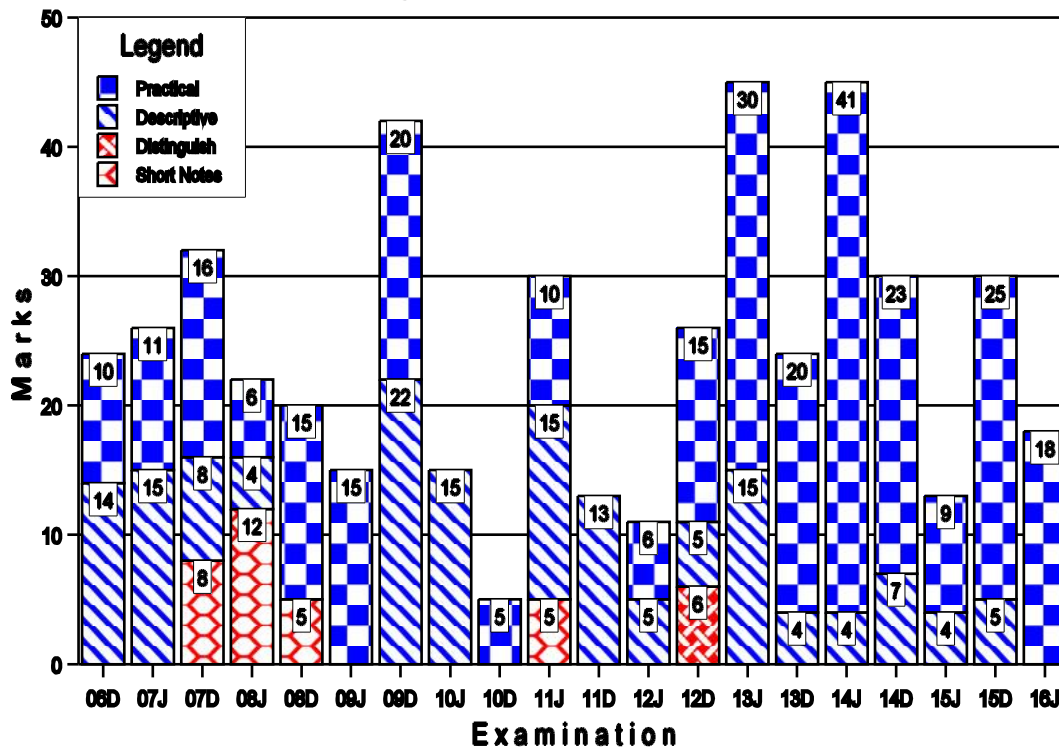


1

Valuation Basics & Valuation Models

This Chapter Includes : Basis for Valuation; Principles and Techniques of Valuation; Valuation Models; Valuation of Firm.

Marks of Short Notes, Distinguish Between, Descriptive & Practical Questions



SHORT NOTES

2007 - Dec [2] Write short notes on the following :

(c) Limitations of Economic Value Added;

(e) Repurchase Agreement (REPO);

(4 marks each)

Answer:

(c) Limitation of EVA:

The power of EVA derives largely from its simplicity. By reducing the large number of variables and interactions that go into the discounted cash flow value of a firm to two variables and one interaction, EVA has won confidence among CEO's who want to increase their stock prices. This simplicity comes at cost, however, especially for high growth firms that might view increasing EVA as a mantra for higher stock prices. By increasing the current return on assets one will increase the current earnings. If this can be accomplished without affecting expected future returns on assets, the firm value will generally go up. If, however, the increase in the current assets is accomplished by reducing the expected future return on assets, the value of the firm may actually decrease.

In practical term, the current return on assets is derived from existing asset whereas the expected future returns on assets come from future growth. For firms that obtain a significance of their value at the sacrifice of future growth, there is the risk of lowering the value in effect. This danger is compounded when managers are reimbursed on the basis of their economic value added.

(e) Repurchase Agreement:

A REPO is the sale of a security with an agreement that the security will be bought back at a specified price at the end of the agreement period. The seller of the security in the agreement raises funds, whereas the buyer earns interest from the arrangement. From the buyer's prospective this is called a reverse repurchase agreement. Investors in repurchase agreement are usually money market funds and corporations with excess cash to invest for short period. Usually, investors earn higher interest rate than they would from treasury securities.

