

# CA FINAL AFM – MAY/ NOV 2025

# **LAST DAY REVISION**

By CA Rohit Chipper  
AIR 17 CA Final  
AIR 18 CA Inter

## **IMPORTANT QUESTION LIST**

Reference from latest ICAI study material

## **ABC & TREND ANALYSIS**

Chapterwise weightage from last May 2018 to Nov 2024

## **IMPORTANT FORMULAS**

All formulas of AFM at one place for last day revision

## **COMPREHENSIVE STRATEGIES**

Detailed strategy, Exam strategy and 15 Day planner

# Index - Last Day Revision Notes

| Sr. No. | Topic                                                                    | Page No. |
|---------|--------------------------------------------------------------------------|----------|
| 1       | Exam Strategy (How to attempt AFM paper in 3 hours of exam?)             | 3        |
| 2       | Detailed Strategy (How to study AFM subject?)                            | 4        |
| 3       | 1.5 Day Planner (How to plan AFM in exam leaves of 1.5 day?)             | 6        |
| 4       | <b>Important Question List</b> as per latest study material for May 2025 | 8        |
| 5       | <b>ABC &amp; Trend Analysis</b>                                          | 12       |
| 6       | <b>All Formulas</b> (Chapter wise)                                       | 13       |
|         | Chapter 1: Financial Policy and Corporate Strategy                       | NA       |
|         | Chapter 2: Risk Management                                               | 14       |
|         | Chapter 3: Advanced Capital Budgeting Decisions                          | 14       |
|         | Chapter 4: Security Analysis                                             | 16       |
|         | Chapter 5: Security Valuation                                            | 17       |
|         | Chapter 6: Portfolio Management                                          | 22       |
|         | Chapter 7: Securitization                                                | NA       |
|         | Chapter 8: Mutual Funds                                                  | 25       |
|         | Chapter 9: Derivatives Analysis and Valuation                            | 26       |
|         | Chapter 10: Foreign Exchange Exposure & Risk Management                  | 28       |
|         | Chapter 11: International Financial Management                           | 29       |
|         | Chapter 12: Interest Rate Risk Management                                | 30       |
|         | Chapter 13: Business Valuation                                           | 31       |
|         | Chapter 14: Mergers, Acquisitions & Corporate Restructuring              | 34       |
|         | Chapter 15: Startup Finance                                              | NA       |

# CA Final AFM Exam Strategy

**Time Management:** The AFM paper is generally short. If you are well-prepared, you should be able to complete it in 2 to 2.5 hours. If you attempt all 6 questions, your score will be based on the best 5.

**MCQs and Descriptive Questions:** The MCQ paper will not be provided during the reading time, so focus on the descriptive questions first. Plan to attempt your best 3 descriptive answers within the first 1.5 hours. After that, move on to the MCQs (attempt all, as there is no negative marking). Finally, finish the remaining 2 descriptive questions.

**Theory Questions:** Theory questions are highly scoring in AFM, usually worth 14 marks. These questions often repeat from the study material or past year papers. They take less time to answer, and you can earn full marks if you write the correct key points.

**Formulas:** No marks are awarded for simply writing formulas.

**Question Selection:** During reading time, identify the question you plan to leave. It's advisable to skip new, ambiguous, or confusing forex questions.

**Reading Strategy:** Avoid reading Question 1 during the reading time. Instead, read the questions in reverse order, starting from Question 6 and moving to Question 2.

**Answer Order:** Start by answering the smaller questions first, as they are the most scoring. Leave the larger questions for the end.

**Answer Presentation:** Leave proper space in your answer sheet to allow for any changes later. Write your answers according to the ICAI format. Circle important calculations and answers for emphasis.

**Corrections:** Don't fully cut out any answer until you have solved it correctly again—a simple cross is enough to indicate a correction.

**Page Usage:** Start each new answer on a new page.

**Writing Style:** Marks are not awarded for writing style, so focus on content rather than presentation. Avoid making lines, tables, or using multiple pens; use a single pen to increase your speed.

You can join our telegram channel here: <https://t.me/carohitchipper>

Connect with us here:



# CA Final AFM Detailed Strategy

By CA Rohit Chipper AIR 17

## When to start AFM?

Start the AFM class 6 month after joining the articleship

## Material to Refer

- Concept Notes
- Study Material
- Paste year paper (last 2 years)
- RTP (last 2 years)
- MTP (last 1 year)

## Revisions

- First Reading – 10 Days
- 1<sup>st</sup> Revision – 6 Days
- 2<sup>nd</sup> Revision – 3 Days
- Smart Revision – 1.5 Days

## Mock Test

Plan for at least 1 mock test and analyse it properly to decide your

- Strategy
- Time Management
- Qn sequence
- Strength & weakness areas

## Mistake Register

Note down all your mistakes you have done during revision and revise them before exam so, you don't repeat them in exam.

## Paper Pattern

Understand paper pattern – See past year paper to get understanding of format of paper. Familiarize yourself so, in exam there is no panic

MCQ (30 Marks) + Practical (72 marks) + Theory (12 Marks) = 114 marks

- MCQ – 30 marks (15 Case scenario based MCQs × 2 Marks each)
- Descriptive – 84 Marks ( Attempt any 5 out of 6 Qns × 14 Marks each)

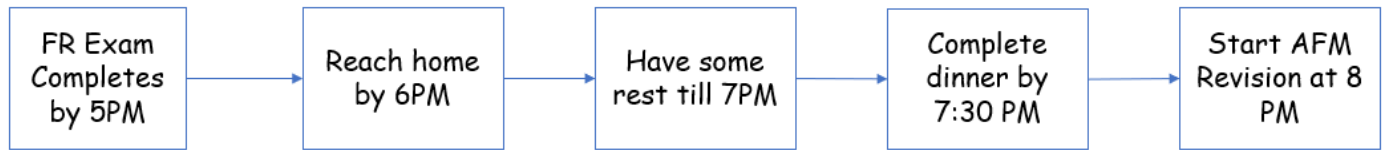
|                    |           |
|--------------------|-----------|
| Q1 (a) + (b) + (c) | 6 + 4 + 4 |
| Q2 (a) + (b) + (c) | 6 + 4 + 4 |
| Q3 (a) + (b)       | 10 + 4    |
| Q4 (a) + (b) + (c) | 6 + 4 + 4 |
| Q5 (a) + (b)       | 8 + 6     |
| Q6 (a) + (b)       | 8 + 6     |

Tips To Remember During Revision

1. Follow ABC analysis for the revision sequence but don't leave any chapter based on ABC. Start with small & easy chapters of category A then move to difficult chapters.
2. Whenever you revise the subject, don't solve all the questions from study material or question bank. Follow below approach
  - Cancel the same or similar question
  - Cancel the easy question which you have solved correctly in first try without any mistake
  - Mark the important or difficult question where you made mistake for next revision.
3. There is no need to solve all questions by hand during revision as it will consume lots of time and you may not be able to revise all the chapter instead follow below approach for smart revision
  - Read the question
  - Think of the first step you will do to solve the question
  - Calculate the values for the first step in calculator, (if question is small then calculate the final answer directly on calculator)
  - Match the answer of first step with ICAI answer and
  - Continue the process for next step and solve the entire question

This way you can solve question faster and you will know ICAI method as well since you have verified the ICAI answer.
4. Note down all the mistakes you have done while solving question in a mistake register and refer those mistakes next time before you start solving practical qns.
5. For writing practice,
  - Do give 1 MTP and
  - Refer the previous attempt papers and do solve some random Qns by hand
6. Refer the theory & important formulas from last day revision notes at the end of each revision and do revise them on the exam day as these take less time and give you 12-15 marks in exams.

