Basics of AFM

- Ratio Analysis
- Interpretation of Dividend
- Interpretation of Interest Rate
- Basic Mathematics
- Time Value of Money

Ratio Analysis

(1) Income Statement [For AFM Purpose Only] :-

Sales	xxx
(-) COGS	(xxx)
Gross Profit | Gross Income | Gross Margin	xxx
(-) Operating Expenses [Eg: Admin. Selling & Distribution Expense]	(xxx)
EBIT | PBIT | Operating Profit | Operating Income | Operating Margin	xxx
(-) Interest Expense	(xxx)
EBT | PBT | Taxable Income	xxx
(-) Tax	(xxx)
EAT | PAT | Net Profit | Net Income | Net Margin	xxx
(-) Dividend on Preference Shares	(xxx)
EATESH [Earnings Available to Equity Shareholders]	xxx
(-) Dividend on Equity Shares	(xxx)
Retained Earnings | Undistributed Profits	xxx

(2) Balance Sheet [For AFM Purpose Only] :-

Equity & Liabilities	Assets
Share Capital [Always Assume it as Equity Share Capital in AFM]	Fixed Assets
Reserves & Surplus	Current Assets
Debt [Eg: Debentures, Bonds, Borrowings, Loan, etc.]	Preliminary Expenses
Current Liabilities [Eg: Creditors, Provisions, etc.]	
xxx	xxx

(3.) Total Assets = Fixed Assets + Current Assets

(4.) Total Liabilities = Debt + Current Liabilities

(5.) Working Capital = Current Assets - Current Liabilities

(6.) Net Worth | Book Value | Shareholders funds | Equity

⇒ Share Capital + Reserves & Surplus - Preliminary Expenses

OR

Total Assets - Total Liabilities

(7.) Capital Employed

⇒ Share Capital + Reserves & Surplus + Debt - Preliminary Expenses

OR

Equity + Debt

OR

Total Assets - Current Liabilities

(8.) GP Ratio = $\frac{\text{Gross Profit}}{\text{Sales}} \times 100$

(9.) COGS Ratio = $\frac{\text{COGS}}{\text{Sales}} \times 100$ OR 100% - GP Ratio

(10.) Operating Profit Ratio = $\frac{\text{EBIT}}{\text{Sales}} \times 100$

(11.) Operating Ratio = $\frac{\text{COGS + Operating Expenses}}{\text{Sales}} \times 100$

(12.) Net Profit Ratio = $\frac{\text{Net Profit}}{\text{Sales}} \times 100$

(13.) Debt Ratio or Debt to Capital Employed Ratio = $\frac{\text{Debt}}{\text{Equity + Debt}}$

(14.) Equity Ratio or Equity to Capital Employed Ratio = $\frac{\text{Equity}}{\text{Equity + Debt}}$

(15.) Debt Equity Ratio = $\frac{\text{Debt}}{\text{Equity}}$

(16.) Assets Turnover Ratio = $\frac{\text{Sales [Turnover]}}{\text{Assets}} \times 100$

(17.) Fixed Assets Turnover Ratio = $\frac{\text{Sales}}{\text{Fixed Assets}} \times 100$

(18.) Current Assets Turnover Ratio = $\frac{\text{Sales}}{\text{Current Assets}} \times 100$

(19.) Inventory Turnover Ratio = $\frac{\text{COGS}}{\text{Stock}} \times 100$

(20.) Debtors Turnover Ratio = $\frac{\text{Credit Sales}}{\text{Debtors}} \times 100$

(21.) Assets to Sales Ratio = $\frac{\text{Assets}}{\text{Sales}} \times 100$

(22.) Interest Coverage Ratio = $\frac{EBIT}{\text{Interest}}$ [Higher the Better]

(23.) Interest & fixed Dividend Coverage Ratio

$\Rightarrow \frac{PAT + \text{Interest}}{\text{Interest} + \text{Preference Dividend}}$ [Higher the Better]

(24.) Capital Gearing Ratio = $\frac{\text{Debt} + \text{Preference Share Capital}}{\text{Equity Share Capital} + R\&S}$ [Lower the Better]

(25.) Earnings Per Share [EPS] = $\frac{EATESH}{\text{No. of Equity Shares}}$

(26.) Dividend Per Share [DPS] = $\frac{\text{Dividend on Equity Shares}}{\text{No. of Equity Shares}}$

(27.) Book Value Per Share [BVPS] = $\frac{\text{Book Value}}{\text{No. of Equity Shares}}$

