

Question 1: RTP May 2023

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
1.04.2015			?	?
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 1.04.2015.

Solution 1:**(i) Dividend Plan**

(a) Average Annual gain over a period of 5 Years	₹ 27748.60
(b) Total gain over a period of 5 years (a*5)	₹ 138743
(c) Initial Investment	₹ 920000
(d) Total value of investment (b+c)	₹ 1058743
(e) NAV as on 31.3.2020	₹ 49
(f) Number of units at the end of the period as on 31.03.2019 (d/e)	21607

	1	2	3	4 = (2*3)	5	6 = (1*4) (4+5)	7
Period	Units held	Rate	Unit value	Dividend	NAV	New Units*	Balance Units Pre Dividend
31.03.2019	21607	0.15	10	1.5	45	697	20910
31.03.2018	20910	0.1	10	1	50	410	20500
31.03.2017	20500	0.12	10	1.2	48	500	20000

Issue Price as on 01.04.2015 Investment 920000/ Units purchased 20000 (c/i)
= ₹ 46

* Let the units issued be X

$X = (\text{Closing Units}/\text{NAV} + \text{Dividend}) \times \text{Dividend}$

(ii) Bonus Plan

(a) Average Yield	0.064
(b) Investment	₹ 1000000
(c) Gain over a period of 5 years (a*b*5)	₹ 320000
(d) Market Value as on 31.03.2019 (b + c)	₹ 1320000
(e) NAV as on 31.03.2020	₹ 44
(f) Total units as on 31.03.2020 (d/e)	30000
(g) No of units as on 31.03.2018 Pre bonus = 30000*5/ (5 + 1)	25000
(h) No of units as on 31.12.2016 Pre bonus = 25000*4/ (4 + 1)	20000
(i) Issue Price as on 01.04.2015 Investment 1000000/ Units purchased 20000 (b/h)	₹ 50

Question 2: MTP 1 May 2023 (March)

Mr. K has invested in three Mutual fund schemes as per details below:

	Scheme A	Scheme B	Scheme C
Date of Investment	01-12-2018	01-01-2019	01-03-2019

Amount of Investment	₹ 5,00,000	₹ 10,00,000	₹ 5,00,000
Net Asset Value at entry date	₹ 10.50	₹ 10.00	₹ 10.00
Dividend received up to 31-03-2019	₹ 9,500	₹ 15,000	₹ 5,000
NAV as at 31-3-2019	₹ 10.40	₹ 10.10	₹ 9.80

You are required to calculate the effective yield on per annum basis in respect of each of the three schemes to Mr. K upto 31-03-2019, taking the year consisting of 365 days.

Provide a brief comment on the course of action he should take for future period.

(Calculation should be upto three decimal places)

Solution 2:

(i) Calculation of effective yield on per annum basis in respect of three mutual fund schemes to Mr. K up to 31-03-2019:

Particulars	Scheme A	Scheme B	Scheme C
(a) Investments	₹ 5,00,000	₹ 10,00,000	₹ 5,00,000
(b) Opening NAV	₹ 10.50	₹ 10.00	₹ 10.00
(c) No. of units (a/b)	47,619.048	1,00,000	50,000
(d) Unit NAV on 31-3-2019	₹ 10.40	₹ 10.10	₹ 9.80
(e) Total NAV on 31-3-2019 (c x d)	₹ 4,95,238.099	₹ 10,10,000	₹ 4,90,000
(f) Increase / Decrease of NAV (e - a)	(₹ 4,761.901)	₹ 10,000	(₹ 10,000)
(g) Dividend Received	₹ 9,500	₹ 15,000	₹ 5,000
(h) Total yield (f + g)	₹ 4,738.099	₹ 25,000	(₹ 5,000)
(i) Number of Days	121	90	31
(j) Effective yield p.a. (h/a x 365/i x 100)	2.859%	10.139%	(-) 11.774%

Comments: Since the Effective Yield in Scheme C is negative and that of Scheme A is much lower than Scheme B, it is advised that Mr. K should redeem the investments in Scheme A and Scheme C and the proceeds should be invested in Scheme B in the next period.

