30/09/2005	10	5236	39.10	133.90	5,369.50
31/03/2007	15	8054	44.20	182.22	5,551.72
15/09/2008	13	7217	45.05	160.20	5,711.92
27/03/2009	16	9139	44.80	204	5,915.92

Investment value 31/03/2010

$5,915.92 \times 40.40$ = 2,39,003

Annual Return

$$HPR = \frac{2,39,003 - 2,00,000}{2,00,000} \times 100 = 19.50\%$$

$$\text{Annual Return} = 19.50 \times \frac{1}{5} = 3.90\%$$

Effective Yield

Alternative 1

$2,00,000\ (1 + r)^5 = 2,39,003$

$$(1 + r)^5 = \frac{2,39,003}{2,00,000}$$

$1 + r = (1.195)^{1/5}$

$r = 0.0363 - 1$

$= 0.0363$ or 3.63%

Alternative 2

IRR Method (NPV Method)

IRR is a rate where NPV = 0

2%

$$\frac{2,39,003}{(1.02)^5} - 2,00,000 = 16,472$$

5%

$$\frac{2,39,003}{(1.05)^5} - 2,00,000 = -12,735$$

Interpolation Method (NPV Method)

2 %	16,472
5%	- 12,735
3%	29,207

EY $= 2 + \left(\frac{3}{29,207} \times 16,472\right)$

$= 3.69$ % P.a.

Bonus Plan

No of Units $= \frac{2,00,000}{35.60} = 5,617.98$

Date	Pre Bonus	Bonus Ratio	Bonus Unit	Balance
30/06/2006	5,617.98	1:5	$5617.98 \times \frac{1}{5} = 1123.60$	6,741.58
30/10/2008	6,741.58	1:8	$6741.58 \times \frac{1}{8} = 842.69$	7,584.28
11/04/2009	7,584.28	1:10	$7584.28 \times \frac{1}{10} = 758.428$	8,342.708

Investment Value on 31/03/2010 $= (8,342.708 \times 39.70)$

$= 3,31,205.5$

HPR $= \frac{3,31,205 - 2,00,000}{2,00,000} \times 100 = 65.60\%$

Annual Return $= 65.60 \times \frac{1}{5} = 13.12\%$

Alternative

Effective Yield

EY $= 2,00,000\ (1 + r)^5 = 3,31,205$

$$r = \left[\left(\frac{3,31,205}{2,00,000}\right)^{\frac{1}{5}} - 1\right] \times 100$$

$$= 10.61\%$$

Question – 16

A mutual fund company introduces two schemes i.e. Dividend plan (Plan-D) and Bonus plan (Plan-B). The face value of the unit is ₹ 10. On 1-4-2018 Mr. K invested ₹ 2,00,000 each in Plan-D and Plan-B when the NAV was ₹ 38.20 and ₹ 35.60 respectively. Both the plans matured on 31-3-2023.

Particulars of dividend and bonus declared over the period are as follows:

Date	Dividend %	Bonus Ratio	Net Asset Value (₹)	
			Plan D	Plan B
30-09-2018	10	---	39.10	35.60
30-06-2019	---	1:5	41.15	36.25
31-03-2020	15	---	44.20	33.10
15-09-2021	13	---	45.05	37.25
30-10-2021	---	1:8	42.70	38.30
27-03-2022	16	---	44.80	39.10
11-04-2022	---	1:10	40.25	38.90
31-03-2023	---	---	40.40	39.70

Evaluate the Effective Yield Per Annum in respect of the above two plans.

Note:

1. Use following PV Factors: PVIF (2%,5) = 0.9057, PVIF (4%,5) = 0.8219, PVIF (8%,5) = 0.6806, PVIF (13%,5) = 0.5428

2. Round off calculations upto 2 decimal points.

(MTP April – 2024)

Solution:

Plan – D

Unit acquired = $\frac{2,00,000}{38.20}$ = 5,235.60

Date	Units Held	Dividend		Reinvestment Rate	New Units	Total Units
		%	Amount			
01.04.2018				39.10	133.90	5235.60
30.09.2018	5235.60	10	5235.60	44.20	182.22	5369.50
31.03.2020	5369.50	15	8054.25	45.05	160.20	5551.72
15.09.2021	5551.72	13	7217.24	44.80	204.00	5711.92
27.03.2022	5711.92	16	9139.07			5915.92
31.03.2023	Maturity Value	(₹ 40.40 × 5915.92)				₹ 2,39,003.17
	Less: Cost of Acquisition					₹ 2,00,000.00
	Total Gain					₹ 39,003.17

$$\therefore \text{Approximate Effective Yield} = \frac{₹39,003.17}{₹2,00,000} \times \frac{1}{5} \times 100 = 3.90\%$$