(28.) Market Price Per Share [MPS] = Market Price of Equity Share

(29.) Dividend Payout Ratio = $\frac{\text{Dividend on Equity Shares}}{EATESH} \times 100$

OR

$$\frac{DPS}{EPS} \times 100$$

OR

100% - Retention Ratio

(30) Retention Ratio = $\frac{\text{Retained Earnings}}{\text{EATESH}} \times 100$

OR

100% - Dividend Payout Ratio

(31) Dividend Yield = $\frac{DPS}{MPS} \times 100$

(32) Return on Capital Employed [ROCE] = $\frac{EBIT}{\text{Capital Employed}} \times 100$

(33) Return on Equity [ROE] = $\frac{EATESH}{\text{Net Worth [Book Value]}} \times 100$

OR

$$\frac{EPS}{BVPS} \times 100$$

(34) P/E Ratio = $\frac{MPS}{EPS}$

Note: Sometimes ROE is calculated on Market Price, i.e. ROE = $\frac{EPS}{MPS}$

Hence, P/E Ratio = $\frac{1}{ROE}$

(35) Market Capitalisation ⇒ Total Market Value of Equity Shareholders

⇒ MPS × No. of Equity Shares

OR

P/E Ratio × EATESH

Interpretation of Dividend

(1.) Dividend ⇒ On Face Value

(2.) Dividend Yield ⇒ On Market Price

(3.) Dividend Payout ⇒ On Earnings

Interpretation of Interest Rate

(1.) 100 Basis Points [Bp] = 1%

(2.) Interest Rate given in question will always be assumed as Per Annum [p.a.] unless specifically mentioned.

Example:

(i) Interest Rate is 10% ⇒ p.a.

(ii) Interest Rate for 6 months Borrowings is 10% ⇒ p.a.

(iii) 6 Months LIBOR is 10% ⇒ p.a.

(iv) Interest Rate is 1% per month ⇒ p.m. [Per Month]

Basic Mathematics

(1.) International Number System :-

1 Million = 10 Lakh = 1,000,000

1 Billion = 100 Crore = 1,000,000,000

(2.) Equation Solving :-

$x + y = z \rightarrow x = z - y$

$x - y = z \rightarrow x = z + y$

$x \times y = z \rightarrow x = \frac{z}{y}$

$\frac{x}{y} = z \rightarrow x = z \times y$

(3.) Converting Data into Percent (%) or Back to Normal :-

Example: Marks Obtained in Exams = 24

Total Marks = 30

∴ Marks obtained in relation to Total Marks = $\frac{24}{30} = 0.80$

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∴ Marks obtained in relation to Total Marks = $\frac{24}{30} = 0.80$

Convert it into % by Multiplying it by 100 = $\frac{24}{30} \times 100 = 80\%$

Now, To Remove % from Any figure, Divide it by 100

Example: $80\% \Rightarrow \frac{80}{100} \Rightarrow 0.80$

(4) Some Mathematical Notations:-

- Base with Power $[\text{Base}^{\text{Power}}]$

  Example:

  $(6)^4 \Rightarrow 6 \times 6 \times 6 \times 6 \Rightarrow 1,296$

- Base with Negative Power $[\text{Base}^{\text{Negative Power}}]$

  Example:

  $(6)^{-4} \Rightarrow \left(\frac{1}{6}\right)^4 \Rightarrow \frac{1}{(6)^4} = \frac{1}{1296} = 0.0007716$

- Squareroot $[\sqrt{\ }]$

  Example:

  $\sqrt{36} \Rightarrow (36)^{\frac{1}{2}} = 6$

(5) Solving Base with Power Using Calculator:-

- Normal Power [Example $\Rightarrow (6)^4$]:

  Steps to solve this on calculator

  → Type Base in Calculator [Example $\Rightarrow$ 6]

  → Press Multiply (×) Button

  → Now, Press Equals to (=) Button for (Power − 1) Times [Example $\Rightarrow 4-1=3$]

- Dirty Power [Example $\Rightarrow (6)^{\frac{3}{10}}$ OR $(6)^{0.30}$]:

  Steps to solve this on calculator

  → Type Base in Calculator [Example $\Rightarrow$ 6]

  → Press Undersoot ($\sqrt{\ }$) Button 12 times

  → Subtract (−) 1 from it

→ Press Underroot (√) button 12 times

→ Subtract (-) 1 from it

→ Multiply (x) it by Power [Example ⇒ $\frac{3}{10}$ OR 0.30]