Question 3: MTP 1 May 2023 (March)

On 1st January, 2020, an open ended scheme of mutual fund had outstanding units of 300 lakhs with a NAV of ₹ 20.25. At the end of January 2020, it had issued 5 lakhs units at an opening NAV plus a load of 2%, adjusted for dividend equalisation. At the end of February 2020, it had repurchased 2.5 lakhs units at an opening NAV less 2% exit load adjusted for dividend equalisation. At the end of March 2020, it had distributed 70 per cent of its available income.

In respect. of January - March quarter, the following additional information is available:

Value appreciation of the portfolio	₹ 460 lakhs
Income for January	₹ 24 lakhs
Income for February	₹ 36 lakhs
Income for March	₹ 47 lakhs

You are required to calculate:

- Income available for distribution
- Issue price at the end of January
- Repurchase price at the end of February
- Closing value of Net Assets at the end of March

Solution 3:

(i) Calculation of Income Available for Distribution

	Units (Lakh)	Per Unit (₹)	Total (₹ In lakh)
Income from January	300	0.0800	24.0000
Add: Dividend equalization collected on issue	5	0.0800	0.4000
	305	0.0800	24.4000
Add: Income from February		0.1180	36.0000
	305	0.1980	60.4000
Less: Dividend equalization paid on repurchase	2.50	0.1980	(0.4950)
	302.50	0.1980	59.9050

Add: Income from March		0.1554	47.0000
	302.50	0.3534	106.9050
Less: Dividend Paid		0.2474	(74.8335)
	302.50	0.1060	32.0715

(ii) **Calculation of Issue Price at the end of January**

	₹
Opening NAV	20.250
Add: Entry Load 2% of ₹ 20.25	0.405
	20.655
Add: Dividend Equalization collected on Issue Price	0.080
	20.735

(iii) **Calculation of Repurchase Price at the end of February**

	₹
Opening NAV	20.250
Less: Exit Load 2% of ₹ 20.250	(0.405)
	19.845
Add: Dividend Equalization paid on Issue Price	0.198
	20.043

(iv) **Closing NAV at the end of March**

		₹ (Lakh)
Opening Net Asset Value (₹ 20.25 × 300)		6075.000
Portfolio Value Appreciation		460.000
Issue of Fresh Units (5 × 20.735)		103.675
Income Received (24 + 36 + 47)		107.000
		6745.675
Less: Units repurchased (2.5 × 20.043)	- 50.1075	
Income Distributed	-74.8335	(-124.941)
Closing Net Asset Value		6620.734
Closing Units (300 + 5 – 2.5) lakh		302.50 lakh
Closing NAV as on 31st March		₹ 21.8867

Question 4: MTP 2 May 2023 (April)

The following are the details of three mutual funds of MFL:

	Growth Fund	Balanced Fund	Regular Fund	Market
Average Return (%)	7	6	5	9
Variance	92.16	54.76	40.96	57.76
Coefficient of Determination	0.3025	0.6561	0.9604	

The yield on 182 days Treasury Bill is 9 per cent per annum. You are required to:

- Rank the funds as per Sharpe's measure.
- Rank the funds as per Treynor's measure.
- Compare the performance with the market.

Solution 4:

	Growth Fund	Balanced Fund	Regular Fund	Market
Average Return (%)	7	6	5	9
Variance	92.16	54.76	40.96	57.76
Std. Deviation	9.60	7.40	6.40	7.60
Coefficient of Determination	0.3025	0.6561	0.9604	
Coefficient of Correlation	0.55	0.81	0.98	
Beta (β)	$\frac{9.60}{7.60} \times 0.55$ = 0.695	$\frac{7.40}{7.60} \times 0.81$ = 0.789	$\frac{6.40}{7.60} \times 0.98$ = 0.825	

(i) Ranking of Funds as per Sharpe Ratio

$$\text{Sharpe Ratio} = \frac{\text{Expected Return} - \text{Risk Free Rate of Return}}{\text{Standard Deviation}}$$

	Growth Fund	Balanced Fund	Regular Fund
Sharpe Ratio	$\frac{7-9}{9.60} = -0.208$	$\frac{6-9}{7.40} = -0.405$	$\frac{5-9}{6.40} = -0.625$
Ranking	1	2	3

(ii) Ranking of Funds as per Treynor Ratio

$$\text{Treynor Ratio} = \frac{\text{Expected Return} - \text{Risk Free Rate of Return}}{\text{Standard Deviation}}$$

	Growth Fund	Balanced Fund	Regular Fund
Treynor Ratio	$\frac{7-9}{0.695} = -2.878$	$\frac{6-9}{0.789} = -3.802$	$\frac{5-9}{0.825} = -4.85$
Ranking	1	2	3

(iii) Comparison with performance of market

Sharpe Ratio	$\frac{9-9}{7.60} = 0$
Treynor Ratio	$\frac{9-9}{1} = 0$

Thus, the performance of funds is very poor since all values are negative as compared to market performance.