# CA Final AFM 1.5 Day Plan

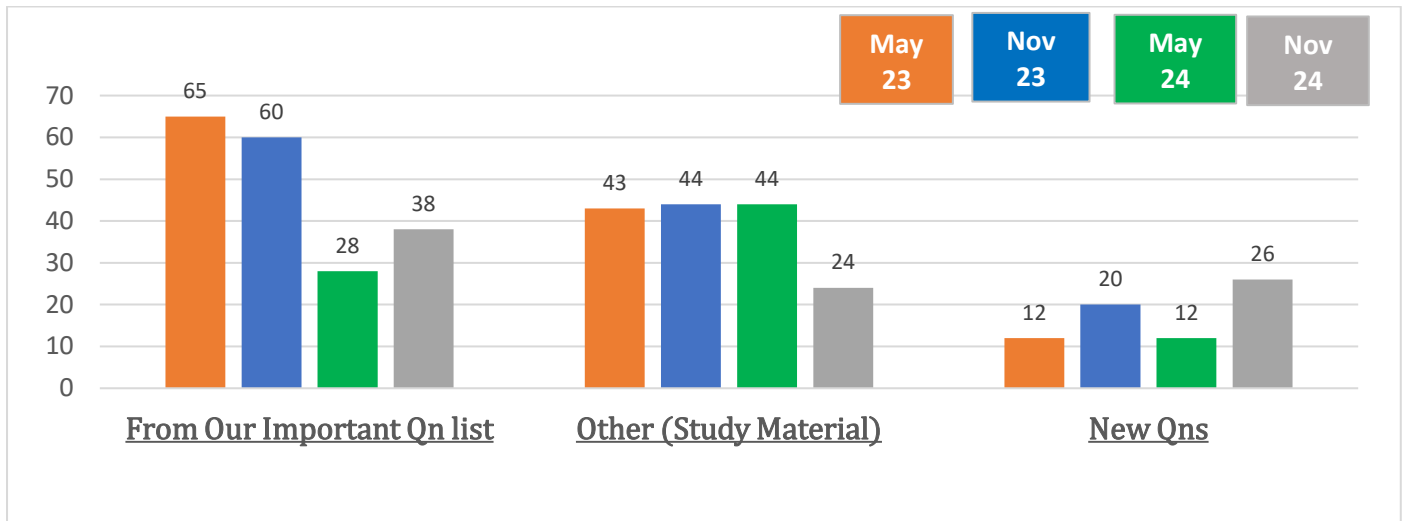


| Time                | Chapter                                           | Concept | Question    |
|---------------------|---------------------------------------------------|---------|-------------|
| Day 1 (FR Exam Day) |                                                   |         |             |
| 20:00 to 22:20      | Portfolio Management                              | 40 min  | 100 min     |
| 22:30 to 23:00      | Security Analysis                                 | 10 min  | 20 min      |
| 23:00 to 23:45      | Security Valuation                                | 45 min  | Next day    |
| 00:00               | Go to sleep                                       |         |             |
| Day 2               |                                                   |         |             |
| 06:30 to 07:30      | Wake up and get ready                             |         |             |
| 07:30 to 9:30       | Security Valuation                                |         | 120 min     |
| 10:00 to 11:30      | Business Valuation                                | 30 min  | 60 min      |
| 11:30 to 14:00      | Mergers, Acquisitions and Corporate Restructuring | 40 min  | 100 min     |
| 14:00 to 14:30      | Lunch                                             |         |             |
| 14:30 to 15:30      | Mutual Funds                                      | 20 min  | 40 min      |
| 15:30 to 17:50      | Advanced Capital Budgeting Decisions              | 40 min  | 100 min     |
| 18:00 to 18:45      | International Financial Management                | 10 min  | 35 min      |
| 18:45 to 19:25      | Derivatives Analysis and Valuation                | 40 min  | After lunch |
| 19:30 to 20:00      | Dinner                                            |         |             |
| 20:00 to 21:30      | Derivatives Analysis and Valuation                |         | 90 min      |
| 21:30 to 22:15      | Interest Rate Risk Management                     | 15 min  | 30 min      |
| 22:15 to 00:45      | Foreign Exchange Exposure and Risk Management     | 40 min  | 110 min     |
| 00:45               | Go to sleep                                       |         |             |
| Day 3 (Exam Day)    |                                                   |         |             |
| 07:00 to 08:00      | Wake up and get ready                             |         |             |
| 08:00 to 08:10      | Risk Management (Var Concept)                     | 5 min   | 5 min       |
| 08:10 to 11:30      | AFM Theory                                        | 200 min |             |
| 11:30 to 12:00      | Refer any past year paper for practice            | 30 min  |             |
| 11:30 to 12:20      | Revise all formulas from last day revision notes  | 20 min  |             |
| 12:30               | Leave for exam                                    |         |             |

### **Tips for last day revision**

- **Avoid New Topics or Books:** Do not start any new topic or book that you haven't read before during 1.5 day revision.
- **Get Sufficient Rest:** Take 6-7 hours of sleep each night, and incorporate small breaks (5-10 minutes) between study sessions.
- **Avoid Exam Discussions:** After each exam, avoid discussing the paper with friends or watching solution videos on YouTube until all exams are finished.
- **Rest After the Exam:** Take a 30-40 minute nap when you get home after an exam.
- **Do not practice question by writing:** During the 1.5-day syllabus revision, avoid solving questions by hand. Just solve them on calculator and verify the steps from answers
- **Focus on Key Questions:** Only review selected questions in the 1.5-day revision. Mark important or challenging parts in each question now, so you can focus only on these key areas rather than the entire question.
- **Don't Skip Theory in AFM:** Theory in Strategic Financial Management is crucial, covering 12-15 marks, so make sure to review it.
- **Revise Formulas Before the Exam:** Go over all essential formulas just before heading to the exam center.

# AFM Important Question List



## Question Categories

- Most Imp.
- Very Imp.
- Important

## Study Leave Plan:

- In-depth Reading: 10-15 days
- First Revision: 5-7 days
- Second Revision: 4-6 days
- Third Revision: 3-5 days

## Nov 2024 Paper Analysis

| Nov 2024 Questions | Page                  | TYK No. | Illustration No. | Marks |
|--------------------|-----------------------|---------|------------------|-------|
| SA.N24.Q1(a)       | 6.78                  | 42      |                  | 6     |
| SA.N24.Q1(b)       | 9.41                  | 5       |                  | 4     |
| SA.N24.Q1(c)       | Theory Book – Page 7  | Q5      |                  | 4     |
| SA.N24.Q2(a)       | 8.26                  | 14      |                  | 6     |
| SA.N24.Q2(b)       | New                   |         |                  | 8     |
| SA.N24.Q3(a)       | 12.15                 | 1       |                  | 6     |
| SA.N24.Q3(b)       | 10.66                 | 51      |                  | 8     |
| SA.N24.Q4(a)       | 9.61                  | 11      |                  | 6     |
| SA.N24.Q4(b)       | New                   |         |                  | 4     |
| SA.N24.Q4(c)       | Theory Book – Page 46 | Q16     |                  | 4     |
| SA.N24.Q4(c) or    | 12.16                 | 5       |                  | 4     |
| SA.N24.Q5(a)       | New                   |         |                  | 6     |
| SA.N24.Q5(b)       | 5.37                  | 18      |                  | 4     |
| SA.N24.Q5(c)       | 9.60                  | 10      |                  | 4     |
| SA.N24.Q6(a)       | New                   |         |                  | 8     |
| SA.N24.Q6(b)       | 10.66                 | 50      |                  | 6     |
| Total              |                       |         |                  | 88    |



**May 2024 Paper Analysis**

| May 2024 Questions | Page                             | TYK No. | Illustration No. | Marks     |
|--------------------|----------------------------------|---------|------------------|-----------|
| SA.M24.Q1(a)       | 6.74                             | 30      |                  | 6         |
| SA.M24.Q1(b)       | 8.25                             | 12      |                  | 4         |
| SA.M24.Q1(c)       | From new topic added in May 2024 |         |                  | 4         |
| SA.M24.Q2(a)       | 4.34                             | 1       |                  | 6         |
| SA.M24.Q2(b)       | 11.18                            |         | 4                | 4         |
| SA.M24.Q2(c)       | 8.22                             | 6       |                  | 4         |
| SA.M24.Q3(a)       | 12.17                            | 7       |                  | 10        |
| SA.M24.Q3(b)       | From new topic added in May 2024 |         |                  | 4         |
| SA.M24.Q4(a)       | 9.63                             | 16      |                  | 6         |
| SA.M24.Q4(b)       | 14.31                            | 2       |                  | 4         |
| SA.M24.Q4(c)       | From new topic added in May 2024 |         |                  | 4         |
| SA.M24.Q5(a)       | 6.66                             | 7       |                  | 8         |
| SA.M24.Q5(b)       | 5.37                             | 17      |                  | 6         |
| SA.M24.Q6(a)       | 3.50                             | 26      |                  | 8         |
| SA.M24.Q6(b)       | 14.48                            | 31      |                  | 6         |
| <b>Total</b>       |                                  |         |                  | <b>84</b> |