2008 - June [2] Write short notes on the following:

- (a) Features of a future contract;
- (d) Market approach of valuation;
- (e) Models of maximizing shareholder value; (4 marks each)

Answer:**(a) Features of a Future Contract:**

A future contract is a firm legal commitment between buyer and a seller in which they agree to exchange something at a specified price at the end of a specified period of time. The buyer agrees to take delivery of something and the seller agrees to make delivery through open outcry on the floor of an organized future exchange. The important features of a future contract are:

- (i) Standard quantity
- (ii) Liquidity
- (iii) Counterpart guarantee by exchange
- (iv) Intermediate cash flow

(d) Market approach of valuation:

Market approach of valuation has several alternative methods of valuation, they are:

- (i) Sales transaction method
- (ii) Relief from royalty method
- (iii) Comparable income differential method
- (iv) Market replacement cost method

(e) Models of maximizing shareholders value

- (i) Markon model- It is based on the fact that a firm's value is measured by the ratio of its book value to its market value. An increase in this ratio depicts an increase in the firm's value. It can be, maximized by using financial factors, strategic forces, strategy formulation and internal structure.
- (ii) Alcar model- It uses discounted cash flow analysis to identify value adding strategies. This model uses seven value drivers that affect a firm's value e.g. the rate of growth of sales, operating profit margin, incremental investment in working capital and fixed assets, value growth duration, income tax rate and cost of capital.
- (iii) Mckinsey Model- It focuses on the identification of key value drivers levels of the organization and places emphasis on these value drivers in all the areas.

20.154 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

2008 - Dec [2] Write short notes on the following:

(a) Categories of Financial assets (5 marks)

Answer:

Categories of financial assets:

A financial asset is any asset that is:

- (i) Financial assets at fair value through profit and loss account
- (ii) Assets held to maturity
- (iii) Loans and advances, receivables
- (iv) Any other financial asset, which are not clearly defined as in the above three categories

2011 - June [4] Write short notes on:

(iv) McKinsey Model of maximizing the value of a firm; (5 marks)

Answer:

According to McKinsey Model, the key steps in maximizing the value of a firm are as follows:-

- (a) Identification of value maximization as the supreme goal
- (b) Identification of the value drivers,
- (c) Development of strategy,
- (d) Setting of targets,
- (e) Deciding upon the action plan (budgets),
- (f) Setting up the performance measurements system/ incentive system,
- (g) Implementation

DISTINGUISH BETWEEN

2012 - Dec [5] (a) Distinguish between Intrinsic Value and Time Value of an 'Option' with suitable examples. (6 marks)

Answer:

Intrinsic value of an option and the time value of an option are primary determinants of an option's price. By being familiar with these terms and knowing how to use them, one will find himself in a much better position to choose the option contract that best suits the particular investment. Intrinsic value is the value that any given option would have if it were exercised today. This is defined as the difference between the option's strike price (x) and the

stock actual current price (c.p). In the case of a call option, one can calculate the intrinsic value by taking $CP - X$. If the result is greater than Zero (In other words, if the stock's current price is greater than option's strike price), then the amount left over after subtracting $CP - X$ is option's intrinsic value. If the strike price is greater than the current stock price, then the intrinsic value of the option is zero. It would not be worth anything if it were to be exercised today. An option's intrinsic value can never be below zero. To determine the intrinsic value of a put option, simply reverse the calculation to $X - CP$.

Time value is basically the risk premium that the seller requires to provide the option buyer with the right to buy/sell the stock upto the expiration date. This component may be regarded as the Insurance premium of the option. This is also known as "Extrinsic value". Time value decays over time. In other words, the time value of an option is directly related to how much time an option has until expiration. The more time an option has until expiration, the greater the chances of option ending up in earning money.

DESCRIPTIVE QUESTIONS

2006 - Dec [2] (a) Discuss how effectively shareholder value analysis indicates the creation of economic value for shareholders. (6 marks)

Answer:

Shareholder value analysis focuses on the creation of economic value for the shareholders as measured by the share price performance and the flow of dividends. Under shareholder value analysis key decisions with implications for cash flow and risk are spiciest impact on shareholder value, such as sales growth rate, profit margin, working capital investment, and the required rate of return.

Limitations of shareholder value analysis model

- (i) The model makes the questionable assumptions that sales growth rates are constant that operating profit rates are also constant and that tax is a constant percentage of operating profit.
- (ii) Some of the necessary data may not be readily available.

20.156 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

- (iii) The present values of all the business's activities have theoretically to be taken to infinity. This difficulty can be overcome by taking a terminal value at some point in the future. However this introduces a further problem: not only do future cash flows have to be estimated, but a decision is needed on when those estimates cease to be realistic and the terminal value has to be taken. Also, the terminal value may prove difficult to estimate.
- (iv) The value drivers that the business is focusing on may not always give the same message.

2006 - Dec [6] (a) Why do firms 'Manage Earnings'? How do firms manage earnings ? (8 marks)

Answer:

Firms generally manage earnings because they believe that they will be rewarded by markets for delivering earnings that are smoother and come in consistently above analyst estimates. Furthermore, there are firms where managerial compensation is still built around profit targets, and meeting these targets can lead to lucrative bonuses.