Question 5: MTP 2 May 2023 (April)

There are two Mutual Funds viz. D Mutual Fund 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:

Particular	Equity Schemes	
	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.

Solution 5:**Working Notes:**

(i) Decomposition of Funds in Equity and Cash Components

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
NAV on 31.12.14	₹ 70.71	₹ 62.50
% of Equity	99%	96%
Equity element in NAV	₹ 70	₹ 60
Cash element in NAV	₹ 0.71	₹ 2.50

(ii) Calculation of Beta

(a) D Mutual Fund Ltd.

$$\text{Sharpe Ratio} = 2 = \frac{E(R) - R_f}{\sigma_D} = \frac{E(R) - R_f}{11.25}$$

$$E(R) - R_f = 22.50$$

$$\text{Treynor Ratio} = 15 = \frac{E(R) - R_f}{\beta_D} = \frac{22.50}{\beta_D}$$

$$\beta_D = 22.50/15 = 1.50$$

(b) K Mutual Fund Ltd.

$$\text{Sharpe Ratio} = 3.3 = \frac{E(R) - R_f}{\sigma_K} = \frac{E(R) - R_f}{5}$$

$$E(R) - R_f = 16.50$$

$$\text{Treynor Ratio} = 15 = \frac{E(R) - R_f}{\beta_K} = \frac{16.50}{\beta_K}$$

$$\beta_K = 16.50/15 = 1.10$$

(iii) Decrease in the Value of Equity

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Market goes down by	5.00%	5.00%
Beta	1.50	1.10
Equity component goes down	7.50%	5.50%

(iv) Balance of Cash after 1 month

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Cash in Hand on 31.12.14	₹ 0.71	₹ 2.50
Less: Exp. Per month	₹ 0.25	₹ 0.25
Balance after 1 month	₹ 0.46	₹ 2.25

NAV after 1 month

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Value of Equity after 1 month		
70 x (1 - 0.075)	₹ 64.75	-
60 x (1 - 0.055)	-	₹ 56.70
Cash Balance	0.46	2.25
	65.21	58.95

Question 6: May 2023

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 the face value of the 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.

Solution 6:**(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

$X = (\text{Closing Units}/\text{NAV} + \text{Dividend}) \times \text{Dividend}$

Alternatively, it can also be computed as follows:

(i) Dividend Plan

Average Profit = ₹ 121,824

Total Gain = ₹ 121,824 x 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

$$\text{Thus, units acquired on 01.04.18} = \frac{10,80,000}{X}$$

$$\text{Units added on 31.03.2020} = \frac{\left[\frac{10,80,000}{X} \times 1.2 \right]}{60} = \left[\frac{21600}{X} \right]$$

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

Units added on 31.03.2022 =

$$\left[\frac{1080000}{X} + \frac{21600}{X} + \frac{16200}{X} \right] \times \frac{1.5}{75} = \frac{22356}{X}$$

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

(b) Investment

(c) Gain over a period of 5 years (a*b*5)

(d) Market Value as on 31.03.2023 (b + c)

(e) NAV as on 31.03.2023

(f) Total units as on 31.03.2023 (d/e)

(g) No of units as on 31.03.2022 Pre bonu:

(h) No of units as on 31.12.2019 Pre bonu:

(i) Issue Price as on 01.04.2019

Investment ₹ 10,00,000/ Units purchased 12

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 x 0.084 x 5)	₹ 4,20,000
Total Value (₹ 10,00,000 + ₹ 4,20,000)	<u>₹ 14,20,000</u>

Where, $1.6X \times ₹ 71 = ₹ 14,20,000$
 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
 No. of units = $\frac{14,20,000}{71} = 20,000$
 Now let B be the NAV on 01.04.18 then
 Units acquired on 01.04.18 = $\frac{10,00,000}{B}$
 Units added on 31.12.19 = $\frac{10,00,000}{B} \times \frac{1}{5} = \frac{2,00,000}{B}$
 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:

$$\left[\frac{10,00,000}{B} + \frac{2,00,000}{B} + \frac{4,00,000}{B} \right] = 20,000$$

$$B = ₹ 80$$
 Thus, the issue Price of units under Bonus Plan shall be ₹ 80.

