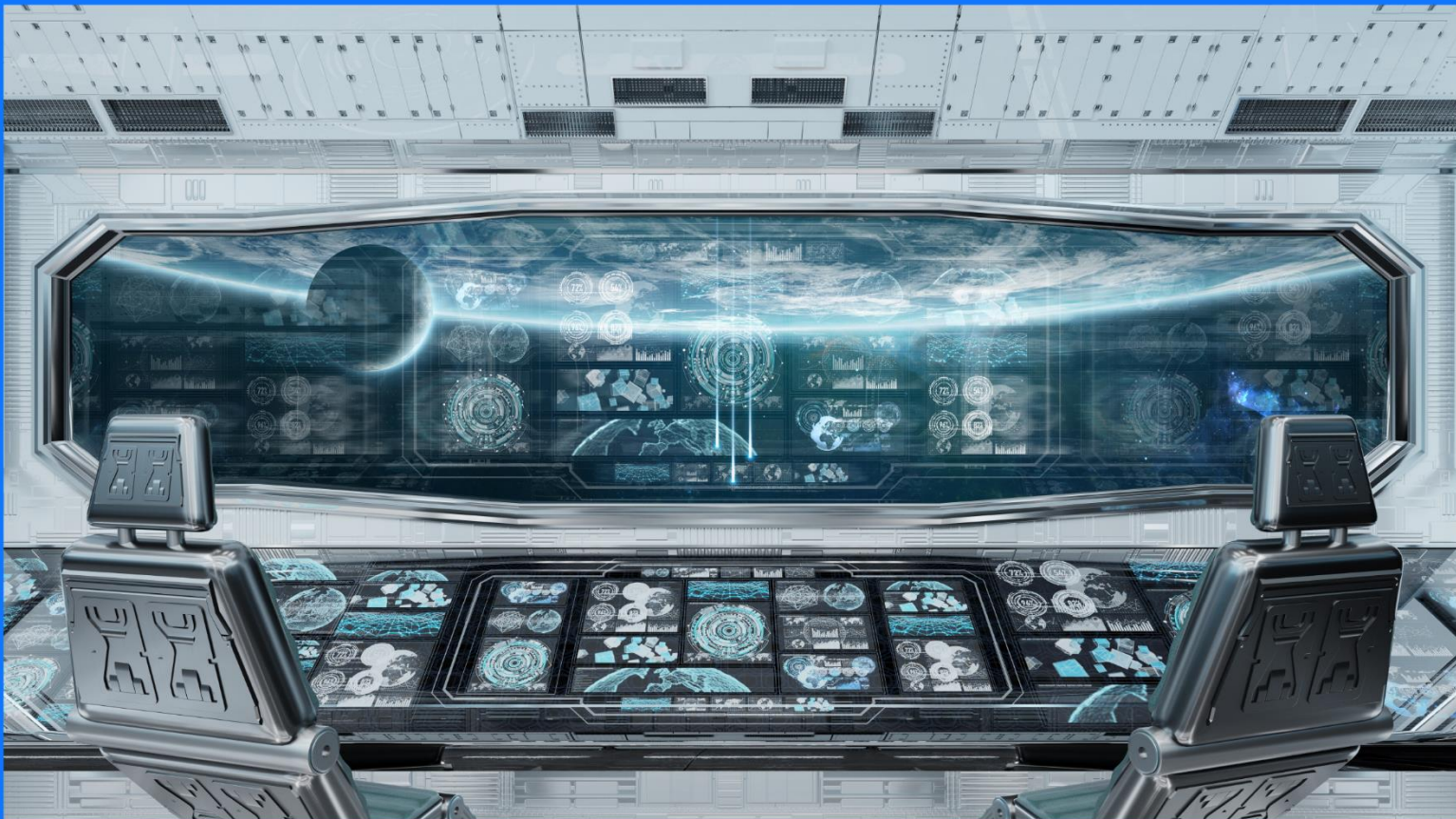




PFM Body of Knowledge



International Financial Modeling Institute

About PFM Body of Knowledge

Professional Financial Modeler Body of Knowledge (PFM BOK) is a curriculum guideline for candidates who wish to prepare for taking PFM Examination mainly the Multiple Choice Examination. The BOK is the learning objective when preparing for PFM Examination to provide the outline of what will appear in PFM Multiple Choice Examination. PFM BOK is developed on a global basis, meaning there is a unified curriculum applicable for every country where PFM Examination is administered.