**Important Question List**

| ABC | Chapter                                                       | Importance | Test your knowledge                | Illustration |
|-----|---------------------------------------------------------------|------------|------------------------------------|--------------|
| C   | Chapter 1: Financial Policy and Corporate Strategy            | Most Imp.  | Refer theory book                  | 1            |
| C   | Chapter 2: Risk Management                                    | Very Imp.  | 1                                  |              |
| A   | Chapter 3: Advanced Capital Budgeting Decisions               | Important  | 3                                  |              |
|     |                                                               | Very Imp.  | 5, 14(ii), 23                      | 12           |
|     |                                                               | Most Imp.  | 7,9,21,22,25                       | 2,11,13      |
| B   | Chapter 4: Security Analysis                                  | Most Imp.  | 1,2                                |              |
| A   | Chapter 5: Security Valuation                                 | Important  | 5,16                               |              |
|     |                                                               | Very Imp.  | 24                                 |              |
|     |                                                               | Most Imp.  | 7, 10, 12, 14, 25, 27, 29, 31      |              |
| A   | Chapter 6: Portfolio Management                               | Important  | 24(c ),38,40                       | 5            |
|     |                                                               | Very Imp.  | 2,15(iii),26,32,39                 |              |
|     |                                                               | Most Imp.  | 8,14(ii),22,31,34,35               |              |
| A   | Chapter 7: Securitization                                     | Important  | Refer theory book                  |              |
| B   | Chapter 8: Mutual Funds                                       | Important  | 1,2                                |              |
|     |                                                               | Very Imp.  | 3                                  |              |
|     |                                                               | Most Imp.  | 12,16,19,20,21                     |              |
| A   | Chapter 9: Derivatives Analysis and Valuation                 | Important  | 3,11,12                            | 2            |
|     |                                                               | Very Imp.  | 5                                  |              |
|     |                                                               | Most Imp.  | 4,8,14,22                          | 3            |
| A   | Chapter 10: Foreign Exchange Exposure and Risk Management     | Important  | 10,24                              |              |
|     |                                                               | Very Imp.  | 16,37,38,50, 51                    | 9            |
|     |                                                               | Most Imp.  | 25, 33, 36, 39, 42, 43, 47, 48, 49 |              |
| B   | Chapter 11: International Financial Management                | Very Imp.  | 3                                  |              |
|     |                                                               | Most Imp.  | 1,4                                | 1,2,3        |
| B   | Chapter 12: Interest Rate Risk Management                     | Important  | 4,7                                |              |
|     |                                                               | Very Imp.  | 5,6                                |              |
|     |                                                               | Most Imp.  | 3                                  |              |
| B   | Chapter 13: Business Valuation                                | Important  | 9,11                               | 1,2,4        |
|     |                                                               | Very Imp.  | 16                                 | 3,5          |
|     |                                                               | Most Imp.  | 3,7                                |              |
| A   | Chapter 14: Mergers, Acquisitions and Corporate Restructuring | Important  | 28(iii)                            |              |
|     |                                                               | Very Imp.  | 20                                 | 1            |
|     |                                                               | Most Imp.  | 14,15,22,29,30                     | 4            |
| A   | Chapter 15: Start-up Finance                                  | Most Imp.  | Refer theory book                  |              |

[Access all past year paper, RTPs and MTPs on this link > Google Drive Link](#)

| Particular                   | Attempt     | Question                           |
|------------------------------|-------------|------------------------------------|
| Past year paper (Sugg. ans.) | Nov-18      | 1(a), 5(a)                         |
|                              | May-19      | 2(a), 6(b)                         |
|                              | Nov-19      | 1(b)                               |
|                              | Nov-20      | 1(c), 2(a), 4(a), 6(a), 6(b)       |
|                              | Jan-21      | 1(a), 1(b), 2(b), 6(a)             |
|                              | May-22      | 1(c), 6(c)                         |
|                              | Nov-22      | 5(A), 6(A) (ii) & (iii)            |
|                              | May-23      | 5(A), 5(C), 6(A)                   |
|                              | Nov-23      | 2(A), 2(C), 3(B)                   |
|                              | Nov-24      | 2(B), 3(A), 4(B), 5(A), 6(A)       |
| RTPs                         | May-19      | 7, 10, 11, 14(c), 15(c)            |
|                              | Nov-19      | 1,2                                |
|                              | May-20      | 5                                  |
|                              | Nov-20      | 6,10,12                            |
|                              | May-21      | 5,14,15                            |
|                              | Dec-21      | 2,10,11                            |
|                              | May-22      | 1,14                               |
|                              | Nov-22      | All questions were repeated        |
|                              | May-23      | All questions were repeated        |
|                              | Nov-23      | All questions were repeated        |
|                              | May-24      | 4, 12, 13                          |
| MTPs                         | Oct-18      | 2 (c)                              |
|                              | Aug-18      | 1(c), 4(d)                         |
|                              | May-20      | 3(a)                               |
|                              | Oct-20      | 1(c), 2(c), 4(c), 5(a), 6(a), 6(b) |
|                              | Apr-21      | 1(a), 1(c), 2(b), 3(c), 6(a)       |
|                              | Nov-21      | 3(a)                               |
|                              | Apr 23 - II | 2(a)                               |

# AFM ABC & Trend Analysis

| ABC | Topic                                                         | May 18                        | Nov 18 | May 19 | Nov 19 | Nov 20 | Jan 21 | Jul 21 | Dec 21 | May 22 | Nov 22 | May 23 | Nov 23 | May 24 | Nov 24 | Total | Avg. |
|-----|---------------------------------------------------------------|-------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|------|
| C   | Chapter 1: Financial Policy and Corporate Strategy            | 4                             |        |        | 4      |        | 4      | 4      |        | 4      | 8      | 4      | 4      | 4      | 4      | 40    | 3    |
| C   | Chapter 2: Risk Management                                    | 4                             | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 8      | 4      |        |        | 52    | 4    |
| A   | Chapter 3: Advanced Capital Budgeting Decisions               | New chapter added in May 2024 |        |        |        |        |        |        |        |        |        |        |        | 8      | 8      | 16    | 8    |
| B   | Chapter 4: Security Analysis                                  | 8                             |        |        | 8      | 4      | 8      |        | 4      | 8      |        |        | 4      | 6      |        | 50    | 4    |
| A   | Chapter 5: Security Valuation                                 | 10                            | 28     | 16     |        | 23     | 4      | 24     | 8      | 8      | 16     | 17     | 8      | 6      | 18     | 186   | 14   |
| A   | Chapter 6: Portfolio Management                               | 14                            | 8      | 8      | 16     | 8      | 10     | 16     | 20     | 16     | 24     | 16     | 16     | 14     | 14     | 200   | 15   |
| A   | Chapter 7: Securitization                                     | 4                             | 4      | 4      | 8      | 4      | 8      | 4      | 4      | 4      | 4      | 4      | 4      | 4      |        | 60    | 5    |
| B   | Chapter 8: Mutual Funds                                       | 10                            | 8      | 8      | 10     | 14     | 8      | 12     | 8      | 16     | 8      | 8      | 8      | 8      | 6      | 132   | 10   |
| A   | Chapter 9: Derivatives Analysis and Valuation                 | 9                             | 8      | 16     | 14     | 8      | 12     | 8      | 16     | 8      | 8      | 14     | 20     | 6      | 20     | 167   | 13   |
| B   | Chapter 10: Foreign Exchange Exposure and Risk Management     | 8                             | 4      |        | 8      | 8      |        | 12     | 4      | 8      | 12     | 6      | 16     |        | 8      | 94    | 7    |
| B   | Chapter 11: International Financial Management                | 8                             | 24     | 16     | 8      | 20     | 16     | 8      | 16     | 12     | 8      | 7      | 0      | 8      | 6      | 157   | 12   |
| A   | Chapter 12: Interest Rate Risk Management                     | 8                             |        | 8      | 12     | 8      | 22     | 8      | 16     | 12     | 8      | 12     | 14     | 10     | 16     | 154   | 12   |
| B   | Chapter 13: Business Valuation                                | 13                            | 12     | 8      | 8      | 4      | 8      | 8      | 8      | 8      | 8      |        | 8      |        | 4      | 97    | 7    |
| A   | Chapter 14: Mergers, Acquisitions and Corporate Restructuring | 8                             | 12     | 16     | 16     | 12     | 12     | 8      | 8      | 8      | 8      | 18     | 10     | 10     | 6      | 152   | 12   |
| A   | Chapter 15: Startup Finance                                   | 4                             | 4      | 4      | 8      | 7      | 8      | 8      | 8      | 4      | 8      | 8      | 8      | 4      | 4      | 87    | 6    |

\*From Nov-24, ICAI has started releasing MCQs so, Nov-24 and onwards marks contains both descriptive and MCQs.

# AFM Important Formulas

This list covers all the formula and important calculation covered in AFM study material, past year paper, RTP & MTP questions.

Do refer this formula on the day of exam so, that you don't make any mistakes in formula in exam. It will surely save you the 8-10 marks in exam by avoiding silly mistakes in formula and calculations :)

| Chapters                                                      | Page No. |
|---------------------------------------------------------------|----------|
| Chapter 1: Financial Policy and Corporate Strategy            | NA       |
| Chapter 2: Risk Management                                    | 14       |
| Chapter 3: Advanced Capital Budgeting Decisions               | 14       |
| Chapter 4: Security Analysis                                  | 16       |
| Chapter 5: Security Valuation                                 | 17       |
| Chapter 6: Portfolio Management                               | 22       |
| Chapter 7: Securitization                                     | NA       |
| Chapter 8: Mutual Funds                                       | 25       |
| Chapter 9: Derivatives Analysis and Valuation                 | 26       |
| Chapter 10: Foreign Exchange Exposure and Risk Management     | 28       |
| Chapter 11: International Financial Management                | 29       |
| Chapter 12: Interest Rate Risk Management                     | 30       |
| Chapter 13: Business Valuation                                | 31       |
| Chapter 14: Mergers, Acquisitions and Corporate Restructuring | 34       |
| Chapter 15: Startup Finance                                   | NA       |

For more such last day revision notes for CA Final, join us here

<https://t.me/carohitchipper>

## Risk Management

$\text{VAR} = \text{Daily Standard Deviation} \times \text{Confidence Interval Value} \times \sqrt{\text{Number of days}}$

$\text{Daily Standard Deviation} = \text{Portfolio Value (₹)} \times \text{Portfolio Standard Deviation (\%)}$

Confidence Interval (Z) Value

- 2.33 for a 99% confidence,
- 1.65 for a 95% confidence,
- 1.29 for a 90% confidence.