→ Add (+) 1 to it

→ Press Multiply Equals to (x =) Button 12 times

(6.) BODMAS Rule :-

- It tells the sequence in which mathematical operations are required to be performed to solve an equation.
- Sequence is as follows:

1st ⇒ B = Bracket

2nd ⇒ O = Orders [i.e. Power or Underroot]

3rd ⇒ D = Divide

4th ⇒ M = Multiply

5th ⇒ A = Add

6th ⇒ S = Subtract

Example:

$3 \times 16 \div 4 + 2 (9-4)^2$

$\Rightarrow 3 \times 16 \div 4 + 2 \times (5)^2$

$\Rightarrow 3 \times 16 \div 4 + 2 \times 25$

$\Rightarrow 3 \times 4 + 2 \times 25$

$\Rightarrow 12 + 50$

$\Rightarrow 62$

(7.) Addition, Subtraction, Multiplication or Division of figures with Minus Sign:-

Example:

(i.) $5 + 3 = 8$

(ii.) $5 + (-3) = 5 - 3 = 2$

(iii.) $5 + (-9) = 5 - 9 = -4$

(iv.) $-5 - 3 = -8$

(v.) $-5 + (-3) = -5 - 3 = -8$

(vi) $5 \times (-3) = -15$

(vii) $(-5) \times (-3) = 15$

(viii) $\frac{-6}{3}$ OR $\frac{6}{-3}$ OR $-\frac{6}{3} = -2$

(ix) $\frac{-6}{-3} = 2$

Time Value of Money

(1) Future Value = Present Value $(1+R)^t$

OR

Cash flow $\times$ FVf_t

Here, $FVf_t = (1+R)^t$

Example:

Principal Amount to be Invested = ₹ 1,000 ; Interest Rate is 10%.

(i) Calculation of future Value after 1 Year $\Rightarrow 1{,}000 \times (1.10)^1 =$ ₹ 1,100

(ii) Calculation of future Value after 2 Years $\Rightarrow 1{,}000 \times (1.10)^2 =$ ₹ 1,210

(iii) Calculation of future Value after 3 Years $\Rightarrow 1{,}000 \times (1.10)^3 =$ ₹ 1,331

(2) Present Value (PV) = $\frac{\text{future Value}}{(1+R)^t}$

OR

$\text{Cash Flow}_t \times PVf_t$

Here, $PVf_t = \frac{1}{(1+R)^t}$

- It is a Process which discounts future cash flows, i.e. Process of Removing Interest / Return Component from future cash flows.

Example:

Interest Rate is 10%

(i) Calculation of PV if future Value after 1 Year is ₹ 1,100

$\Rightarrow \frac{1100}{1.1}$ OR $1100 \times 0.909 \Rightarrow$ ₹ 1000

(i) Calculation of PV if future value after 1 year is ₹ 1,100

$\Rightarrow \frac{1,100}{(1.10)^1}$ OR $1,100 \times 0.909 \Rightarrow$ ₹ 1,000

(ii) Calculation of PV if future Value after 2 Years is ₹ 1,210

$\Rightarrow \frac{1,210}{(1.10)^2}$ OR $1,210 \times 0.826 \Rightarrow$ ₹ 1,000

(iii) Calculation of PV if future Value after 3 Years is ₹ 1,331

$\Rightarrow \frac{1,331}{(1.10)^3}$ OR $1,331 \times 0.751 \Rightarrow$ ₹ 1,000

- Calculation of Present Value in Various Scenarios:

(i) If there is Uneven Cash Flow for Limited Period

$P.V. = \text{Cash Flow}_1 \times PVF_1 + \text{Cash Flow}_2 \times PVF_2 + \ldots \text{Cash Flow}_n \times PVF_n$

OR

It can be calculated using following Table format

Year	Cash flow	PVF @ Discounting Rate	P.V.
(1)	(2)	(3)	(4) = (2) x (3)

Example:

Year	Cash Flow	PVF @ 10%	P.V.
1	1,000	0.909	909
2	1,500	0.826	1,239
3	800	0.751	600.8
		P.V. =	2,748.80

(ii) If there is Even Cash flow for Limited Period

P.V. = Even Cash flow x PVAf

Here, PVAF = Present Value Annuity Factor

Example:

Cash flow of ₹ 1,000 will be received at end of each years for 3 Years. Discounting Rate is 10%. Calculate PV