PFM Body of Knowledge (PFM BOK) is developed based on analysis and consensus of what a modeler should know to analyze a company or business and prepare a sound financial model.

Before attending PFM Examination, every Candidate is responsible for ensuring the mastery of Examination Curriculum as stated on the latest BOK either through self-learning, research, obtaining learning materials from a third party or by attending training programs in the form of classroom or e-learning conducted by Licensed Training Provider. Every Licensed Training Provider is required to develop curriculum material or deliver training based on the latest BOK.

For Candidate who wants to take PFM Examination, it is crucial that the Candidate checks for any possible updates by downloading the latest version of this BOK from PFM Website and carefully run through the list of the required knowledge tested in PFM Examination.

PFM BOK is designed to push the boundary of financial and investment knowledge of a Candidate. PFM BOK is developed in such a way not only to reflect the current best practice but also to include promising new concepts and understanding which may not be mainstream among analysts. By incorporating specific subjects in PFM BOK, the candidates will be compelled to learn and master the subjects.

By acquiring the knowledge for exam preparation, a Candidate is exposed to concepts and subjects which can be adopted into practice. The inclusion of subjects in PFM Examination is done after deep logical consideration is done on the concepts. Emphasis on the practicality and applicability of the concepts for investment professionals is the main consideration for the inclusion of concepts in BOK.

Provisions on PFM BOK

Each of the Sections is divided into Chapters, where each Chapter explains a specific discussion within the Section. Topic in each Chapter is further divided into particular instruction outlines called Detailed Outline Subtopic (DOS) to ensure the comprehensive standardization of topics appear in the examination.

The DOS is updated, enhanced and increased from time to time to ensure the thoroughness of the PFM Curriculum and its applicability with the financial model and analyst profession. DOS which is not considered applicable may be taken out from Curriculum. The number of DOS will increase further in the future.

For computer practice examination, the development of examination problem ingrains various DOSes from different sections. It is assumed that the examination candidate already knows how to apply a particular DOS in spreadsheet-based financial models. Please note that not every DOS will appear in Computer Practice Examination.

To allow simple tracking of change in curriculum, DOS which does not appear in the previous version of BOK is marked as 'New.'

How Examination Problems May Appear from BOK

This PFM BOK is the basis for determining how the examination problems appear mainly in Multiple Choice Examination. The multiple choice examination problems are based on each DOS of BOK. Each DOS has the probability to appear as one or more examination problems. But the BOK also becomes the basis for determining the format of Computer Practice Examination problems. None of PFM Examination problems will deviate from the latest BOK. That also means there could be problems which test the understanding of the stated knowledge on practical context or cases.

As the BOK is designed to be open-ended, examination problem variation based on each PFM DOS is endless. A competent candidate is expected to be able to answer the examination problem correctly. However, there is a standard guideline on how an examination problem may appear based on the DOS of the BOK. Examination problem will likely appear to test:

1. understanding of the definition of a specific topic
2. understanding of the mechanics, use, and applicability of the concept
3. basic or conceptual calculation on a specific concept if the DOS specifically mentions instruction pertaining to calculation
4. cases based on the application of specific DOS

Below is the knowledge or topic which is unlikely to be tested in PFM Examination:

1. Concepts which are mainly theoretical with no practical application
 2. Knowledge which requires serious understanding in any programming language to develop or put into practice
 3. Knowledge which will mostly promote specific third party software to use other than standard Excel or spreadsheet software
 4. Complex calculations which require more than a simple basic calculator to solve such as Time Value of Money or calculation which cannot be reasonably solved within the allocated time limit by a reasonably competent candidate
 5. Complex mathematical formula derivation such as the use of calculus
 6. Problems which require a complex process which cannot be solved within the allocated time limit
 7. Cases which is specific to particular job function, geography or sector which requires specific knowledge not commonly known by candidates in general
 8. Complex application cases and problems
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The Main Sections of PFM BOK

The BOK is divided into seven main Sections, and each has specific topics or concepts that a candidate needs to understand as outlined below:

1. Accounts and Reports Used for Financial Model

The common format of generic financial statement format (income statement, balance sheet, cash flow statement) used for building a financial model. The use, purpose and logical calculation of each account in a financial model. Candidate needs to understand how to make a balanced projection by using the direct and indirect method. The difference between common practice in a financial model with accounting standard may also be tested.