Now more accurate effective yield can be computed by using the IRR method as follows:

NPV at 4% = - ₹ 2,00,000 + ₹ 1,96,436.71 = - ₹ 3,563.29

NPV at 2% = - ₹ 2,00,000 + ₹ 2,16,465.17 = ₹ 16,465.17

$$\text{IRR} = \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR-NPV at HR}} (\text{HR} - \text{LR})$$

$$= 2\% + \frac{16465.17}{16465.17 - 3563.29} (4\% - 2\%) = 3.64\%$$

Plan – B

Date	Particulars	Calculation Working	No. of Units	NAV (₹)
01.04.2018	Investment	₹ 2,00,000/35.60 =	5617.98	35.60
30.06.2019	Bonus	5617.98/5 =	1123.60	36.25
			6741.58	
30.10.2021	"	6741.58/8 =	842.70	38.30
			7584.28	
11.04.2022	"	7584.28/10 =	758.43	38.90
			8342.71	
31.03.2023	Maturity Value	8342.71 × ₹ 39.70 =		3,31,205.59
	Less: Investment			2,00,000.00
	Gain			1,31,205.59

$$\therefore \text{Approximate Effective Yield} = \frac{₹1,31,205.59}{₹2,00,000} \times \frac{1}{5} \times 100 = 13.12\%$$

Now more accurate effective yield can be computed by using the IRR method as follows:

NPV at 13% = - ₹ 2,00,000 + ₹ 1,79,778.39 = - ₹ 20,221.61

NPV at 8% = - ₹ 2,00,000 + ₹ 2,25,418.52 = ₹ 25,418.52

$$\text{IRR} = \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} (\text{HR} - \text{LR})$$

$$= 8\% + \frac{25{,}418.52}{25{,}418.52 - (-20{,}221.61)} (13\% - 8\%) = 10.78\%.$$

Question – 17

During the year 2017 an investor invested in a mutual fund. The capital gain and dividend for the year was ₹ 3.00 per unit, which were re-invested at the year end NAV of ₹ 23.75. The investor had total units of 26,750 as at the end of the year. The NAV had appreciated by 18.75% during the year and there was an entry load of ₹ 0.05 at the time when the investment was made.

The investor lost his records and wants to find out the amount of investment made and the entry load in the mutual fund.

(Exam November – 2018) (5 Marks)

Solution:

NAV at the Beginning of the Year

$$\text{NAV} = \frac{23.75}{1.1875} = ₹ 20$$

Number of units

Let assume number of unit at beginning of the year be x

$$= x + \frac{3x}{23.75} = 26{,}750$$

$$= \frac{23.75x + 3x}{23.75} = 26{,}750$$

$$x = 26{,}750 \times \frac{23.75}{23.75 + 3} = 23{,}750 \text{ Units}$$

Investment Amount = 23,750 Units × 20.50

= 4,76,187.50

Entry Load = 23,750 Units × 0.50

= 1,187.50

Question – 18

M/S. Corpus an AMC, on 1.04.2015 has floated two schemes viz. Dividend Plan and Bonus Plan. Mr. X, an investor has invested in both the schemes. The following details (except the issue price) are available:

Date	Dividend (%)	Bonus Ratio	NAV	
			Dividend Plan	Bonus Plan
01-04-2015			?	?
31-12-2016		1:4 (One unit on 4 units held)	47	40
31-03-2017	12		48	42
31-03-2018	10		50	39
31-12-2018		1:5 (One unit on 5 units held)	46	43
31-03-2019	15		45	42
31-03-2020	-		49	44

Additional details

Investment (₹)	₹ 9,20,000	₹ 10,00,000
Average Profit (₹)	₹ 27, 748.60	
Average Yield (%)		6.40

Your are required to calculate the issue price of both the schemes as on 01.04.2015.

(Exam November – 2020) (10 Marks)

Solution:

1. Dividend Plan

Particulars	Amount
Investment (01/04/15)	9,20,000
(+) Profit (27,748.60 × 5)	1,38,743
Investment (31/3/2020)	10,58,743