Question 7: May 2023

Index Funds is one of the Special Funds. What are other funds in Special Funds category?

Solution 7:

The other funds in Special Fund category are as follows:

- International Funds:** A mutual fund located in India to raise money in India for investing globally.
- Offshore Funds:** A mutual fund located in India to raise money globally for investing in India.
- Sector Funds:** They invest their entire fund in a particular industry e.g. utility fund for utility industry like power, gas, public works.
- Money Market Funds:** These are predominantly debt-oriented schemes, whose main objective is preservation of capital, easy liquidity and moderate income. To achieve this objective, liquid funds invest predominantly in safer short-term instruments like Commercial Papers, Certificate of Deposits, Treasury Bills, G-Secs etc.
- Fund of Funds:** Fund of Funds (FoF) as the name suggests are schemes which invest in other mutual fund schemes. The concept is popular in markets where there are number of mutual fund offerings and choosing a suitable scheme according to one's objective is tough. Just as a mutual fund scheme invests in a portfolio of securities such as equity, debt etc., the underlying investments for a FoF is the units of other mutual fund schemes, either from the same fund family or from other fund houses.
- Capital Protection Oriented Fund:** The term 'capital protection oriented scheme' means a mutual fund scheme which is designated as such and which endeavours to protect the capital invested therein through suitable orientation of its portfolio structure. The orientation towards protection of capital

originates from the portfolio structure of the scheme and not from any bank guarantee, insurance cover etc.

- (g) **Gold Funds:** The objective of these funds is to track the performance of Gold. The units represent the value of gold or gold related instruments held in the scheme. Gold Funds which are generally in the form of an Exchange Traded Fund (ETF) are listed on the stock exchange and offers investors an opportunity to participate in the bullion market without having to take physical delivery of gold.
- (h) **Quant Funds:** Quant Fund works on a data-driven approach for stock selection and investment decisions based on a pre-determined rules or parameters using statistics or mathematics-based models.

Question 8: RTP Nov 2023

On 01-07-2010, Mr. X Invested ₹ 50,000/- at initial offer in Mutual Funds at a face value of ₹ 10 each per unit. On 31-03-2011, a dividend was paid @ 10% and annualized yield was 120%. On 31-03-2012, 20% dividend and capital gain of ₹ 0.60 per unit was given. Mr. X redeemed all his 6271.98 units when his annualized yield was 71.50% over the period of holding. Calculate NAV as on 31-03-2011, 31-03-2012 and 31-03-2013.

Note: For calculations consider a year of 12 months.

Solution 8:

Yield for 9 months $(120\% \times 9/12) = 90\%$

Market value of Investments as on 31-03-2011 = ₹ 50,000 + (₹ 50,000 × 90%) = ₹ 95,000

Therefore, NAV as on 31-03-2011 = $(₹ 95,000 - ₹ 5,000)/5,000 = ₹ 18.00$

Since dividend was reinvested by Mr. X, additional units acquired = $\frac{₹ 5,000}{₹ 18} = 277.78$ unit

Therefore, units as on 31-03-2011 = $5,000 + 277.78 = 5,277.78$

Alternatively, units as on 31-03-2011 = $(₹ 95,000/₹ 18) = 5,277.78$

Dividend as on 31-03-2012 = $5,277.78 \times ₹ 10 \times 0.2$

= ₹ 10,555.56

Capital Gain $(5,277.78 \times ₹ 0.60)$

= ₹ 3,166.67

= ₹ 13,722.23

Let X be the NAV on 31-03-2012, then number of new units reinvested will be ₹ 13,722.23/X.

Accordingly, 6,271.98 units shall consist of reinvested units and 5,277.78 (as on 31-03-2011).