## Advanced Capital Budgeting

### (1) Conversion of cashflow from real to nominal or nominal to real

- If inflation rate is same for all years

$$\text{Nominal Cashflow}_{\text{year 1}} = \text{Real cashflow}_{\text{year 1}} \times (1 + \text{IR})^1$$

$$\text{Nominal Cashflow}_{\text{year 2}} = \text{Real cashflow}_{\text{year 2}} \times (1 + \text{IR})^2$$

$$\text{Nominal Cashflow}_{\text{year n}} = \text{Real cashflow}_{\text{year n}} \times (1 + \text{IR})^n$$

- If inflation rate is different for all years

$$\text{Nominal Cashflow}_{\text{year 1}} = \text{Real cashflow}_{\text{year 1}} \times (1 + \text{IR}_{\text{year 1}})$$

$$\text{Nominal Cashflow}_{\text{year 2}} = \text{Real cashflow}_{\text{year 2}} \times (1 + \text{IR}_{\text{year 1}}) \times (1 + \text{IR}_{\text{year 2}})$$

$$\text{Nominal Cashflow}_{\text{year n}} = \text{Real cashflow}_{\text{year n}} \times (1 + \text{IR}_{\text{year 1}}) \times (1 + \text{IR}_{\text{year 2}}) \dots \text{till n}$$

Here IR = Inflation rate for the year

### (2) Conversion of discount rate from real to nominal or nominal to real

$$\text{Nominal Rate} = (1 + \text{Real Rate}) \times (1 + \text{Inflation Rate}) - 1$$

### (3) Profitability Index

$$\text{Profitability index} = \frac{\text{PV of cash flows}}{\text{Initial outlay}}$$

### (4) Variance and standard deviation

$$\text{Cashflow variance } (\sigma^2) = \sum \{(\text{Cashflow} - \text{Expected casflow})^2 \times \text{Probability of cashflow}\}$$

$$\text{Project variance } (\sigma^2) = \sum \{(\text{NPV} - \text{Expected NPV})^2 \times \text{Probability of NPV}\}$$

$$\text{Sd } (\sigma) \text{ of year 1 cashflow} = \sqrt{\text{Cashflow Variance}}$$

$$\text{Sd } (\sigma) \text{ of PV Dist.} = \sqrt{\frac{\text{Cashflow Variance}_{\text{Year 1}}}{(1+\text{rate})^2} + \frac{\text{Cashflow Variance}_{\text{Year 2}}}{(1+\text{rate})^4} + \dots + \frac{\text{Cashflow Variance}_{\text{Year n}}}{(1+\text{rate})^{2n}}}$$

$$\text{Sd } (\sigma) \text{ of Project NPV} = \sqrt{\text{Project Variance}}$$

### (5) Co-efficient of variation (CV)

Coefficient of Variation calculates the risk borne for every percent of expected return

$$\text{Coefficient of variation} = \frac{\text{Stanadard Deviation}}{\text{Expected Return}}$$

(6) Risk Adjusted Discount Rate

Risk adjusted discount rate (RADR) = Risk free rate + Risk premium

Risk premium = Risk index × (Minimum required return of firm – Risk free rate)

(7) Certainty Equivalent (CE)

Certainty equivalent (CE) =  $\frac{\text{Certain cash flow}}{\text{Risky or expected cash flow}}$

Certain Cashflow = Expected cashflow × Certainty equivalent

Certainty equivalent (CE) Co-efficient of Project = Sum of CE of each year cashflow

- Higher the CE of project - lower the risk and
- Lower the CE of project - higher the risk

(8) Formulas used in Sensitivity Analysis question

- NPV = Annual cash flow × PVAF (% , year) – Initial Investment
- Annual Cash flow = {Annual sale units × (Sale price – variable cost)} – Fixed cost
- Profit volume (PV ) ratio =  $\frac{\text{Sale value} - \text{Variable cost}}{\text{Sale value}} = \frac{\text{Annual cash flow} + \text{fixed cost}}{\text{Sale value}}$
- Contribution per unit = Sale price per unit – Variable cost per unit
- Breakeven units =  $\frac{\text{Fixed cost}}{\text{Contribution per unit}}$

(9) Effective Annual Cost

Effective Annual Cost (EAC) =  $\frac{\text{PV of cash outflow}}{\text{PVAF}}$

(10) Expected Utility

Expected Utility = sum of (Utility value of cashflow × Probability of cashflow)

## Security Analysis

### (1) Arithmetic/ Simple Moving Average

simple average of the last n period prices

Simple moving average = (Sum total of share prices of last n no.of days)/(No.of days)

### (2) Exponential Moving Average (EMA)

$EMA_T = \text{Previous Day's EMA} + (\text{Closing Price of day} - \text{Previous Day's EMA}) \times \text{Exponent}$

Here,  $EMA_T = \text{EMA of today}$

$$\text{Exponent} = \frac{2}{(1 + \text{no. of day for which exponent is calculated})}$$

if value of exponent is not given in question, then it can be calculated as above. For e.g. question may have data for 8 days but it will ask to calculate exponent for 15 Days EMA then exponent =  $2/(15+1) = 2/16 = 0.125$

### (3) Run Test

**Step 1:** determine the sign of **closing** price change (+ / -). If price increase from previous day then sign will + and if price decrease then sign will be -

**Step 2:** Count the number of runs, + ve sign and - ve signs

$n_1 = \text{No of Positive changes}$

$n_2 = \text{No of Negative changes}$

**Step 3:** Calculate average/ expected number of runs ( $\mu$ )

$$\mu = \frac{2n_1n_2}{n_1 + n_2} + 1$$

**Step 4:** Calculate standard deviation of number of runs

$$\sigma = \sqrt{\frac{(\mu-1)(\mu-2)}{n_1 + n_2 - 1}}$$

**Step 5:** Calculate the range in between of which no. of runs (r) should lie to reflect weak form of market efficiency

Upper limit =  $\mu + (\sigma \times t)$  & Lower limit =  $\mu - (\sigma \times t)$

t = Confidence value at given level of significance and degree of freedom (value of t will be given in question)

Degree of freedom = No. of data used in standard deviation ( $n_1 + n_2 - 1$ )

**Step 6:** If number of runs (r) as calculated in step 1 lies between upper & lower limit, then it reflects weak form of market efficiency



## Security Valuation

### (1) Return on equity, Earning, Retention ratio and Growth

$$\text{Return on equity} = \frac{\text{Earning}}{\text{Book value}} = \frac{\text{Earning per share}}{\text{Book value per share}}$$

$$\text{Earning} = \text{Book value of (equity \& reserve)} \times \text{Return on equity}$$

$$\text{Retention Ratio} = \frac{\text{Amount retained}}{\text{Earning}} = 1 - \text{dividend pay-out ratio (b)}$$

$$\text{Growth rate} = \text{return on equity (r)} \times \text{retention ratio}$$

### (2) Expected/ Required rate of return

#### CAPM Approach (same as portfolio management)

$$\text{Required return (Ri)} = \text{Risk free rate} + \text{Risk premium on security} = R_f + \beta (R_m - R_f)$$

#### Dividend discount model

$$\text{Cost of equity as per dividend discount model (K}_e\text{)} = \left( \frac{D_1}{P_0} \times 100 \right) + g$$

$$\text{Above formula can be used calculate price as well } P_0 = \frac{D_1}{(K_e - g)}$$

### (3) EPS and other formulas

$$\text{EPS} = \frac{\text{Earning available for equity or Profit after tax or Net income}}{\text{Total number of share}}$$

- Turnover can be calculated from asset turnover ratio.

$$\text{Asset turnover ratio} = \frac{\text{Turnover}}{\text{Total Asset}}$$

$$\text{Turnover} = \text{Asset Turnover ratio} \times \text{Total Asset}$$

- Operating expense can be calculated from operating margin

$$\text{Operating margin} = \frac{\text{EBIT (Earning before interest and tax)}}{\text{Turnover}}$$

$$\text{Operating expense} = \text{Turnover} \times (1 - \text{Operating margin})$$

- Interest can be calculated from effective interest rate

If effective interest rate is given in question, then ignore the specific interest rate of bond debenture

$$\text{Interest} = (\text{Bond} + \text{Debenture}) \times \text{Effective interest rate (TYK 12)}$$