2. Forecasting Techniques and Assumptions

Understand the use of some forecasting tools along with the strengths and weaknesses of each method. Also about important forecasting techniques by using regression and time series for the linear, non-linear and cyclical forecast. Exam Candidates need to know how to create single variable Monte Carlo prediction by using Excel by using probabilistic distributions based on the linear and non-linear drift. Candidate needs to know how to apply Monte Carlo simulation in preparing important assumptions.

3. Financial Projection

Candidate needs to understand various projection assumptions commonly used in preparing financial projections, both macroeconomic and firm-specific projections. Some specific topics are tested such as modeling FX rate, interest rate, and inflation. Understand conceptually to derive interest rate from bond yields by using the bootstrapping technique.

On the specific firm assumptions, a candidate needs to understand the technical logic of various accounting provisions and accounts in financial model and analysis context. Understand how to prepare various assumptions to derive a sustainable model based on continuous fixed asset investments, continuous long term loan balance, preparing depreciation and amortization table, loan model, model intangibles, goodwill, and how to account investment in subsidiaries by using various methods. Know how to develop a financial projection step by step.

4. Valuation Methodologies

This section deals mainly on how to conduct valuation based on several different valuation methods based on time value, relative value, and asset-based methods. This valuation section covers the valuation of equities, bonds and to a lesser extent, certain other asset classes.

Understand about single rate and multiple rates Present Value and develop Required Rate of Return by using single interest rate and multiple interest rates. Able to calculate firm and equity value by using various discounted based models, namely Discounted Cash Flow (DCF) model, Enterprise Value based DCF models, Dividend Discount Model and Residual Income Models. Candidate needs to understand the connectivity between valuation concepts and the material differences and weaknesses of each method. Candidates are able to value a company by using price multiples.

5. Project Financial Model and Feasibility Analysis

Candidate needs to understand about financial model for a specific project, the crucial aspects of preparing a model. Differ between financial projection for corporate and project. Feasibility analysis of a project by using methods such as NPV, IRR, Discounted Payback, Profitability Index and others.

On discounted based feasibility tools, Candidate needs to understand the behavior of various feasibility tools given the change of discount rates and on how different projects may have different behavior given the change of discount rate. Candidate needs to understand how to apply Term Structure NPV and understand the various flaws of specific feasibility tools such that may severely impact the actual feasibility of a project. Candidate needs to know the interaction of different feasibility tools and also the direct connectivity between feasibility and valuation methods and on how to apply the connectivity.

6. Financial Model Sustainability and Risk Analysis

This section covers two main topics: determination of financial model sustainability and risk analysis. The sustainability covers the understanding of how the predictability of a model will increase by developing the model realistically based on certain principles.

Candidate needs to understand sustainable modeling and various common flaws done by analysts which cause erroneous models and analysis. There is analysis on how to determine the sustainability of a model by using tools such as financial ratios, delta ratios, common size, and index analysis. Candidate needs to understand to conduct sensitivity risk analysis by applying duration based methods such as equity duration, NPV duration, factor sensitivity duration, cross duration, and others.

Candidate needs to know the difference between cross duration and correlation and to apply cross duration to determine the connectivity of different asset classes such as equity and bonds. Ability to identify the most influential (risky) assumptions is also tested. Method to conduct scenario analysis by using multi-factor sensitivity duration is also tested.

7. Credit Analysis Based on Financial Model

This topic describes the process to determine whether a company or project is creditworthy through the application of credit analysis on a model. There are two main methods to assess the creditworthiness of a company: by using cash flow analysis and deterministic models. Candidate needs to understand how to calculate Cash Flow Available for Debt Service (CFADS) and Net Cash Flow and to differ CFADS with Free Cash Flow and EBITDA. Candidate needs to know how to calculate DSCR and LLCR. Also able to connect conceptually between various concepts on valuation, feasibility and credit analysis. Candidate needs to understand how to apply a deterministic model in financial model format.