Thus, by way of equation it can be shown as follows:

$$6,271.98 = \frac{₹ 13,722.23}{X} \times ₹ 13,722.23$$

Therefore, NAV as on 31-03-2012 = ₹ 13,722.23 / (6,271.98 – 5,277.78) = ₹ 13.80

NAV as on 31-03-2013 = ₹ 50,000 (1 + 0.715 × 33/12) / 6,271.98 = ₹ 23.65

Question 9: MTP 1 Nov 2023 (September)

Mr. A is having 500 units of a Mutual Fund which has shown its per unit NAV of ₹ 9.75 and ₹ 12.35 at the beginning and at the end of the year respectively. The Mutual Fund has given two options:

- Receive a payment of ₹ 1.25 per unit as dividend and ₹ 0.80 per unit as a capital gain, or
- Reinvestment of these distributions at an average NAV of ₹ 11.05 per unit.

Evaluate the difference it would make in terms of return available and which option is preferable?

Solution 9:

(i) Returns for the year

(All changes on a Per -Unit Basis)

Change in Price: $(₹ 12.35 - ₹ 9.75)$ ₹ 2.60

Dividends received: ₹ 1.25

Capital gains distribution ₹ 0.80

Total reward ₹ 4.65

Holding period reward: $\frac{4.65}{9.75} \times 100 = 47.69\%$

(ii) When all dividends and capital gains distributions are re-invested into additional units of the fund @ (₹ 11.05/unit)

Dividend + Capital Gains per unit = ₹ 1.25 + ₹ 0.80 = ₹ 2.05
 Total received from 500 units = ₹ 2.05 x 500 = ₹ 1,025/-.
 Additional Units Acquired (₹ 1,025/₹ 11.05) = 92.76 Units.
 Total No. of Units = 500 units + 92.76 units = 592.76 units.
 Value of 592.76 units held at the end of the year
 = 592.76 units x ₹ 12.35 = ₹ 7,320.59
 Price Paid for 500 Units at the beginning of the year
 = 500 units x ₹ 9.75 = ₹ 4,875.00

Holding Period Reward

₹ (7320.59 – 4875.00) = ₹ 2445.59

Holding Period Reward = $\frac{2445.59}{4875.00} \times 100 = 50.17\%$

Conclusion: Since the holding period reward is more in terms of percentage in option-two i.e., reinvestment of distributions at an average NAV of ₹11.05 per unit, Mr. A should opt for reinvestment option.

Question 10: MTP 2 Nov 2023 (September)

A mutual fund made an issue of 5,00,000 units of ₹ 10 each on January 01, 2020. No entry load was charged. It made the following investments:

Particulars	₹
25,000 Equity shares of ₹ 100 each @ ₹ 160	40,00,000
7% Government Securities	4,00,000
9% Debentures (Unlisted)	2,50,000
10% Debentures (Listed)	2,50,000
	49,00,000

During the year, dividends of ₹ 6,00,000 were received on equity shares. Interest on all types of debt securities was received as and when due. At the end of the year equity shares and 10% debentures are quoted at 175% and 90% respectively of face value. Other investments are valued at par.

Find out the Net Asset Value (NAV) per unit given that operating expenses paid during the year amounted to ₹ 2,50,000. Also find out the NAV, if the Mutual fund had distributed a dividend of ₹ 0.80 per unit during the year to the unit holders.

Solution 10:

In order to find out the NAV, the cash balance at the end of the year is calculated as follows-

Particulars	₹
Cash balance in the beginning (₹ 50 lakhs – ₹ 49 lakhs)	1,00,000
Dividend Received	6,00,000
Interest on 7% Govt. Securities	28,000
Interest on 9% Debentures	22,500
Interest on 10% Debentures	25,000
	7,75,500
(-) Operating expenses	2,50,000
Net cash balance at the end	5,25,500
Calculation of NAV	₹
Cash Balance	5,25,500
7% Govt. Securities (at par)	4,00,000
25,000 equity shares @ ₹ 175 each	43,75,000
9% Debentures (Unlisted) at cost	2,50,000
10% Debentures @90%	2,25,000
Total Assets	57,75,500
No. of Units	5,00,000
NAV per Unit	₹ 11.55

Calculation of NAV, if dividend of ₹ 0.80 is paid –

Net Assets (₹ 57,75,500 – ₹ 4,00,000) ₹ 53,75,500
 No. of Units 5,00,000
 NAV per unit ₹10.75

Question 11: MTP 2 Nov 2023 (October)

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 ₹ 16 lakhs in the plan before the declaration of the first bonus and remain invested thereafter.