### (4) Buy Back of Equity Share

$$\text{Market Capitalisation after buy back} = \text{Market price after buy back} \times \text{Active shares}$$

$$= \text{Market price after buy back} \times (\text{Original shares} - \text{Shares bought back})$$

$$\text{Shares bought back} = \frac{\text{Surplus fund}}{\text{Buy back price}}$$

(5) Valuation of Equity ShareIf growth rate is stable

$$P_0 = \frac{D_1}{(K_e - g)} = \frac{D_0 (1+g)}{(K_e - g)}$$

If there is zero growth, then  $P_0 = \frac{D_0}{(K_e)}$

If growth rate is changing or price at time of sale is given in question

$$P_0 = \frac{D_1}{(1+K_e)} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \dots + \frac{D_n}{(1+K_e)^n} + \frac{P_n}{(1+K_e)^n}$$

$$P_0 = \frac{D_0(1+g)}{(1+K_e)} + \frac{D_0(1+g)^2}{(1+K_e)^2} + \frac{D_0(1+g)^3}{(1+K_e)^3} + \dots + \frac{D_0(1+g)^n}{(1+K_e)^n} + \frac{P_n}{(1+K_e)^n}$$

$P_n$  = Price of share at the end on  $n^{\text{th}}$  year when growth rate stabilizes =  $\frac{D_{n+1}}{(K_e - g)}$

Earnings Growth Model (Gordon formula based on earning instead of dividend)

$$P_0 = \frac{EPS_0 (1+g)}{(K_e - g)}$$

Walter's Approach

$$P_0 = \frac{D_1 + (E_1 - D_1) \frac{ROE}{K_e}}{K_e}$$

Multiplier Approach

$$\text{Price} = \text{EPS} \times \frac{\text{Price}}{\text{EPS}}$$

Price = EPS × PE ratio

$$\text{PE Ratio} = \frac{\text{Price}}{\text{EPS}} = \frac{1}{\left(\frac{\text{EPS}}{\text{Price}}\right)} = \frac{1}{\text{Return on equity}}$$

Value = Paid up value of share ×  $\frac{\text{Actual yield}}{\text{Expected yield}}$

$$\text{Value of firm} = \frac{\text{FCFF} (1+g)}{(K_o - g)}$$

$K_o$  = Cost of capital for the company

$$\text{Value of equity} = \frac{\text{FCFE} (1+g)}{(K_e - g)}$$

$K_e$  = Cost of equity

(6) Other formulas used in chapter

$$\text{Capital gearing ratio} = \frac{\text{Fixed interest bearing funds}}{\text{Equity Shareholder fund}} = \frac{\text{Debenture+Preference share}}{\text{Equity Share+reserves}}$$

$$\text{Interest \& Fixed Dividend Coverage} = \frac{\text{Earning available to debenture, preference \& equity}}{\text{Payment to debenture \& preference share}}$$

$$\text{Interest \& Fixed Dividend Coverage} = \frac{\text{Deb.interest+Pref. dividend+Equity earning}}{\text{Deb.interest+Pref. dividend}}$$

$$\text{Interest \& Fixed Dividend Coverage} = \frac{\text{Debenture interest+PAT}}{\text{Debenture interest+Preference dividend}}$$

(7) Right ValuationA. Price of share after right issue/ Ex-right price

$$\frac{(\text{Existing MPS} \times \text{Existing No. of shares}) + (\text{Right issue price} \times \text{No. of right share})}{(\text{Existing No. of shares}) + (\text{No. of right share})}$$

MPS = Market price per share

Concept/ Memory trick:  $\frac{\text{Existing value} + \text{New Funds}}{\text{Existing shares} + \text{New shares}}$

B. Value of Right

Value of right = Price after right issue – Right issue price

C. Value of Right per original share

$$= \frac{\text{Value of right}}{\text{No. of original share required to buy 1 right share}} \quad \text{or}$$

$$= \text{Existing MPS} - \text{Ex-right price}$$

(7) Bond Valuation

$$\text{YTM} = \frac{\text{Annual interest} + \frac{(\text{Redemption value} - \text{purchase price})}{\text{maturity}}}{\frac{(\text{Redemption value} + \text{purchase price})}{2}}$$

Value of bond = Present value of all future cash flows from the bond

Redeemable Bond

$$\text{Value of bond} = \frac{\text{Interest}}{(1+K_d)} + \frac{\text{Interest}}{(1+K_d)^2} + \frac{\text{Interest}}{(1+K_d)^3} + \dots + \frac{\text{Interest}}{(1+K_d)^n} + \frac{\text{Redemption value}}{(1+K_d)^n}$$

Irredeemable Bond

Bonds which will be hold till eternity, they will not have any redemption value

$$\text{Value of bond} = \frac{\text{Interest}}{(K_d)}$$

## Zero Coupon Bond (ZCB)

Value of ZCB = Present value of redemption amount

$$\text{Value of bond} = \frac{\text{Face value of ZCB}}{(1 + K_d)^n}$$

## (8) Duration and Convexity

### Modified Duration (Volatility of bond)

It represents % change in market price of bond due to 1% change in yield rate (YTM)

$$\text{Modified duration or volatility of bond} = \frac{\text{Macaulay Duration in years}}{1 + \text{YTM}}$$

% Change in market price of bond = Change in YTM% × Modified duration

₹ Change in market price of bond = Market price × % Change in market price of bond

### Convexity

Convexity of bond =  $C \times (\text{Change in YTM in decimals})^2 \times 100$

$$C = \frac{\text{Average of upward \& downward change}}{(\Delta Y)^2} = \frac{\frac{(V_+) - (V_0)}{V_0} + \frac{(V_-) - (V_0)}{V_0}}{2} \times \frac{1}{(\Delta Y)^2}$$

$$C = \frac{(V_+) + (V_-) - (2V_0)}{(2V_0) \times (\Delta Y)^2}$$

Here,  $V_+$  = Price of bond if YTM increase by  $\Delta Y$

$V_-$  = Price of bond if YTM decrease by  $\Delta Y$

$V_0$  = Initial price of bond

$\Delta Y$  = Change in YTM

## (9) Convertible Bond

### 1. Conversion ratio

No. of share per bond on conversion

### 2. Conversion value/ Stock value

= Conversion ratio × Market price per share

### 3. Conversion Premium or Premium over conversion value

Total conversion premium = Market price of bond – conversion value

$$\text{Conversion premium in \%} = \frac{(\text{Market price of bond} - \text{conversion value})}{\text{Conversion value}} \times 100$$

$$\text{Ratio of Conversion premium} = \frac{(\text{Market price of bond} - \text{conversion value})}{\text{Conversion value}} \times 100$$

$$\text{Conversion premium per share} = \frac{(\text{Market price of bond} - \text{conversion value})}{\text{Conversion ratio}}$$

4. Conversion Parity price or Market Conversion Price

$$\text{Conversion parity price} = \frac{\text{Market price of bond}}{\text{Conversion ratio}}$$

$$\text{Conversion parity price} = \text{Current market price of share} + \text{Conv. Premium per share}$$

5. Favourable Income differential per share

$$= \frac{\text{Coupon interest from bond} - (\text{conversion ratio} \times \text{dividend per share})}{\text{Conversion ratio}}$$

6. Premium payback period

$$\text{Payback period} = \frac{\text{Conversion premium}}{\text{Favourable income differential per share}}$$

7. Straight value of bond

Straight value = present value of future cash flow from bond without conversion option

8. Percentage of downside risk

$$\% \text{ of downside risk} = \frac{\text{Market price of bond} - \text{Staright Value}}{\text{Market price of bond}}$$

9. Premium over straight value

$$\text{Premium over straight value} = \frac{\text{Market price of bond} - \text{Staright Value}}{\text{Staright value of bond}}$$

(10) Money Market Instrument

$$\text{Yield} = \frac{(\text{Face Value} - \text{Issue Price})}{\text{Issue Price}} \times \frac{365}{\text{Actual days to maturity}} \times 100$$

Repurchase Options (Repo.) and Reverse Repurchase Agreement (Reverse Repo)

In this transaction a bank raise fund from another bank by selling government of India (GOI) bonds and also agree to repurchase the bond after a specified time by paying interest at repo rate on the initially raised fund

Clean Price: The price of GOI bond at the time when last interest is paid on bond.