Following are the techniques for managing earnings:

- (i) Planning ahead
- (ii) Revenue recognition
- (iii) Capitalize operating expenses
- (iv) Use reserves

2007 - June [3] (b) When will Economic Value Added increase ? (5 marks)

(c) What are the different levels of market efficiency? (5 marks)

Answer:

(b) Economic Value Added will increase if:

- (i) Operating profits can be made to grow without employing more capital, i.e., with increase in efficiency without using additional resources.
- (ii) Additional capital is invested in projects that return more than the cost of obtaining new capital, i.e., in projects with profitable growth.
- (iii) Capital is curtailed that do not cover the cost of capital, i.e., by liquidating unproductive capital.
- (iv) Growth is maintained by retained profit so long as its return will

exceed the Weighted Average Cost of Capital.

- (v) Better financing policy is adopted with reduced cost of capital.
- (c) Investors determine stock prices on the basis of the expected cash flows to be received from a stock and the risk involved. Rational investors should use all the information they have available or can reasonably obtain. The three generally discussed forms of the efficient market are as under:
 - (a) **Weak form:** The weak form says that the current prices of stocks already fully reflect all the information that is contained in the historical sequences of prices. Therefore, there is no benefit as far as forecasting the future is concerned-in examining the historical sequence of prices. The weak form of the efficient market hypothesis is popularly known as the random walk theory.
 - (b) **Semi-strong:** the semi-strong form of the efficient market hypothesis says that current prices of stocks not only reflect all informational content of historical prices but also reflect all publicly available knowledge about the corporations being studied. Furthermore, the semi-strong form says that efforts by analysts and investors to acquire and analyze public information will not yield consistently superior returns.
 - (c) **Strong-form:** The strong form of the efficient market hypothesis maintains that not only is publicly available information useless to the investors or analyst but all information is useless. Specifically, no information that is available be it public or inside can be used to earn consistently superior investment returns.

2007 - June [6] (a) In valuing a firm should you use the marginal or effective tax rate ? (5 marks)

Answer:

The most widely reported tax rate in financial statements is the effective tax rate. It is computed as under:

Taxes due /Taxable income

The second choice on tax rate is the marginal tax rate, which is the tax rate the firm faces on its last rupee of income. The reason for the choice of marginal tax rate lies in the fact that marginal tax rate for most of firms remains fairly similar but wide differences in effective tax rates are noted

20.158 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

across firms. In valuing firms, if the same tax rate has to be applied to earnings of every period, the safer choice is the marginal tax rate.

2007 - Dec [8] (b) In recent years, firms have started looking at equity alternatives to common stock. Why might a firm use warrants rather than common stock to raise equity? Explain. (8 marks)

Answer:

The reason why a firm might use warrants rather than common stock to raise equity is as follows:

- (i) Warrants are priced according to the variance of the underlying stock's price; the greater the variance, the greater the value. To the degree that the market overestimates a firm's risk, the firm may gain by using warrants and other equity options because they will be overpriced relative to their true value.
- (ii) Warrants themselves create no financial obligations at the time of issue. Consequently issuing warrants is a good way for a high growth firm to raise funds, especially when current cash flows are low or non-existent.
- (iii) For companies who are sensitive to the dilution created by issuing common stock, warrants seem to provide the best alternative.

2008 - June [6] (b) What are the different levels of market efficiency? (4 marks)

Answer:

Please refer 2007 - June [3] (c) on page no. 164

2009 - Dec [2] Define each of the following terms:

- (a) Real Options;
- (b) Efficient Market Hypothesis;
- (d) Operating Current Assets; (5 marks each)

Answer:

(a) Real Options:

Real options occur when managers can influence the size and risk of project's cash flows by taking different actions during the project's life. They are referred to as real options because they deal with real as opposed to financial assets. They are also called managerial options because they give opportunities to managers to respond to changing

market conditions. Sometimes they are called strategic options because they often deal with strategic issues. Finally they are also called embedded options because they are a part of other projects.

(b) Efficient Market Hypothesis:

Equilibrium is the condition under which the expected return on a security is just equal to its required return and price is stable. The efficient market hypothesis states:

- (i) That stocks are always in equilibrium and
 - (ii) That it is impossible for an investor to consistently beat the market
- In essence the theory holds that the price of a stock will adjust almost immediately in response to any new developments. In other words the EMH assumes that all important information regarding a stock is reflected in the price of that stock.

(d) Operating Current Assets:

Operating current assets are used to support operations such as cash, account receivables and inventory. It does not include short term investments. Operating current liabilities are the current liabilities that are a natural consequence of the firm's operations such as accounts payable and accruals. It does not include notes payable or any other short term debt that charges interest. Net operating working capital is operating current assets minus operating current liabilities.