$P.V. = 1,000 \times PVAF_3 = 1,000 \times 2.486 \Rightarrow$ ₹ 2,486

(iii) If there is Perpetual Cash Flow [i.e. Cash Flow forever]

$$P.V. = \frac{\text{Perpetual Cash Flow}}{\text{Discounting Rate}}$$

Example:

Cash Flow of ₹ 1,000 will be received at the end of each year forever. Discounting Rate is 10%. Calculate PV

$$PV = \frac{1,000}{10\%} = ₹\ 10,000$$

(iv) If there is Perpetual Cash Flow with Constant Growth Rate [i.e. Cash Flow with Constant Growth]

$$P.V. = \frac{\text{first Perpetual Cash Flow}}{\text{Discounting Rate} - \text{Growth Rate}}$$

Example:

Cash Flow of ₹ 1,000 will be received at 1st year end & thereafter it will grow by 2% p.a. forever. Discounting Rate is 10%. Calculate P.V.

$$P.V. = \frac{1,000}{10\% - 2\%} = \frac{1,000}{8\%} = ₹\ 12,500$$

(v) If there is Uneven Cash Flow for Limited Period & thereafter Perpetual Cash flow

PV is calculated as follows:

PV of Uneven Cash flow for Limited Period [Calculated using PV Table] ✓

(+) PV of Perpetual Cash Flow [Terminal Value$_{(t-1)}$ × PVF$_{(t-1)}$] ✓

P.V. = ✓

Here, Terminal Value$_{(t-1)}$ = $\frac{\text{Perpetual Cash Flow}_t}{\text{Discounting Rate}}$

⇓

This Value will be of 1 Year Before the Date on which Perpetual Cash

1 Year Before the Date on which Perpetual Cash Flow will start to receive

Example:

Year	Cash flows	
1	1,000	Discrete Values
2	2,000	
3	5,000	

further, Cash Flow of ₹ 7,000 will be received at each year end from 4th year & onwards. Discounting Rate is 10%. Calculate P.V.

Calculation of P.V.:

PV of Uneven Cash flow

Year	Cash flows	PVf @ 10%	PV
1	1,000	0.909	909
2	2,000	0.826	1,652
3	5,000	0.757	3,755
			6,316

PV of Perpetual Cash flow

Terminal Value $[TV_3] = \frac{CF_4}{10\%} = \frac{7,000}{10\%} = ₹\ 70,000$

P.V. of TV_3 = 70,000 × 0.751 ⇒ ₹ 52,570

∴ Total P.V. = 6,316 + 52,570 ⇒ ₹ 58,886

(v) If there is Uneven Cash flow for Limited Period & thereafter Perpetual Cash flow with Constant Growth

PV is calculated as follows:

PV of Uneven Cash flow for Limited Period [Calculated using PV Table] ✓

(+) PV of Perpetual Cash flow [Terminal Value$_{(t-1)}$ × PVF$_{(t-1)}$] ✓

P.V. = ✓

Here, Terminal Value $_{(t-1)}$ = $\frac{\text{First Perpetual Cash Flow}_t}{\text{Discounting Rate} - \text{Growth Rate}}$

⇓

This Value will be of 1 Year Before the Date on which Perpetual Cash Flow will start to receive

* First Perpetual Cash Flow$_t$ = Cash Flow $_{(t-1)}$ × (1+g)

Example:

Year	Cash flows	
1	1,000	⎫
2	2,000	⎬ Discrete Values
3	5,000	⎭

Further, Cash Flow from 4th Year & Onwards will grow at 2% p.a. forever. Discounting Rate is 10%.
Calculate P.V.

Calculation of P.V.:

PV of Uneven Cash flow

Year	Cash flows	PVf @ 10%	PV
1	1,000	0.909	909
2	2,000	0.826	1,652
3	5,000	0.757	3,755
			6,316

PV of Perpetual Cash Flow

Terminal Value $[TV_3]$ = $\frac{CF_4}{10\% - 2\%}$ = $\frac{CF_3(1+g)}{8\%}$ = $\frac{5,000(1+0.02)}{8\%}$

⇒ ₹ 63,750

P.V. of TV_3 = 63,750 × 0.751 ⇒ ₹ 47,876

∴ Total P.V. = 6,316 + 47,876 ⇒ ₹ 54,192

Note:- PV factor [PVF] should always be taken in 3 decimals unless specifically mentioned in question