The following information is also available :

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

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

Solution 11:

Particulars	
(a) Amount invested by Mr. Optimistic as on 01/04/2016	₹ 16,00,000
(b) Gain during 5 years (16,00,000 x 17.5% x 5 years)	₹ 14,00,000
(c) Value of investment as on 31/03/2021 (a + b)	₹ 30,00,000
(d) NAV as on 31/03/2021	₹ 100 per Unit
(e) Total number of units as on 31/03/2021 (c / d)	30000 Units
Total units before second bonus = 30,000 x 4/5	24000 Units
Total units before first bonus = 24,000 x 5/6	20000 Units
NAV as on 01/04/2016 = 16,00,000/ 20000	₹ 80 per Unit

Question 12: Nov 2023

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:

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

Solution 12:

(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 13: RTP May 2024

There are two Mutual Funds viz. D Mutual Fund Ltd. and K Mutual Fund Ltd. Each having close ended equity schemes.

NAV as on 31-12-2022 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:

Particular	Equity Schemes	
	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Sharpe Ratio	2	3.3
Treynor Ratio	15	15
Standard deviation	11.25	5
Risk free rate of return (Rf)	7%	

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.

Required:

(i) Tabulate the expected NAVs of both the schemes if the share market goes down by 5% within a month.

(ii) Advise which mutual fund should an investor choose from the perspective of risk per unit of return.

Note: For calculation purposes, consider 12 months in a year and ignore the number of days for a particular month.

Solution 13:

Working Notes:

(I) Decomposition of Funds in Equity and Cash Components

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
NAV on 31.12.14	₹ 70.71	₹ 62.50
% of Equity	99%	96%
Equity element in NAV	₹ 70	₹ 60
Cash element in NAV	₹ 0.71	₹ 2.50

(II) Calculation of Beta

(a) D Mutual Fund Ltd.

$$\text{Sharpe Ratio} = 2 = \frac{E(R) - R_f}{\sigma_D} = \frac{E(R) - R_f}{11.25}$$

$$E(R) - R_f = 22.50$$

$$\text{Treynor Ratio} = 15 = \frac{E(R) - R_f}{\beta_D} = \frac{22.50}{\beta_D}$$

$$\beta_D = 22.50/15 = 1.50$$

(b) K Mutual Fund Ltd.

$$\text{Sharpe Ratio} = 3.3 = \frac{E(R) - R_f}{\sigma_K} = \frac{E(R) - R_f}{5}$$

$$E(R) - R_f = 16.50$$

$$\text{Treynor Ratio} = 15 = \frac{E(R) - R_f}{\beta_K} = \frac{16.50}{\beta_K}$$

$$\beta_K = 16.50/15 = 1.10$$

(III) Decrease in the Value of Equity

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Market goes down by	5.00%	5.00%
Beta	1.50	1.10
Equity component goes down	7.50%	5.50%

(IV) Balance of Cash after 1 month

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Cash in Hand on 31.12.14	₹ 0.71	₹ 2.50
Less: Exp. Per month	₹ 0.25	₹ 0.25
Balance after 1 month	₹ 0.46	₹ 2.25

(i) NAV after 1 month

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Value of Equity after 1 month		
70 x (1 - 0.075)	₹ 64.75	-
60 x (1 - 0.055)	-	₹ 56.70
Cash Balance	0.46	2.25
	₹ 65.21	₹ 58.95

(ii) Computation to find out more beneficial Mutual fund:

	D Mutual Fund	K Mutual Fund
E(R) - RF (a)	22.50	16.50
Risk free rate of return (b)	7	7
Expected Return (a+b) = (c)	29.50	23.50
Standard deviation (d)	11.25	5
Risk per unit Return (d/c)	0.38	0.21

Question 14: MTP 2 May 2024 (April)

XYZ Plan, a hedge fund currently has assets of ₹ 40 crore. Mr. A, the manager of the fund charges a fee of 0.10% of portfolio assets. In addition to it he charges an incentive fee of 2%. The incentive will be linked to gross return each year in excess of the portfolio maximum value since the inception of the fund. The maximum value the fund achieved so far since inception of the fund about one and half year ago was ₹ 42 crores.