2009 - Dec [6] (b) Explain how is it possible for sales growth to decrease the value of a profitable company. (7 marks)

Answer:

A company can be profitable and yet have a ROIC that is less than the WACC if the company has large capital requirements. If ROIC is less than the WACC, then the company is not earning enough on its capital to satisfy its investors. Growth adds even more capital that is not satisfying investors. Hence, growth decreases values. It is thus clear that merely being a profit earning company is not enough. If the profit earning give a return on capital invested that is less than the WACC deployed. This will erode shareholders' value and result in a decrease in value even of a profitable company. Capital structure and WACC in reference to the rate of return, thus become very significant factor in valuation.

2010 - June [4] Define *any three*:

- (iii) Three forms of Efficient Market Hypothesis;
- (iv) DCF technique of valuation of common stock;
- (v) Relative Valuation Method;
- (vi) Investment timing options as part of Real Options; (5 marks each)

Answer:

(iii) Three form of market hypothesis:

- (a) **Weak form:** The weak form says that the current prices of stocks already fully reflect all the information that is contained in the historical sequences of prices. Therefore, there is no benefit as far as forecasting the future is concerned-in examining the historical sequence of prices. The weak form of the efficient market hypothesis is popularly known as the random walk theory.
- (b) **Semi-strong:** the semi-strong form of the efficient market hypothesis says that current prices of stocks not only reflect all informational content of historical prices but also reflect all publicly available knowledge about the corporations being studied. Furthermore, the semi-strong form says that efforts by analysts and investors to acquire and analyze public information that will not yield consistently superior returns.
- (c) **Strong-form:** The strong form of the efficient market hypothesis maintains that not only is publicly available information useless to the investors or analyst but all information is useless. Specifically, no information that is available is it public or inside can be used to earn consistently superior investment returns

(iv) DCF technique of valuation of common stock:

DCF technique uses the time value of money concept. For valuing shares of a firm, three steps are required. The first step is to find the value of operations by discounting all expected future free cash flow at the WACC. The second step is to find the total corporate value by summing the value of operations, the value of non operating asset and the value of growth options. The third step is to find the value of equity by subtracting the value of debt and preferred stock from the total value of the corporations. The last step is to divide the value of equity by the number of shares of common stock.

(v) Relative Valuation Method:

This approach involves valuing a company by comparing it with the valuation of other companies in the same industry. This comparison is done using two approaches:

1. Comparison with industry average
2. Comparison with comparable companies

The various multiples that are frequently used are:

1. P/E Ratio
2. Price/Book Value
3. Price/sale
4. Price/Replacement cost of asset

Relative valuation is not a sound approach for making investment decision, let alone for valuing a target company from the acquisition perspective. However, relative valuation is a very popular approach, right from the retail investors to the fund managers and corporate bigwigs, the reason being that this approach is easy to understand, apply and discuss.

(vi) Investment timing options as part of real options:

Real options occur when manager can influence the size and risk of a project's cash flow by taking different actions during the project's life. They are referred to as real options because they deal with real as opposed to financial assets. They are also called managerial options because they give opportunities to managers to respond to changing market conditions. Sometimes they are called strategic options because they often deal with strategic issues. Investment timing options give companies the option to delay a project rather than implement it immediately. This option to wait allows a company to reduce the uncertainty of market conditions before it decides to implement the project. Capacity options allow a company to change the capacity of their output in response to changing market conditions.

2011 - June [2] (b) Discuss the major aspects, assumptions and decision rules of the discounted cash flow model. (10 marks)

Answer:

Major aspects of DCF:

1. It weighs the time value of money explicitly while evaluating the costs and benefits of a project.
2. Focus is on relevant cash inflows and outflows during the entire life of the project as against income as computed in the accrual accounting sense.

Two Main Variations of DCF

1. NPV
2. IRR

Assumptions of DCF Model

1. Assumed a world of certainty
2. The original amount of investment can be looked upon as being either borrowed or loaned at some specified rate of return

Decision rules of DCF Model

1. If NPV is greater than 0, accept the project. If NPV is <0 , reject. If NPV=0, the project may be accepted specially when non-financial considerations are strong enough.
2. Rank the projects according to their NPVs and select the project at or above the cut off rate of return.
3. Select the project if $IRR > \text{cost of capital}$.

2011 - June [3] (b) When will Economic Value Added of a Company increase ? (5 marks)

Answer:

Economic Value Added of a company will increase if:

1. Operating profits can be made to grow without employing more capital.
2. Additional capital is invested in projects that return more than the cost of obtaining net capital.
3. Capital is curtailed in activities that do not cover the cost of capital.
4. Growth is maintained by retained profits so long as its returns will exceed WACC.
5. Better financing policy is adopted with reduced cost of capital.