PFM BOK Detailed Outline Statement (DOS)

Instruction Words Used in DOS

Examination Candidates should take careful note on the wording of each DOS, as the wording provides guidance on how exam problem is structured and presented during the examination, in particular, for Multiple Choice Examination.

Note that the definition of each instruction is applied explicitly in interpreting PFM DOS and may not be suitable for other purposes. For a general guideline, DOS which contains wording of 'calculate,' 'construct,' 'prepare,' 'estimate,' 'forecast' or DOS pertaining to calculation requires the candidate to have the ability to conduct calculation on the method.

Below are the instruction words commonly used in PFM DOS.

Calculate	To find value through the application some mathematical formula
Classify	To assign to categories or group based on a certain parameter
Connect	To bring together so that a real or notional link is established
Construct	To build by putting together constituent components. DOS containing this wording will mainly appear as the component for Computer Practice Examination problem
Define	To mention the exact meaning of terminology or concept
Describe	To portray in words
Determine	To ascertain between choices
Differ	To compare the meaning between somewhat similar concepts
Discuss	To apply critical thinking and develop an argument on a concept
Estimate	To determine the approximate value by using less certain calculation methods
Explain	To make clear the understanding of a concept in more detail
Forecast	To estimate the value of something, mainly a single variable
Judge	To develop an opinion based on careful analysis of factors
Prepare	To put into a written format based on specific instruction. DOS containing this wording will mainly appear as the component for Computer Practice Examination problem
Understand	To infer comprehension from the provided explanation

Section I – Accounts and Reports Used in Financial Model Development

- 1.1. Understand the difference between a financial report and financial model
- 1.2. Understand why the structure of financial model reports is sometimes different from the International Financial Reporting Standard (IFRS)
- 1.3. Understand the format of Balance Sheet and Income Statement for Financial Model
- 1.4. Discuss the format of the financial statement
- 1.5. Understand the breakdown of revenue
- 1.6. Understand Cost of Goods Sold and why some companies do not have Cost of Goods Sold
- 1.7. Understand operating costs
- 1.8. Understand other income or expenses
- 1.9. Understand about comprehensive income
- 1.10. Understand the items in a balance sheet
- 1.11. Understand the different structure of balance sheet across different industries
- 1.12. Understand items regarded as Current asset
- 1.13. Understand Fixed asset including Capitalized Interest, Construction in Progress
- 1.14. Understand items in Current liabilities
- 1.15. Calculate Current Maturity of Long Term Liabilities
- 1.16. Understand various items in Long Term Liabilities
- 1.17. Understand various items in Equities
- 1.18. Calculate Retained Earnings and Other Comprehensive Income
- 1.19. Differ Cash versus Accrual Accounting
- 1.20. Classify transactions into Cash Flow Operating, Cash Flow Investing, and Cash Flow Financing
- 1.21. Describe Direct versus Indirect Cash Flow Statement
- 1.22. Prepare Indirect Cash Flow Projection, connect with the balance sheet and balance the projection

- 1.23. Understand the concept of working capital and Calculate Working Capital
- 1.24. Explain the mechanics of direct and indirect cash flow statement
- 1.25. Explain the strength and weaknesses of a direct and indirect cash flow statement
- 1.26. Understand the relationship between cash flow statement, balance sheet, and income statement
- 1.27. Prepare a cash flow statement for financial modeling purpose based on the direct and indirect method
- 1.28. Estimate the level of health of a company by looking at its cash flow