Dirty Price or Current Market Price = Clean Price + Accrued interest on GOI bond

$$\text{Accrued interest} = \text{Face value} \times \text{Interest rate on bond} \times \frac{\text{Accrued days}}{365}$$

## Portfolio Management

### (1) Return, Expected return, Average return, Variance

$$\text{Return (X)} = \frac{D + (P_1 - P_0)}{P_0} \times 100$$

Expected return ( $\bar{X}$ ) =  $\Sigma(PX)$  = sum total of (probability x possible return)  
here, P = probability and X = possible return

$$\text{Average return } (\bar{X}) = \frac{\Sigma X}{N}$$

$$\text{Variance } (\sigma^2) = \Sigma\{(X - \bar{X})^2 \times p(x)\}$$

$$\text{For historical data, } \sigma^2 = \frac{\Sigma(X - \bar{X})^2}{N} \text{ where.}$$

$$\text{Standard deviation } (\sigma) = \sqrt{\text{Variance}} = \sqrt{\frac{\Sigma(X - \bar{X})^2}{N}} = \sqrt{\Sigma(X - \bar{X})^2 \cdot p(x)}$$

$$\text{Covariance (Cov}_{AB}) = \frac{\Sigma(X - \bar{X})(Y - \bar{Y})}{N} = \Sigma(X - \bar{X})(Y - \bar{Y})P$$

$$\text{Covariance (Cov}_{AB}) = \sigma_A \times \sigma_B \times r_{AB}$$

$$\text{Covariance (Cov}_{AB}) = B_A \times B_B \times \sigma_M^2 \text{ (used in TYK 14)}$$

$$\text{Correlation } (r_{AB}) = \frac{\text{Cov}_{AB}}{\sigma_A \sigma_B}$$

$$\text{Correlation } (r_{AB}) = \frac{\text{Beta A} \times \text{Beta B} \times \sigma_M^2}{\sigma_A \times \sigma_B}$$

$$r_{AB} = r_{AM} \times r_{BM}$$

$r_{AB}$  = Correlation between security A & B

$r_{AM}$  = Correlation between security A & market

$r_{BM}$  = Correlation between security B & market

Co-efficient of determination ( $r^2$ ) = systematic risk/ total risk

Co-efficient of determination ( $r^2$ ) = square of Correlation Coefficient (r)

$$\text{Coefficient of variation} = \frac{\text{Standard Deviation}}{\text{Expected Return}}$$

$$\text{Beta } (\beta_X) = \text{Cov}_{XM} / \sigma_M^2$$

$$\text{Beta } (\beta_X) = r_{XM} \times \sigma_X \times \sigma_M / \sigma_M^2$$

$$\text{Beta } (\beta_X) = r_{XM} \times \sigma_X / \sigma_M$$

(2) Portfolio Risk

Total risk of stock/ portfolio = Total Systematic risk + Total Unsystematic risk

Systematic risk =  $(\beta \text{ of stock})^2 \times \text{variance of market } (\sigma_M^2)$

Systematic risk for portfolio =  $(\beta \text{ of portfolio})^2 \times \text{variance of market } (\sigma_M^2)$

Unsystematic risk of stock X  $(\epsilon_X^2) = \text{Total risk } (\sigma_X^2) - \text{Systematic risk } (\beta_X^2 \times \sigma_M^2)$

Unsystematic risk for portfolio  $(\epsilon_P^2) = (W_X^2 \times \epsilon_X^2) + (W_Y^2 \times \epsilon_Y^2)$

Here,  $W_X$  and  $W_Y$  are the weight of security X & Y in portfolio

$\epsilon_X^2$  &  $\epsilon_Y^2$  are the unsystematic risk of X & Y in portfolio

Portfolio Variance  $(\sigma_P^2) = (W_A^2 \times \sigma_A^2) + (W_B^2 \times \sigma_B^2) + (2 \times W_A \times W_B \times \underline{\sigma_A \times \sigma_B \times r_{AB}})$   
or

Portfolio Variance  $(\sigma_P^2) = (W_A^2 \times \sigma_A^2) + (W_B^2 \times \sigma_B^2) + (2 \times W_A \times W_B \times \underline{\text{Covar}_{AB}})$   
or

Portfolio Variance  $(\sigma_P^2) = (W_A^2 \times \sigma_A^2) + (W_B^2 \times \sigma_B^2) + (2 \times W_A \times W_B \times \underline{B_A \times B_B \times \sigma_M})$

Beta of portfolio  $(\beta) = (W_A \beta_A) + (W_B \beta_B) + \dots W_n \beta_n$

(3) CAPM, Characteristic line and Security market line

Required return  $(R_i) = \text{Risk free rate} + \text{Risk premium on security}$

Required return  $(R_i) = R_f + \beta (R_m - R_f)$

Equation of characteristic line:  $\bar{R}_S = \alpha + \beta R_m$

Security market line:  $R_i = R_f + \beta (R_m - R_f)$

(4) Arbitrage pricing theory (APT)

$E(R_i) = R_f + FRP_1 \beta_1 + FRP_2 \beta_2 + FRP_3 \beta_3 + \dots + FRP_n \beta_n$

Where,

$R_f$  = Risk Free Rate

$FRP_n$  = Factor risk premium

$\beta_n$  = Sensitivity of the Factor n

Factor sensitivity of portfolio  $(\beta) = (W_1 \beta_1) + (W_2 \beta_2) + \dots W_n \beta_n$

weighted average of factor sensitivity of stock 1,2.... n in portfolio

(5) Sharpe Ratio, Treynor ratio and Alpha

Sharpe ratio =  $\frac{(R_x - R_f)}{\sigma}$

$$\text{Treynor ratio} = \frac{(R_x - R_f)}{\beta}$$

$R_x$  = Return on Security x/Portfolio

$R_f$  = Risk Free Rate of Return

$\beta$  = Beta of Security or Portfolio

Alpha = Actual Return on portfolio – Expected Return on portfolio as per CAPM.

### (6) Minimum Risk/ Variance Portfolio

For constructing the minimum risk portfolio of 2 securities A & B, the condition to be satisfied is

$$W_A = \frac{\sigma_B^2 - \text{Cov}AB}{\sigma_A^2 + \sigma_B^2 - 2\text{Cov}AB} \quad \text{Memory trick: } \frac{\text{dusre ka variance} - \text{covariance}}{\text{dono ka variance} - 2 \times \text{covariance}}$$

$$W_B = 1 - W_A$$

### (7) Sharpe's Optimum Portfolio

(a) Calculate Treynor ratio for each security, Treynor ratio =  $\frac{(R_x - R_f)}{\beta}$

| Security | Return ( $R_x$ ) | Beta ( $\beta_x$ ) | Excess return ( $R_x - R_f$ ) | Treynor ratio |
|----------|------------------|--------------------|-------------------------------|---------------|
|          |                  |                    |                               |               |

(b) Make a ranked table by listing securities in sequence of highest to the lowest Treynor ratio.

| Security<br>(High to low) | $R_x - R_f$ | $\beta_x$ | $\epsilon_x^2$ | $\frac{\beta}{\epsilon^2} \times (R_x - R_f)$ | Cumulative total of column E | $\frac{\beta}{\epsilon^2} \times \beta$ | Cumulative total of column G | C value<br>$\frac{\sigma_M^2 \times \text{column F}}{1 + (\sigma_M^2 \times \text{column H})}$ |
|---------------------------|-------------|-----------|----------------|-----------------------------------------------|------------------------------|-----------------------------------------|------------------------------|------------------------------------------------------------------------------------------------|
| A                         | B           | C         | D              | E                                             | F                            | G                                       | H                            | I                                                                                              |

Here,

$\epsilon_x^2$  = Unsystematic risk

$$\text{C value} = \frac{\sigma_M^2 \times \text{column F}}{1 + (\sigma_M^2 \times \text{column H})}$$

(c) Highest C value as calculated in column I is taken as cut off point

(d) Securities having Treynor ratio  $\geq$  cut off point, should be selected

(e) Calculate Z value for selected securities (in 4 decimal)

$$\text{Z value} = \frac{\beta}{\epsilon^2} \times (\text{Treynor ratio} - \text{cut off})$$

(f) Calculate weight of each selected security as follow

$$\text{Weight} = \frac{\text{Z value of security}}{\text{Sum of Z value of all securities}}$$



## Mutual Fund

### (1) NAV, redemption price and public offer price

$$\text{NAV} = \frac{(\text{Total Assets} - \text{Total Liabilities})}{\text{Number of Outstanding Shares}}$$

$$\text{Redemption Price} = \text{NAV} - (\text{Redemption Price} \times \text{Back-end load}\%)$$

$$\text{Redemption Price} + (\text{Redemption Price} \times \text{Back-end load}\%) = \text{NAV}$$

$$\text{Redemption Price} \times (1 + \text{Back-end Load}\%) = \text{NAV}$$

$$\text{Public Offer Price} = \text{NAV} + (\text{Public offer Price} \times \text{Front end load}\%)$$

$$\text{Public Offer Price} - (\text{Public Offer Price} \times \text{Front End Load}\%) = \text{NAV}$$

$$\text{Public Offer Price} \times (1 - \text{Front End Load}\%) = \text{NAV}.$$

### (2) Holding Period Return and Annual Return

$$\text{HPR} = \frac{\text{Investment value at end} - \text{Investment value at beginning} + \text{Income distributed}}{\text{Investment value at beginning}}$$

$$\text{Investment value at end} = \text{No. of units} \times \text{NAV at end or redemption price}$$

$$\text{Investment value at beginning} = \text{No. of units} \times \text{NAV at beginning or offer price}$$

$$\text{Annual Return} = \frac{\text{Holding period Return} \times 365 \text{ days}}{\text{Number of days for which investment held}}$$

$$\text{Total NAV} = (\text{No. of units in MF1} \times \text{NAV of MF1}) + (\text{No. of units in MF2} \times \text{NAV of MF2})$$

$$\text{Total Yield} = \text{Income from MF1} + \text{Income from MF2} + \dots$$

$$\text{No. of days investment held} = \frac{\text{Holding period Return or Total Yield}}{\text{Annual Return or Annual Yield}} \times 365 \text{ Days}$$

$$\text{Date of investment} = \text{Period end date} - \text{No. of days investment held} + 1 \text{ day}$$

$$\text{Market value of equity share} = \text{Share price at cost} \times \frac{\text{Current value of index}}{\text{Value of index when share was bought}}$$

$$\text{Market value of bond} = \text{Face value of bond} \times \frac{\text{Interest rate or coupon on the bond}}{\text{market expectation on the bond}}$$

$$\text{NAV} = \frac{\text{Net assets of the mutual fund}}{\text{Number of units outstanding of mutual fund}}$$

## Derivatives Analysis and Valuation

### (1) Theoretical Pricing/ Valuation of Forward/ Future

Future price = Spot price + Carrying cost – Returns (dividends, etc.)