2011 - Dec [2] (b) Give the steps of calculating economic value added. (5 marks)

(c) What is 'Asset-based approach' towards business valuation? (5 marks)

Answer:

(b) Economic Value Added (EVA) is based on the premise that shareholder value is created by earning a return in excess of the company's cost of capital. EVA is calculated by subtracting a capital charge (invested capital x WACC) from the company's net operating profit after taxes (NOPAT). If the EVA is positive, shareholder value has increased. Therefore, increasing the company's future EVA is key to creating shareholder value.

An EVA model normally includes an analysis of the company's historical EVA performance and projected future EVA under various assumptions. By changing the assumptions, such as for revenue growth and operating margins, management can see the effects of certain value improvement initiatives.

Step 1: Calculate the NOPAT (Net Operating Profit after Tax)

Step 2: Calculate the Total Invested Capital

Step 3: Determine the WACC (Weighted Average Cost of Capital)

Step 4: $EVA = NOPAT - TC \times WACC\%$

(c) Asset-based approach: The valuation here is simply the difference between the assets and liabilities taken from the balance sheet, adjusted for certain accounting principles.

Two methods are used here: The Liquidation Value, which is the sum of estimated sale values of the assets owned by a company.

Replacement Cost: The current cost of replacing all the assets of a company.

However, the asset-based approach is not an alternative to the first three approaches, as this approach itself uses one of the three approaches to determine the values. This approach is commonly used by property and investment companies, to cross check for asset based trading companies such as hotels and property developers, under performing trading companies with strong asset base (market value vs. existing use), and to work out break – up valuations.

Assets based approach is not an alternative to the other popular methods of valuation such as:

1. Discounted cash flow valuation
2. Relative valuation
3. Contingent claim valuation

20.164 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

2011 - Dec [3] (b) Suggest any three adjustments you will like to make in financial statements before calculating EVA. (3 marks)

Answer:

Net Profit as per financial statements before calculating EVA	
<i>Add :</i>	
Provisions for Bad Debt	
Provisions for deferred tax	
Capitalized interest on operating lease	
Goodwill written off	
Accounting depreciation during the year	
Expenditure on research & development, employee training etc.	
<i>Less:</i>	
Economic depreciation based on life and uses of assets	

2012 - June [7] (a) Discuss the major aspects and decision Rules of the Discounted Cash Flow (DCF) Model. (5 marks)

Answer:

The Discounted Cash Flow (DCF) analysis represents the net present value (NPV) of projected cash flows available to all providers of capital, net of the cash needed. The Present Value of an asset is arrived at by determining the present values of all expected future cash flows from the use of the asset. Mathematically, the discounted cash flow formula is derived from the future value formula for calculating the time value of money and compounding returns.

$$DPV = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

$$FV = DPV \cdot (1+i)^n$$

Where

- DPV is the discounted present value of the future cash flow (FV), or FV adjusted for the delay in receipt;
- FV is the nominal value of a cash flow amount in a future period;
- *i* is the interest rate, which reflects the cost of tying up capital and may also allow for the risk that the payment may not be received in full;

- d is the discount rate, which is $i/(1+i)$, i.e. the interest rate expressed as a deduction at the beginning of the year instead of an addition at the end of the year,
 - n is the time in years before the future cash flow occurs.
- Major aspects of DCF (Discounted Cash Flow) Model are:
- (i) It weights the time value of money explicitly while evaluating the Costs and benefits of a Project.
 - (ii) Focus is on relevant Cash inflows and outflows during the entire life of the project as against income as computed in the accrual accounting sense.
 - (iii) Two main variations of DCF.
- (a) NPV - Net present value is the total of the present value of Cash Flows (DCF) discounted at a given rate (generally the Costs of Capital/ desired rate of return).
- (b) IRR - The IRR (Internal Rate of Return) has been defined as “the maximum rate of interest that could be paid for the Capital employed over the life of an investment without loss on the Project. ” It is the yield on investment.

Decision Rules of DCF Models:

- (i) If NPV is greater than “O,” accept the project.
If NPV is <0 , reject. If NPV = 0, the project may be accepted specially when non-financial Considerations are strong enough.
- (ii) Rank the Projects according to their NPV’s (Net Present Value) and select required project as per ranking.
- (iii) In case of IRR all projects where IRR $>$ Cost of capital/required rate of return can be selected.

2012 - Dec [2] (b) In valuing a firm should you use marginal or effective tax rate? (5 marks)

Answer:

The most widely reported tax rate in financial statements is the effective tax rate. It is computed as under:

(Taxes due) / Taxable income

The second choice on tax rate is marginal tax rate, which is the tax rate the firm faces on its last rupee of income. The reason for the choice of marginal tax rate lies in the fact that marginal tax rate for most firms remains fairly similar but wide differences in effective tax rates are noted across firms. In

20.166 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

valuing a firm, if same tax rate has to be applied to earning of every period, the preferred choice is the marginal tax rate. This makes calculation and analysis comparable across different years of the same firm and across different firms in an industry.