Section II – Forecasting Techniques and Assumptions

- 2.1. Calculate the average growth and Compounded Annual Growth Rate (CAGR) and understand the weaknesses of both methods
- 2.2. Understand the impact of using popular growth models to a global valuation
- 2.3. Understand Quantitative Forecasting methodologies
- 2.4. Understand Anchoring Technique and Moving Average Technique
- 2.5. Prepare the forecast by using nonlinear models
- 2.6. Prepare the best case, base case, and worst case scenario through forecasting
- 2.7. Prepare cyclical forecast using Autoregressive Method
- 2.8. Understand Linear and Multiple Regression
- 2.9. Estimate the predictive ability of a forecast model and understand how to improve the accuracy of a model
- 2.10. Understand and develop Monte Carlo Model
- 2.11. Differ between Normal and Lognormal Monte Carlo
- 2.12. Calculate probability by using Monte Carlo
- 2.13. Understand and develop Monte Carlo Simulation with various non-linear drifts including custom drift for projects
- 2.14. Understand and Calculate Value at Risk for a financial model
- 2.15. Understand How to Model Monte Carlo Value At Risk (VAR)
- 2.16. Understand the GARCH method and how to apply volatility prediction based on GARCH in Monte Carlo Simulation
- 2.17. Understand Monte Carlo for modeling interest rate
- 2.18. Understand the probabilistic nature of an assumption
- 2.19. Understand the types and nature of macroeconomic, industry and company related assumptions
- 2.20. Calculate future exchange rate
- 2.21. Understand yield to maturity, yield curve and spot interest rate
- 2.22. Understand how to calculate bonds value by using yield to maturity and spot interest rate

- 2.23. Understand the term structure model
- 2.24. Understand how to model growth and inflation rates by using several techniques
- 2.25. Calculate working capital turnover assumptions
- 2.26. Understand and calculate various types of capital expenditure including continuous capital expenditure
- 2.27. Understand Capitalized Interest
- 2.28. Calculate EBITDA and understand the strength and weakness of EBITDA
- 2.29. Calculate the model for Comprehensive Income items
- 2.30. Understand various types of intangibles including goodwill and calculate goodwill
- 2.31. Understand and calculate depreciation models and how to apply in model
- 2.32. Understand the model of various loan types including Continuous Loan
- 2.32. Understand and calculate Loan payment by using Amortization and Discretionary Method
- 2.33. Understand various types of Current Maturity of Long Term Liabilities for loans and bullet payment bonds
- 2.34. Understand and Differ Cost Method, Equity Method, Proportionate Consolidation Method, and Consolidation Method

Section III - Financial Projection

- 3.1. The purpose of preparing a financial model and the characteristics of financial models based on their purposes
- 3.2. Differ between financial model for credit, investment, mergers and acquisitions, and risk management purposes
- 3.3. Explain the role of standard error in determining the level of error of a projection
- 3.4. Understand how to build projection based on extensive assumptions
- 3.5. Explain The format of a financial model for a corporation
- 3.6. Explain how to construct subfolders supporting the accounts in a financial model
- 3.7. Calculate revenue by using multiple assumptions
- 3.8. Construct and differ COGS and inventory calculation for trading and manufacturing company
- 3.9. Construct an operating cost folder by using various costs with different calculation methodologies
- 3.10. Calculate foreign exchange gain or loss
- 3.11. Construct and calculate other income and other comprehensive income accounts
- 3.12. Prepare capital expenditure, intangibles, depreciation and amortization calculation, including continuous capital expenditure and depreciation based on various models
- 3.13. Construct debt schedule and interest calculation
- 3.14. Understand and calculate continuous loan
- 3.15. Construct Cash Flow Statement by Using Indirect Method
- 3.16. Understand and Calculate Working Capital
- 3.17. New Understand the impact of using different working capital calculation methods: Current Asset minus Current Liabilities and CFO method

- 3.18. Explain the technique to quickly and efficiently prepare a full set financial model
- 3.19 Connect the whole projection by building all supporting folders and folders and balance the balance sheet

Section IV – Valuation Methodologies

- 4.1. Understand multiple cash flow Present Value Method by using single and multiple discount rates
- 4.2. Understand and differ various valuation types
- 4.3. Understand the workflow of various valuation methods
- 4.4. Understand and calculate Free Cash Flow Methods: FCFF and FCFE
- 4.5. New Understand and calculate the difference between FCFF and FCFE and the impact to valuation
- 4.6. Understand required return and differ with a projected return
- 4.7. Understand and calculate Cost of Debt for a company with final and nonfinal tax
- 4.8. Understand the adjustment of Cost of Debt for the issuance of premium bonds, discount bonds, and zero coupon bonds
- 4.9. Understand and calculate Cost of Mezzanine: Cost of Preferred Shares
- 4.10. Understand and calculate Cost of Equity by using various models including Capital Asset Pricing Model
- 4.11. Understand the technique to generate a single risk-free rate by combining multiple discount rates
- 4.12. Understand Beta and calculate Beta from raw data
- 4.13. Calculate Beta for Non-Listed Companies
- 4.14. Understand and calculate Weighted Average Cost of Capital (WACC)
- 4.15. Understand the market value and book value weighting for calculating WACC
- 4.16. Understand and calculate Terminal Value based on the Constant Growth Model
- 4.17. New Understand the impact of Terminal Value to determine the valuation
- 4.18. Understand why Terminal Value based on constant growth model may lead to serious valuation bias and understand the terminal value method based on an H growth model

