

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

**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

**31/7/2009**

$$\text{Sales } (37,500 \times 22.98) = 8,61,750$$

$$\begin{aligned} (-) \text{ STT @ } 0.2\% &= 1,724 \\ \hline &= 8,60,026 \end{aligned}$$

$$\begin{aligned} (-) \text{ Short Term Capital Gain} \\ 7,500 (22.93 - 19.95) \times 10\% &= 2,235 \\ \hline &= 8,57,791 \end{aligned}$$

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

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

**Plan C: Growth Plan**

$$\text{Sales Consideration } (10,000 \times 82.07) = 8,20,700$$

$$\begin{aligned} (-) \text{ STT @ } 0.2\% &= 1,641 \\ \hline &= 8,19,059 \end{aligned}$$

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

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

**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	Duration	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**

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

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

**Effective Yield**

**Alternative 1**

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

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

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

$$r = 0.0363 - 1$$

$$= 0.0363 \text{ or } 3.63\%$$

**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)**

$$2 \% \quad 16,472$$

$$5 \% \quad - 12,735$$

$$3 \% \quad \frac{29,207}{\phantom{00000}}$$

$$\begin{aligned} \text{EY} &= 2 + \left(\frac{3}{29,207} \times 16,472\right) \\ &= 3.69 \% \text{ P.a.} \end{aligned}$$

**Bonus Plan**

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

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

$$\begin{aligned} \text{Investment Value on 31/03/2010} &= (8,342.708 \times 39.70) \\ &= 3,31,205.5 \end{aligned}$$

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

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

**Alternative**

**Effective Yield**

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

$$\begin{aligned} r &= \left[ \left(\frac{3,31,205}{2,00,000}\right)^{\frac{1}{5}} - 1 \right] \times 100 \\ &= 10.61\% \end{aligned}$$

**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:**

- Use following PV Factors: PVIF (2%,5) = 0.9057, PVIF (4%,5) = 0.8219, PVIF (8%,5) = 0.6806, PVIF (13%,5) = 0.5428
- Round off calculations upto 2 decimal points.

**(MTP April – 2024)**

**Solution:**

**Plan – D**

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

Date	Units Held	Dividend		Reinvest ment 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

$$\therefore \text{Approximate Effective Yield} = \frac{\text{₹}9,003.17}{\text{₹}2,00,000} \times \frac{1}{5} \times 100 = 3.90\%$$

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

$$\text{NPV at 4\%} = - \text{₹} 2,00,000 + \text{₹} 1,96,436.71 = - \text{₹} 3,563.29$$

$$\text{NPV at 2\%} = - \text{₹} 2,00,000 + \text{₹} 2,16,465.17 = \text{₹} 16,465.17$$

$$\begin{aligned} \text{IRR} &= \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} (\text{HR} - \text{LR}) \\ &= 2\% + \frac{16465.17}{16465.17 - 3563.29} (4\% - 2\%) = 3.64\% \end{aligned}$$

**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 =	<u>1123.60</u>	36.25
30.10.2021	"	6741.58/8 =	6741.58 <u>842.70</u>	38.30
11.04.2022	"	7584.28/10 =	7584.28 <u>758.43</u>	38.90
31.03.2023	Maturity Value	8342.71 × ₹ 39.70 =	8342.71	3,31,205.59
	Less: Investment			<u>2,00,000.00</u>
	Gain			<u>1,31,205.59</u>

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

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

$$\text{NPV at 13\%} = - \text{₹} 2,00,000 + \text{₹} 1,79,778.39 = - \text{₹} 20,221.61$$

$$\text{NPV at 8\%} = - \text{₹} 2,00,000 + \text{₹} 2,25,418.52 = \text{₹} 25,418.52$$

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

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

**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)**

**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

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

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

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

$$\begin{aligned} \text{Investment Amount} &= 23,750 \text{ Units} \times 20.50 \\ &= 4,76,187.50 \end{aligned}$$

$$\begin{aligned} \text{Entry Load} &= 23,750 \text{ Units} \times 0.50 \\ &= 1,187.50 \end{aligned}$$

**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

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

**(Exam November – 2020)**

**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
÷ NAV (31/3/2020)	49
No. of units	21607 units

Date	Dividend Per Unit	NAV	Post Dividend Units	Working	Pre Dividend Unit
31/3/2019	1.50	45	21,607	$21,607 \times \frac{1.5}{45 + 1.5} = 697$	20,910
31/3/2018	1.00	50	20,910	$20,910 \times \frac{1}{51} = 410$	20,500
31/3/2017	1.20	48	20,500	$20,500 \times \frac{1.20}{49.20} = 500$	20,000

$$\text{Issued Price} = \frac{9,20,000}{20,000 \text{ Units}} = ₹ 46$$

**2. Bonus Plan**

Investment 01/04/2015	10,00,000
Profit [10,00,000 × 6.4%] × 5	3,20,000
Investment	<u>13,20,000</u>
÷ NAV (31/03/2020)	44
No. of units (31/03/2020)	<u>30,000 units</u>

Date	Post Bonus Unit	Bonus Unit	Pre Bonus
31/3/2018	30,000	$30,000 \times \frac{1}{6} = 5,000$	25,000
31/12/2016	25,000	$25,000 \times \frac{1}{5} = 5,000$	20,000

$$\text{NAV (1/4/2015)} = \frac{₹ 10,00,000}{20,000} = ₹ 50 \text{ Issue Price}$$

**Question - 19**

Mr. X on 01.07.2007, during the initial offer of some Mutual Fund invested in 10,000 units having face value of ₹ 10 for each unit. On 31.03.2008, the dividend paid by the M.F. was 10% and Mr. X found that his annualized yield was 153.33%. On 31.03.2009, 20% dividend was given. On 31.03.2010, Mr. X redeemed all his balance of 11,296.11 units when his annualized yield was 73.52%. What are the NAVs as on 31.03.2008, 31.3.2009 and 31.03.2010?