- 2013 - June [5]** (a) Identify and explain four techniques of relative valuation. (5 marks)
(b) What are the misconceptions about Valuation? (5 marks)
(c) How do you minimize Valuation bias? (5 marks)

Answer:

(a) Relative valuation approaches and techniques are based on the premise that the value of any asset can be estimated by analyzing the market prices of similar or comparable assets. In this approach comparable assets are identified and their market value obtained (e.g. from share price listing on stock exchange). These market values are converted into multiples based on revenues or EBITDA or other key numbers. The multiple or adjusted multiple is applied to the asset being valued to obtain its market value.

Thus, relative valuation techniques assume that prices have stable and consistent relationships to various firm variables across groups of firms:

- (i) Price – earnings ratio
- (ii) Price – cash flow ratio
- (iii) Price – book value ratio
- (iv) Price sales ratio

(i) **The Price- earnings ratio:** popularly known as P/E ratio is affected by two variables;

- (i) Required rate of return on its equity (k)
- (ii) Expected growth rate of dividends (g)

$$\frac{P}{E} = \frac{\frac{D_1}{k-g}}{E}$$
using the P/E approach to valuation we can

(i) estimate earnings for the next year, (ii) Estimate P/E ratio and

- (iii) multiply expected earning by the expected P/E ratio to get expected price

$$V = E1 * \frac{P}{E}$$

- (ii) **Price – cash flow ratio:** Cash flows can also be used in this approach are often considered less susceptible to manipulation by management. The steps are similar to using P/E ratio

$$V = CF1 * \frac{P}{CF}$$

- (iii) **Price – book value ratio:** Book values can also be used as a measure of relative value. The steps to obtaining valuation estimates are again similar to using the P/E ratio

$$V = BV1 * \frac{P}{BV}$$

- (iv) **Price sales ratio:** Finally, sales can be used in relation to stock price. There are some drawbacks, in that sales do not necessarily produce profits and positive cash flows. The advantage is that sales are also less susceptible to manipulation. The steps are similar to using the P/E ratio

$$V = S1 * \frac{P}{S}$$

- (b) There are a number of misconceptions about valuation. Some of the misconceptions are as under:

- (i) A valuation is an objective search for true value
- (ii) A good valuation provides a precise estimate of value
- (iii) The more quantitative, the better the valuation
- (iv) Valuing a private business should be done only when the business is ready to be sold
- (v) Business in an industry always sell for 'X' times the annual revenue. So why should valuation of the business be done by external valuer
- (vi) The business should be at least worth equivalent to what a competitor sold his business recently
- (vii) The business loses money, so it is not worth much.

- (c) Valuation bias exists and no valuation is completely objective or 'true'. The effort can be made to minimize the direction (i.e. over or under valuation) and magnitude (how much is the variation) of the bias. Bias may be introduced due to personal views of valuer, source of data, assumptions made, which party has commissioned the valuation (buyer or seller) etc.

Bias can't be regulated or legislated out of existence, However, there are ways in which we can mitigate the effects of bias on valuation: -

Reduce institutional pressures: A significant portion of bias can be attributed to Institutional factors. Equity-research analysts in the 1990s, for instance, in addition to dealing with all of the standard sources of bias had to grapple with the demand from their employers that they bring in investment banking business. Institutions that want honest sell-side equity research should protect their equity research analysts from such bias.

De-link valuations from reward/punishment: Any valuation process where the reward or punishment is conditioned on the outcome of the valuation will result in biased valuations. In other words, if we want acquisition valuations to be unbiased, we have to separate the deal analysis from the deal making to reduce bias.

No pre-commitments: Decision makers should avoid taking strong public positions on the value of a firm before the valuation is complete. An acquiring firm that comes up with a price prior to the valuation of a target firm has put analysts in an untenable position, where they are called upon to justify this price. In far too many cases, the decision on whether a firm is under or overvalued precedes the actual valuation, leading to seriously biased analyses.

Self- Awareness: The best antidote to bias is awareness. An analyst who is aware of the biases he or she brings to the valuation process can either actively try to confront these biases when making input choices or open the process up to more objective points of view about a company's future.

Honest reporting: In Bayesian statistics, analysts are required to reveal

their priors (biases) before they present their results from an analysis. Thus, an environmentalist will have to reveal that he or she strongly believes that there is a hole in the ozone layer before presenting empirical evidence to that effect. The person reviewing the study can then factor that bias in while looking at the conclusions. Valuations would be much more useful if analysts revealed their biases up front. While we cannot eliminate bias in valuations, we can try to minimize its impact by designing valuation processes that are more protected from overt outside influences and by report our biases with our estimated values

2013 - Dec [8] (b) What are the uncertainties in business valuation?