- 4.19. New Understand the relationship between firm value and equity value
- 4.20. Calculate Firm Value and Equity Value
- 4.21. Understand various types of value adjustment, explain about adjustment continuum and explain how to model companies with extreme valuation by using adjustment models
- 4.22. Understand Term Structure Discounted Cash Flow
- 4.23. Understand multiple rate Cost of Debt, Cost of Preferred Shares, Cost of Equity and WACC
- 4.24. Understand equity value by using Term Structure Discounted Cash Flow
- 4.25. Explain the strength and weakness of single and Term Structure Discounted Cash Flow
- 4.26. Construct model based on FCFF and FCFE for single and Term Structure DCF
- 4.27. Understand the connectivity between multiple asset classes
- 4.28. Understand the comparison between Enterprise Value and Firm Value and Calculate the connectivity between Enterprise Value and DCF based valuations
- 4.29. Calculate EV/EBITDA multiples and understand the strength and weakness of the multiple
- 4.30. Understand market-based valuation continuum and the bias on company valuation caused by using market-based average
- 4.31. Understand EV/EBITDA as a terminal value in DCF valuation, its use, and understand the strengths and weaknesses of the model
- 4.32. Construct EV/EBITDA based DCF model
- 4.33. Understand the Dividend Discount Model based on multiple cash flow
- 4.34. Understand the weakness of sustainable growth rate which causes bias in model-based Dividend Discount Model valuation
- 4.35. Understand the adjustment for preferred shares

- 4.36. Construct model based on single and Term Structure Dividend Discount Model
- 4.37. Understand Residual Income and the strengths and weaknesses of the model
- 4.38. Understand how to determine whether an investment creates value by using Residual Income Model
- 4.39. Construct model based on single and Term Structure Residual Income
- 4.40. Understand and calculate the most commonly used price multiples: Price to Earnings, Price to Book Value and Price to Sales ratios
- 4.41. Understand the strength and weakness of each price multiple
- 4.42. Understand and calculate price multiples based on fundamental valuation
- 4.43. Construct equity valuation by using several price multiples formula
- 4.44. Strength and weakness of equity value by using various techniques

Section V – Project Financial Model and Feasibility Analysis

- 5.1. Explain the characteristics and type of project
- 5.2. Compare the corporate and project model, including multi-project structure
- 5.3. Understand and explain the commonly used components in project financial model
- 5.4. Understand the components of project assumption
- 5.5. Understand the components commonly used in determining the capital expenditure of a project
- 5.6. Able to construct project term and financing schedule
- 5.7. Understand the difference between Cost of Goods Sold and operating expenses
- 5.8. Able to construct project revenue and expense projection
- 5.9. Understand how to apply depreciation based on various methods and different lifetime in a project
- 5.10. Understand how to apply depreciation method on multiple assets with different lifetime
- 5.11. Understand how to model project financing including interest during construction and interest expense
- 5.12. Calculate project working capital needs
- 5.13. Differentiate the difference between the model among different industries
- 5.14. Understand the purpose and rationale of the feasibility analysis
- 5.15. Describe and calculate feasibility analysis techniques: Payback Period, Discounted Payback Period, Net Present Value, Profitability Index, Internal Rate of Return and Modified Internal Rate of Return including the strength and weakness of each model
- 5.16. Calculate project periodic cash flow for feasibility analysis
- 5.17. Calculate project beta and discount rate
- 5.18. Understand the difference between cash flow and discount rate methodology used for corporate and project and the relationship between them