Evaluate:

- (i) Benchmark Return to make Mr. A eligible for incentive fee.
- (ii) The fee payable to Mr. A if return on the fund this year turns out to be :
 - (1) 29% (2) 4.5%

Solution 14:

- (i) Benchmark Return = $(42 \text{ crore} - 40 \text{ crore}) / 40 \text{ crore} \times 100\% = 5\%$

- (ii) (1) **If return is 29%**

	₹
Fixed fee (A) 0.10% of ₹ 40 crore	4,00,000
New Fund Value $(1.29 \times ₹ 40 \text{ crore})$	51.60 crore
Excess Value of best achieved $(51.60 \text{ crore} - 42.00 \text{ crore})$	9.60 crore
Incentive Fee $(2\% \text{ of } 9.60 \text{ crores})$ (B)	19,20,000
Total Fee (A)+(B)	23,20,000

- (2) **If return is 4.5%**

	₹
Fixed (A) 0.10% of ₹ 40 crore	4,00,000
New Fund Value $(1.045 \times ₹ 40 \text{ crore})$	41.80 crore
Excess Value of best achieved $(41.80 \text{ crore} - 42.00 \text{ crore})$	(₹ 0.20 crore)
Incentive Fee (as does not exceed best achieved) (B)	Nil
Total Fee (A)+(B)	4,00,000

Question 15: MTP 2 May 2024 (April)

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.

Solution 15:**Plan – D**

$$\text{Unit acquired} = \frac{2,00,000}{38.20} = 5235.60$$

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

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

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

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

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

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

$$= 3.64\%$$

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

11.04.2022	"	7584.28/10 =	7584.28 758.43	38.90
31.03.2023	Maturity Value Less: Investment Gain	8342.71 x ₹ 39.70 =	8342.71	3,31,205.59 2,00,000.00 1,31,205.59

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

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

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

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

$$\text{IRR} = \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} (\text{HR} - \text{LR}) = 8\% + \frac{25418.52}{25418.52 - (-20221.61)} (13\% - 8\%) = 10.78\%$$

Question 16: May 2024

Mr. Kar has invested in three mutual funds 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.

Solution 16:

	MFX	MFY	MFZ
A. Amt. of Investment	5,50,000	4,20,000	1,00,000
B. Effective Yield p.a.	19.345%	22.59%	-36.50%
C. Period of Holding	120 Days	100 Days	50 Days
D. Return for Holding Period	34,980	25,993.97	-5,000
E. Dividend Received	10,000	6,000	-
F. Total Gain in NAV (D-E)	24,980	19,993.97	-5,000
G. Total NAV at End of Holding Period (A+F)	5,74,980	4,39,993.97	95,000
H. NAV (p.u.) as on 31.3.23	11.50	11.00	9.50
I. No. of units (G/H)	49,998.26	39,999.45	10,000
J. NAV (p.u.) at the time of Purchase (A/I)	11.00	10.50	10.00

Alternative Solution

MFX

$$\frac{(11.50 - X) \times \frac{5,50,000}{X} + 10,000}{5,50,000} = \frac{0.19345}{365} \times 120$$

$$\text{Or } \frac{63,25,000}{X} - 550,000 + 10,000 = 0.0636 \times 550,000$$

$$\text{Or } \frac{63,25,000}{X} = 5,74,980$$

$$\text{Or } X = \frac{63,25,000}{5,74,980} = 11.00$$

MFY

$$\frac{(11.00 - Y) \times \frac{4,20,000}{Y} + 6,000}{4,20,000} = \frac{0.2259}{365} \times 100$$

$$\text{Or } \frac{46,20,000}{Y} - 420,000 + 6,000 = 0.062 \times 420,000$$

$$\text{Or } \frac{46,20,000}{Y} = 440,040$$

$$\text{Or } Y = \frac{46,20,000}{4,40,040} = 10.50$$

MFZ

$$\frac{(9.50 - Z) \times \frac{1,00,000}{Z}}{1,00,000} = \frac{-0.3650}{365} \times 50$$

$$\text{Or } \frac{9,50,000}{Z} - 100000 = -0.05 \times 100000$$

$$\text{Or } \frac{9,50,000}{Z} = 95000$$

$$\text{Or } Z = \frac{9,50,000}{95,000} = 10.00$$

Question 17: May 2024

Mr. A, has invested in the Growrich Mutual Fund's Scheme. The details of the Mutual Fund Scheme are given below:

Asset Value at the beginning of the month	₹78.50
Annualized Return	16%
Distribution made in the nature of Income and Capital Gain (per unit respectively)	₹0.40 & ₹0.30

You are required to:

- Calculate the month end Net Asset Value of the Growrich Mutual Fund Scheme (Round off to 2 decimals)
- Comment briefly on the Month end NAV.