(4 marks)

Answer:

Starting early in life, we are taught that if we do things right, we will get the right answers. In other words, the precision of the answer is used as a measure of the quality of the process that yielded the answer. While this may be appropriate in mathematics or physics, it is a poor measure of quality in valuation. Barring a very small subset of assets, there will always be uncertainty associated with valuations, and even the best valuations come with a substantial margin for error. This arises due to the sources of uncertainty which have an effect on the valuation.

The value of a business is not a static figure. It depends on change in purpose or circumstances. There are a number of uncertainties involved in the valuation process which if not handled appropriately, would lead to an absurd value. We may design complex financial models with several inputs to handle uncertainties but that does not mean that the value derived is reasonable or the process is sound. What we need to understand is the impact of each input on the value.

The following factors are crucial:

1. The macro economic factors.
2. The business.
3. Its growth potential in the industry in which it operates.
4. How is the business positioned?
5. Who are competitors?
6. What is the quality and stability of the company's management?

20.170 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

The principles and methods of valuation are well settled and they are generally the same across the class of transactions. What changes in the course of deriving value is the selection of approaches and methods. Seller would like to get as much as possible and buyer would like to pay as little as possible. Somewhere between these two the deal takes place. Could it be mentioned that value is the price at which the deal takes place? What if there is no buyer or there is no intention to sell. Could it be concluded that the object or business is worth nothing? The answer is 'No'. There is a 'bigger fool theory' which says any price can be justified if a buyer is ready to pay the price. It might be you who is the last buyer ready to pay the available price. The theory makes us understand that every price cannot be value and vice versa. We need to differentiate between value and price.

2014 - June [8] (a) What are the types of companies where management may find difficulties in using Discounted Cash Flow Technique for Valuation?
(4 marks)

Answer:

Limitations of DCF Valuation:

This technique requires a lot of information. The inputs and information are difficult to estimate. This technique cannot differentiate between over and undervalued stocks. It is difficult to apply this technique in the following scenarios:

- (i) **Negative earnings firms:** For such firms, estimating future cash flows is difficult to do, since there is a strong probability of insolvency and failure. DCF does not work well since under this technique the firm is valued as a going concern which provides positive cash flows to its investors.
- (ii) **Cyclical Firms:** For such firms earnings follow cyclical trends. Discounting smooths the cash flows. It is very difficult to predict the timing and duration of the economic situation. The effect of cyclical situation on these firms is neither avoidable nor separable. Therefore, there are economic biases in valuations of these firms.
- (iii) **Firms with un/under utilized assets:** DCF valuation reflects the value of all assets that produce cash flows, if a firm has assets that are un/under utilized that do not produce any cash flows, the values of these assets will not be reflected in the value obtained from

discounting expected future cash flows. But, the values of these assets can always be obtained externally, and added on to the value obtained from discounted cash flows valuation.

- (iv) **Firms with patents or product options:** firms often have unutilized patents or license that do not produce any current cash flows and are not expected to produce cash flows in the near future, but nevertheless, these are valuable. If values of such patents are ignored then value obtained from discounting expected cash flows to the firm will understate the true value of the firm.
- (v) **Firms in the process of restructuring:** Firms in the process of restructuring often sell, acquire other assets, and change their capital structure and sometimes dividend policy. Some of them also change their status from private to public. Each of these changes makes estimating of future cash flows more difficult and affects the riskiness of the firm. Using historical data for such firms can give a misleading picture of the firm's value. In case of acquisitions if there is synergy then its value is to be estimated. This will require assumptions about the synergy and its effect on cash flows.
- (vi) **Private Firms:** The measurement of risk to be used in estimating discount rates is the problem since securities in private firms are not traded, this is not possible. One solution is to look at the riskiness of comparable firms, which are publicly traded. The other is to relate the measure of risk to accounting variables, which are available for the private firm.

2014 - Dec [3] {C} (b) (iii) Can EVA signal value destroying when ROI is rising? (2 marks)

Answer:

It is a performance metric that calculates the creation of shareholder value. It distinguishes itself from traditional financial performance metrics such as net profit and EPS: EVA is the calculation of what profits remain after the cost of company's capital-both debt and equity are deducted from operating profit.

The value of a firm is the sum of the capital invested and the present value

20.172 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

of the economic value added. The present value of the economic value added by an asset over its life is the net present value of that asset. The value of a firm can be written as the sum of three components, the capital invested in assets in place, the present value of the economic value added by these assets and the expected present value of the economic value that will be added by future investments.

2014 - Dec [4] (a) (i) What are the misconceptions about valuation?

(5 marks)

Answer:

There are a number of misconceptions about valuation. Some of the misconceptions are as under:

1. A valuation is an objective search for true value.
2. A good valuation provides a precise estimate of value.
3. The more quantitative, the better the valuation.
4. Valuing a private business should be done only when the business is ready to be sold.
5. Business in an industry always sells for 'x' times the annual revenue. So why should valuation of the business be done by external valuer.
6. The business should be at least worth equivalent to what a competitor sold his business recently.
7. The business loses money, so it is not worth much.