- 5.19. Understand the application of term structure in conducting a feasibility analysis
- 5.20. Compare valuation with feasibility
- 5.21. Understand the strength and weakness of each feasibility analysis tool
- 5.22. Differ and connect NPV feasibility tool with DCF as a valuation tool
- 5.23. New Understand the use of Residual Income valuation model to determine whether a company adds value to its shareholders
- 5.24. New Calculate Return on Development on project based on the combination of feasibility and valuation
- 5.25. New Explain how weaknesses of NPV which may impact the quality of decision making
- 5.26. New Understand the flaw of project size in NPV determination and explain how to correct the flaw
- 5.27. Explain the flaw to zero NPV as a threshold and determine project feasibility
- 5.28. Understand and calculate the methods for determining the threshold of nonfeasible positive NPV
- 5.29. Understand NPV profile and its role in determining project riskiness
- 5.30. New Understand NPV crossover and the impact in project decision making
- 5.31. Understand erroneous NPV Profile due to Multiple IRR and NPV Resurfacing
- 5.32. Understand Distance to Zero NPV
- 5.33. Explain the detail of a full set project financial model

Section VI – Financial Model Sustainability and Risk Analysis

- 6.1. Understand sustainability modeling and why preparing sustainable model can improve predictability of a model
- 6.2. Understand the principle of financial modeling sustainability
- 6.3. Recognize the characteristics of unsustainable models
- 6.4. Understand, calculate and construct Common Size and Index analysis based on financial projection
- 6.5. Judge the sustainability of a model based on Common Size and Index analysis
- 6.6. Understand and differ between sensitivity analysis and scenario analysis
- 6.7. Explain the usefulness of equity valuation for sensitization purpose
- 6.8. Understand duration, its impact on risk analysis and the application in various asset classes
- 6.9. Understand and calculate equity duration
- 6.10. Understand NPV duration
- 6.11. Understand and calculate Factor Sensitivity Duration to measure the impact of noninterest rate risk factors
- 6.12. Understand the application of Tornado Chart in depicting Factor Sensitivity Duration
- 6.13. Understand Tenor Duration and its impact on measuring the sensitivity of equity value
- 6.14. Understand Cross Duration and differ Cross Duration with covariance and correlation
- 6.15. Understand Cross Duration Matrix and its application
- 6.16. Understand Multi-Factor Sensitivity Duration and the application in scenario analysis
- 6.17. Differ Multi-Factor Duration and regression technique and explain the strength and weakness of each model
- 6.18. Application of Best Case, Base Case, and Worst Case by using basic probabilistic statistic in sensitivity analysis

- 6.19. Understand financial ratio analysis for the financial model and the application and determine the sustainability of a model
- 6.20. Understand and calculate various ratios based on various categories: profitability, liquidity, solvency, turnover
- 6.21. Understand and calculate leverage analysis
- 6.22. Calculate Dupont analysis and the implication to financial models and its sustainability
- 6.23. Understand and calculate Delta Ratio and its application and determine the sustainability of a model
- 6.24. Construct and Interpret a full set of financial ratio based on financial projection

Section VII – Credit Analysis Based on Financial Model

- 7.1. Differ valuation, feasibility and credit analysis and understand how to connect between methods
- 7.2. Understand about financing needs of a company and how to fulfill the needs
- 7.3. Understand and Calculate the general format of Cash Flow Available for Debt Service (CFADS) for Credit Analysis
- 7.4. New Determine why EBITDA is not CFADS
- 7.5. New Understand and Calculate the difference between CFADS, Net Cash Flow, Free Cash Flow to Firm and Free Cash Flow to Equity
- 7.6. Understand the application of CFADS calculation on multi-tranche financing
- 7.7. Understand and Calculate Debt Service Coverage Ratio, Loan Life Coverage Ratio
- 7.8. Understand how to model short term financing needs by using the cash budget method
- 7.9. Understand how to connect between CFADS, free cash flows, Enterprise Value, and feasibility tools
- 7.1 Explain the implication of change in one valuation, feasibility or credit analysis method on the simultaneous shift in valuation, feasibility and credit analysis
- 7.11. Explain how to take advantage of the valuation, feasibility and credit analysis connectivity to enhance analysis
- 7.12 Understand Altmann Z-Score Method and the application in the financial model

New means the DOS does not appear in previous BOK.