If simple interest rate = annual p.a. rate is given

Future price = Spot price  $\times (1 + \text{Rate} \times \text{period})$

If Compounded interest rate = monthly rate or annual rate with monthly rest is given

Future price = Spot price  $\times (1 + \text{Rate})^{\text{period}}$

If Continuously Compounded interest rate is given or value of  $e^{(\text{rate} \times \text{period})}$  is given

Future price = Spot Price  $\times e^{(\text{rate} \times \text{period})}$

*\*If return or dividend is given in % p.a. then it will be adjusted in rate.*

*Rate = Interest rate – Dividend rate*

*\*If return or dividend is given in % but without p.a. then it is assumed that dividend will be received on expiry so, it will be reduced from (spot price + carrying cost) (TYK 4)*

*Future price = (Spot price + Carrying cost) – Face value  $\times$  Dividend %*

Price of 1 future contract

Price of 1 Future Contract = Price of 1 future  $\times$  Lot Size

Futures are traded in lots of different size.

Lot size = No. of future in 1 contract

Gain on Arbitrage = Theoretical value of future - Market price of future

### (2) Number of future contracts to be bought or sold for hedging

$$\frac{- \text{Value of share portfolio} \times (\text{Existing } \beta - \text{Required } \beta)}{\text{Price of 1 future contract} \times \beta \text{ of future}}$$

### (3) Margin in Future Contract

If initial margin % is given in question (AQ 1)

Initial margin = Contract value  $\times$  Initial margin %

If initial margin % is not given in question (TYK 14)

Initial margin =  $\mu + 3\sigma$

$\mu$  = Daily absolute change amount in contract value

$\sigma$  = Standard deviation in daily absolute change

Maintenance margin = Initial margin  $\times$  Maintenance margin %

Maintenance margin = Contract value  $\times$  Maintenance margin %

(4) Binomial Model

$$\text{Probability of up move (p)} = \frac{r-d}{u-d}$$

$$r = (1 + \text{risk free rate}) = e^{(\text{rate} \times \text{period})}$$

$$d = \frac{\text{Price after down move}}{\text{Price before down move}}$$

$$u = \frac{\text{Price after up move}}{\text{Price before up move}}$$

$$\text{Probability of down move} = 1 - \text{Probability of up move}$$

$$\text{Delta} = \frac{V_u - V_d}{S_u - S_d}$$

$V_u$  = Value of option if price goes up

$V_d$  = Value of option if price goes down

$S_u$  = Upward price of the stock

$S_d$  = Downward price of the stock

(5) Black-Scholes Model

$$\text{Call Option price} = \{S \times N(d_1)\} - \left\{ \frac{X}{e^{(r \times t)}} \times N(d_2) \right\}$$

$S$  = current stock price

**\*If value of dividend is given in question reduce the PV of dividend from current stock price (Ill 3).**

$X$  = strike price of the option

$t$  = time remaining until expiration, expressed as a percent of a year =  $\frac{\text{No. of month}}{12}$

$r$  = annual continuously compounded risk-free interest rate

$$D_1 = \frac{\log\left(\frac{S}{X}\right) + \left(r + \frac{\sigma^2}{2}\right) \times t}{\sigma \sqrt{t}}$$

$$D_2 = D_1 - \sigma \sqrt{t}$$

$N(x)$  = standard normal cumulative distribution function (Area under Normal Curve)

Total area under normal curve = 1 so,  $N(x)$  can be calculated as follow

$$N(x) = 1 - \text{Area under one tail}$$

If two tail is given then

$$N(x) = 1 - \frac{\text{Area under two tails}}{2}$$

(6) Put-Call Parity

$$V_S + V_P = PV(E) + V_C$$

Both LHS and RHS portfolio will have the same payoff in all scenario.

$V_S$  = Current price of the underlying asset

$V_P$  = Price of put option at strike price E

$V_C$  = Price of call option at strike price E

$PV(E)$  = Present value of the strike price E discounted at the risk-free rate

**Foreign Exchange Exposure and Risk Management**(1) Annual Premium & Discount %

$$\text{Premium or (Discount) \% on base currency} = \frac{\text{Forward rate} - \text{Spot rate}}{\text{Spot rate}} \times \frac{12}{\text{month}}$$

**Calculation of forward rate from premium or discount %**

(1) If Premium or Discount % is given on **base currency**

Premium %: Add to the spot rate in base currency

$$\text{Forward rate} = \text{Spot rate} \times (100 + \text{Premium \% in base currency})$$

Discount %: Deduct from the spot rate in base currency

$$\text{Forward rate} = \text{Spot rate} \times (100 - \text{Discount \% in base currency})$$

(2) If Premium or Discount % is given on **price currency**

Premium %: Deduct from the spot rate in base currency

$$\text{Forward rate} = \text{Spot rate} \times (100 - \text{Premium \% in price currency})$$

Discount %: Add to the spot rate in base currency

$$\text{Forward rate} = \text{Spot rate} \times (100 + \text{Discount \% in price currency})$$

(2) Interest Rate Parity (IRP)

$$\text{Forward rate} = \text{Spot rate} \times \frac{(1 + \text{Interest rate in price currency})}{(1 + \text{Interest rate in base currency})}$$

(3) Purchasing Power Parity (PPP)

$$\text{Forward rate} = \text{Spot rate} \times \frac{(1 + \text{Inflation rate in price currency})}{(1 + \text{Inflation rate in base currency})}$$

(4) Other formula

$$\% \text{ Increase in demand} = \text{Elasticity of demand} \times \% \text{ Decrease in price due to spot rate ch.}$$

## International Financial Management (IFM)

### (1) Required rate of return

If  $\beta$  is given in question then it can be calculated using CAPM Approach

Required return ( $R_i$ ) = Risk free rate + Risk premium on security =  $R_f + \beta (R_m - R_f)$

If  $\beta$  is not given in question then it will be calculated as follow

$(1 + \text{Risk free rate in home}) \times (1 + \text{Risk premium}) = (1 + \text{Required rate of return in home})$

$(1 + \text{Risk free rate in foreign}) \times (1 + \text{Risk premium}) = (1 + \text{Required rate of return in foreign})$

### (2) Modified Internal Rate of Return

$$\text{MIRR} = \sqrt[n]{\frac{\text{Future value of cashflow at then of the project}}{\text{Initial investment}}} - 1$$

$n$  = life of project

**\*Assume cashflow of year 0 as initial investment**

### (3) Cost of GDR

$$\text{Cost of GDR} = \frac{\text{Dividend per GDR}}{\text{Net Proceed}} + \text{growth}$$

Dividend per GDR = No. of share underlying per GDR  $\times$  Dividend %  $\times$  Face value

Net Proceed = Issue price  $\times$  (1 - Floatation cost)

Issue price = No. of share underlying per GDR  $\times$  Market price  $\times$  (1 - Discount on issue)

Number of GDR to be issued

$$\text{Number of GDR to be issued} = \frac{\text{Amount required for investment in the project}}{\text{Net Proceed per GDR}}$$

## Interest Rate Risk Management

### (1) FRA Settlement or Gain/ (Loss) on FRA

FRAs are cash settled so, difference in FRA contract rate and actual rate is settled between buyer and seller

$$\text{Final Settlement} = \frac{\text{Notional principal} \times (\text{Actual rate} - \text{Contract Rate}) \times \text{Period}}{1 + (\text{Actual rate} \times \text{Period})}$$

### (2) Number of IRF Contract to bought or sold for perfect hedge

$$\text{No. of future contract to buy or sell} = \frac{\text{Loan amount} \times \text{Duration of loan}}{\text{Future contract size} \times \text{Duration of future}}$$

\* Duration of loan and duration of future can be different so, above formula is use to calculate the contracts for perfect hedge.