Solution 17:

(i) Calculation of NAV at the end of month:

Given Annual Return = 16%

Hence Monthly Return = 1.33% ®

$$r = \frac{(NAV_t - NAV_{t-1}) + I_t + G_t}{NAV_{t-1}}$$

$$0.0133 = \frac{(NAV_t - ₹78.50) + ₹0.40 + ₹0.30}{₹78.50}$$

$$1.04405 = NAV_t - ₹77.80$$

$$NAV_t = ₹78.84$$

(ii) COMMENT- Closing NAV is increased by ₹ 0.34 i.e. (₹ 78.84 – ₹ 78.50). So, there is slight change in NAV.

Question 18: MTP 2 Nov 2024 (October)

On 1st April, an open ended scheme of mutual fund had 300 lakh units outstanding with Net Assets Value (NAV) of ₹ 18.75. At the end of April, it issued 6 lakh units at opening NAV plus 2% load, adjusted for dividend equalization. At the end of May, 3 Lakh units were repurchased at opening NAV less 2% exit load adjusted for dividend equalization. At the end of June, 70% of its available income was distributed.

In respect of April-June quarter, the following additional information are available:

	₹ in lakh
Portfolio value appreciation	425.47
Income of April	22.950
Income for May	34.425
Income for June	45.450

You are required to calculate

- Income available for distribution;
- Issue price at the end of April;
- repurchase price at the end of May; and
- net asset value (NAV) as on 30th June.

Solution 18:**Calculation of Income available for Distribution**

	Units (Lakh)	Per Unit(₹)	Total (₹ In lakh)
Income from April	300	0.0765	22.9500
Add: Dividend equalization collected on issue	6	0.0765	0.4590
	306	0.0765	23.4090
Add: Income from May		0.1125	34.4250

Less: Dividend equalization paid on repurchase	306 3	0.1890 0.1890	57.8340 (0.5670)
Add: Income from June	303	0.1890 0.1500	57.2670 45.4500
Less: Dividend Paid	303	0.3390 0.2373	102.7170 (71.9019)
	303	0.1017	30.8151

Calculation of Issue Price at the end of April

	₹
Opening NAV	18.750
Add: Entry Load 2% of ₹ 18.750	0.375
	19.125
Add: Dividend Equalization paid on Issue Price	0.0765
	19.2015

Calculation of Repurchase Price at the end of May

	₹
Opening NAV	18.750
Less: Exit Load 2% of ₹ 18.750	(0.375)
	18.375
Add: Dividend Equalization paid on Issue Price	0.1890
	18.564

Closing NAV

		₹ (Lakh)
Opening Net Asset Value (₹ 18.75 × 300)		5625.0000
Portfolio Value Appreciation		425.4700
Issue of Fresh Units (6 × 19.2015)		115.2090
Income Received (22.950 + 34.425 + 45.450)		102.8250
		6268.504
Less: Units repurchased (3 × 18.564)	-55.692	
Income Distributed	-71.9019	(-127.5939)
Closing Net Asset Value		6140.9101
Closing Units (300 + 6 – 3) lakh		303 lakh
∴ Closing NAV as on 30th June		₹ 20.2670

Question 19: Nov 2024

Mr X invested ₹1,00,000 at a face value of ₹10 per unit in a dividend reinvestment plan in a mutual fund during its initial public offering on 1 July, 2022. On 31 March, 2023, the mutual fund declared a dividend of 10%. At that time Mr X calculated his holding period return to be 115%.

On 31st March, 2024 the mutual fund declared a dividend of 20% and Mr. X redeemed all his investment and calculated his holding period return to be 193.134%.

You are required to calculate

- The NAVs as on 31.03.2023 and 31.03.2024.
- Calculate the total units redeemed.