### (3) Gain/ (Loss) on Interest rate future

If IRF is bought = Future value  $\times$  No.of contract  $\times$  (Actual rate – Contract rate)  $\times$  period

If IRF is Sold = Future value  $\times$  No. of contract  $\times$  (Contract rate – Actual rate)  $\times$  period

### (4) Physical Settlement of Interest Rate Future

(Conversion Factor)  $\times$  (futures price) = Actual delivery price for a bond.

\* Future price of the treasury bond = face value of the bond

Profit/ (loss) on settlement

(Futures Settlement Price  $\times$  Conversion factor) – Quoted Spot Price of Deliverable Bond

## Business Valuation

### (1) Cost of capital of the company (Weighted average cost of capital)

$$WACC (K_o) = W_e \times K_e + W_d \times K_d$$

Here,  $K_e$  = Cost of equity (using CAPM) =  $R_f + \beta (R_m - R_f)$

$K_d$  = Post tax cost of debt = Cost of debt after tax = interest rate on debt  $(1 - \text{tax rate})$

$$W_e = \text{Weight of equity} = \frac{\text{Equity}}{\text{Equity} + \text{Debt}}$$

$$W_d = \text{Weight of debt} = \frac{\text{Debt}}{\text{Equity} + \text{Debt}}$$

Use market value of debt & equity as weight and if market value is not available then use book value as below

Equity = Equity Share capital + Reserves & Surplus + Intangible asset not recorded

Debt = Long term debt (Debenture, Long term loan, Borrowings etc.)

**\*If there is long term debt but cost of debt ( $K_d$ ) is not given in question then calculate WACC using CAPM where  $\beta$  = Asset beta.**

### (2) Asset Based Valuation

#### (1) Net Asset Value/ Book Value

Value of equity = Net Asset at book value

= Fixed Assets + Net Current Asset – Long Term Debt – Contingent liability (if any)

= Equity share capital + Reserve & surplus – Contingent liability (if any)

#### (2) Net Realizable Value

Value of equity = Net Asset at realisable value

= Net asset at book value + Extra amount realised over book value – Lesser amount realised over book value

### (3) Income based

#### (1) PE Ratio or Earning Yield Multiplier

Price Per Share = EPS x PE Ratio

$$\text{PE Ratio} = \frac{\text{Price}}{\text{EPS}} = \frac{1}{\left(\frac{\text{EPS}}{\text{Price}}\right)} = \frac{1}{\text{Return on equity}}$$

$$\text{EPS} = \frac{\text{Earning available for equity}}{\text{Total number of share}} = \frac{\text{Profit after tax} - \text{Preference dividend}}{\text{Total number of share}}$$

(2) Earning Capitalization Method

$$\text{Capitalized Earning Value} = \frac{\text{Expected Annual Maintainable Profit}}{\text{Capitalization Rate or Required Earning Yield}}$$

(4) Equity Value and Enterprise value

Enterprise value = Equity value + Debt - Surplus funds

Equity value = Enterprise value - Debt + Surplus funds

Equity Value = Number of shares × Market price of share

Question based on above concept: Illustration 2, 3, AQ1

(5) Economic Value Added (EVA)

EVA = NOPAT - (Invested capital × WACC)

NOPAT = Net Operating Profit After Tax

| Calculation of NOPAT                                                 | Amount    |
|----------------------------------------------------------------------|-----------|
| EBIT                                                                 | XX        |
| Less: Tax on EBIT                                                    | (XX)      |
| <b>Net Operating Profit After Tax</b>                                | <b>XX</b> |
| Add: Non cash expense (e.g., provision for bad debt)                 | XX        |
| <b>Adjusted Net Operating Profit After Tax to be used in formula</b> | <b>XX</b> |

If EBIT is not given in question but

(1) Profit after tax (Net income) is given then

| Calculation of EBIT                                                           | Amount    |
|-------------------------------------------------------------------------------|-----------|
| Profit before tax ( $\frac{\text{Profit after tax}}{(1 - \text{tax rate})}$ ) | XX        |
| Add: Interest expense                                                         | XX        |
| <b>EBIT</b>                                                                   | <b>XX</b> |

(2) Financial leverage is available then (TYK 9)

Solve this equation to calculate EBIT

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}} = \frac{\text{EBIT}}{\text{EBT}}$$

Calculation of invested capital

| Calculation of Invested capital from liability side                    | Amount    |
|------------------------------------------------------------------------|-----------|
| Equity Share Capital                                                   | XX        |
| Add: Reserves and surplus                                              | XX        |
| Add: Long term debt (debentures, long-term borrowing etc.)             | XX        |
| Add: Intangible asset (e.g., patent) not recorded in books             | XX        |
| Add: Non cash adjustments done in NOPAT (e.g., provision for bad debt) | XX        |
| <b>Invested capital</b>                                                | <b>XX</b> |



| Calculation of Invested capital from Asset side                        | Amount    |
|------------------------------------------------------------------------|-----------|
| Total Asset                                                            | XX        |
| Less: Current liabilities                                              | XX        |
| Add: Intangible asset (e.g., patent) not recorded in books             | XX        |
| Add: Non cash adjustments done in NOPAT (e.g., provision for bad debt) | XX        |
| <b>Invested capital</b>                                                | <b>XX</b> |

$$\text{EVA dividend} = \frac{\text{EVA}}{\text{Number of equity share}}$$

#### (6) Relationship between Asset Beta, Equity Beta & Debt Beta

$$B_{\text{asset}} = \beta_{\text{equity}} \times \frac{\text{Equity}}{\text{Equity} + \text{Debt} (1 - \text{tax})} + \beta_{\text{debt}} \times \frac{\text{Debt}}{\text{Equity} + \text{Debt} (1 - \text{tax})}$$

## Mergers, Acquisition and Corporate Restructuring

### (1) Synergy, Promoter holding, Non promoter holding

Value of synergy = Combined value – (Value of acquirer + Stand-alone value of target)

**\*Synergy can be in market value or earnings or cost etc.**

Promoters holding =  $\frac{\text{No. of equity share held by promoter}}{\text{Total no. of equity shares outstanding in company}}$

Non promoters holding =  $\frac{\text{No. of equity share held by non-promoter}}{\text{Total no. of equity shares outstanding in company}}$

Non promoters holding = 1 – Promoter holding

### (2) Equivalent EPS & Market price for shareholder of Target

Equivalent EPS for Target = EPS after merger × Exchange Ratio for target shareholders

**\* Need to calculate the equivalent EPS for target company if question ask to “Illustrate the impact of merger on EPS” (TYK 8)**

Equivalent Market price for Target = Market price per share × Exchange Ratio

### (3) True Cost of merger or Net cost of acquisition

It's the cost to the acquiror which can be calculated as difference between the market value of share held by target shareholders after and before merger.

True cost for Acquiror or Net cost of acquisition in stock deal

= (MV of new co. after merger × % held by target) - MV of target before merger

True cost for Acquiror or Net cost of acquisition in cash deal

= Cash paid to shareholder of target - MV of target before merger

### (3) Market Value of Merged Firm

If PE ratio is given or PE ratio of acquiror continue or it can be calculated from question

Total Market Value = PE ratio × Total earning of the company

Total Market Value = Market price per share (calculated using PE) × Total no. of share

If Market value of synergy is given or question ask to ignore synergy then use this

Total Market Value = Market value of Acquiror + Market value of Target + synergy

**\*If question ask to calculate “value of original shareholder”, then ignore the PE ratio and calculate the market value of firm by adding the market value of target & Acquiror.**

**Value of acquiror shareholder = Value of firm after merger × % held by Acquiror**

**Value of Target shareholder = Value of firm after merger × % held by Target (TYK 14)**

**\*If question gives the PE ratio of acquiror but does not give the PE ratio after merger then assume that PE ratio of acquiror before merger will continue and remain unchanged after merger (TYK 24).**

(4) Book Value of Merged Firm

Book value = Equity Share Capital + Reserves (including capital reserve) – Preliminary expense

Total book value post-merger = Book value of Acquiror + Book value of Target

Book value per share =  $\frac{\text{Book value}}{\text{Total number of equity shares}}$

(5) Ratios

(1) Capital Adequacy ratio (CAR) =  $\frac{\text{Total Capital}}{\text{Risky Weighted Assets}}$

To calculate CAR after merger, calculate the total capital and risky weighted assets of merged firm as below (**risky weighted assets are not available in balance sheet**).

Total capital (TC) = Share capital + Reserves + Capital reserves – Preliminary expense

Risky weighted asset after merger =  $\frac{\text{Total Capital of Acquiror}}{\text{CAR of Acquiror}} + \frac{\text{Total Capital of Target}}{\text{CAR of Target}}$

(2) Gross NPA (GNPA%) =  $\frac{\text{Gross NPA}}{\text{Gross Advance}}$

NPA after merger = GNPA%<sub>Acquiror</sub> × Advance<sub>Acquiror</sub> + GNPA%<sub>Target</sub> × Advance<sub>Target</sub>