2015 - June [3] {C} (b) (ii) What is Valuation Multiple? Give examples of any four multiples. (4 marks)

Answer:

Valuation Multiple:

A valuation multiple is the ratio of firm value or equity value to some aspect of the firm's economic activity, such as cash flow, sales, or EBITDA. The table below lists the most common multiples used to value firms, together with the terminology that is used to describe the multiple.

Multiples Used in Finance

Quantity	X	Multiple	Terminology = Value
Cash Flow	X	Firm Value/Cash Flow of Firm	"Cash flow multiple" = Value of Firm
EBITDA	X	Firm Value/EBITDA of Firm	"EBITDA multiple" = Value of Firm
Sales	X	Firm Value/Sales Value of Firm	"Sales multiple" = Value of Firm
Customers	X	Firm Value /Customers	"Customer multiple" = Value of Firm
Earnings	X	Price per Share /Earnings	"Price-earnings ratio" = Share Price

2015 - Dec [4] (c) (ii) Define EVA. Also state the means to enhance EVA of a company? (5 marks)

Answer:

EVA is the calculation of what profits remain after the cost of company's capital is deducted from operating profit.

Economic Value Added will increase if:

- (i) Operating profits can be made to grow without employing more capital, i.e., with increase in efficiency without using additional resources.
- (ii) Additional capital is invested in projects that return more than the cost of obtaining new capital, i.e., in projects with profitable growth.
- (iii) Capital is curtailed that do not cover the cost of capital, i.e., by liquidating unproductive capital.
- (iv) Growth is maintained by retained profit so long as its return will exceed the Weighted Average Cost of Capital.

PRACTICAL QUESTIONS

2006 - Dec [2] (b) The following data relates to Morning Glory Ltd.

	Profit and Loss data	
	20 × 1	20 × 2
	<u>₹ in lakh</u>	<u>₹ in lakh</u>
Turnover	1990	2360
Pre-tax accounting Profit	420	530
Taxation	<u>126</u>	<u>160</u>
Profit after Tax	294	370
Dividends	<u>100</u>	<u>120</u>
Retained Earnings	194	250
	Balance Sheet Data	
	20 × 1	20 × 2
	<u>₹ in lakh</u>	<u>₹ in lakh</u>
Fixed Assets	740	960
Net Current Assets	<u>800</u>	<u>1,000</u>
	<u>1540</u>	<u>1960</u>
Finance by Shareholders' Funds	1190	1440
Medium and long term Bank loans	<u>350</u>	<u>520</u>
	1,540	1,960

Pre-tax accounting profit is taken after deducting the economic depreciation of the company's fixed assets (also the depreciation used for tax purposes).

Additional Information:

- (i) Economic depreciation was ₹ 190 lakh in 20 × 1 and ₹ 210 lakh in 20 × 2.
- (ii) Interest expenses were ₹ 26 lakh in 20 × 1 and ₹ 36 lakh in 20 × 2.
- (iii) Other non-cash expenses were ₹ 64 lakh in 20 × 1 and ₹ 72 lakh in 20 × 2.
- (iv) The tax rate in 20 × 1 and 20 × 2 was 30%.
- (v) Morning Glory Ltd. has non-capitalized leases valued at ₹ 70 lakh in each year 20 × 0 - 20 × 2.

- (vi) The company's pre-tax cost of debt was estimated as 7% in 20 x 1 and 8% in 20 x 2.
- (vii) The company's cost of equity was estimated as 14% in 20 x 1 and 16% in 20 x 2.
- (viii) The target capital structure is 75% equity and 25% debt.
- (ix) Balance sheet capital employed at the end of 20 x 0 was ₹ 1,390 lakh. Estimate the economic value added for Morning Glory Ltd. for 20 x 1 and 20 x 2. (10 marks)

Answer:

Economic value added (EVA) may be defined as:

Net operating profit after tax (NOPAT) - (Capital employed x Cost of capital)

	20 x 1 ₹ In lakh	20 x 2 ₹ In lakh
Computation of NOPAT:		
Profit after tax	294.0	370.0
Add Non-cash expenses	64.0	72.0
Interest after tax charge (1-0.30)	<u>18.2</u>	<u>25.2</u>
	₹ 376.2	₹ 467.2

Computation of Capital employed

Capital employed at end of 20 x 0 + Leases	
1,390 + 70	<u>₹ 1,460</u>
Book value of Shareholders' Funds + Bank loans + Leases	
1,190 + 350 + 70	<u>₹ 1,610</u>

Computation of Weighted average cost of Capital:

0.75 x 14% + 0.25 x 7% (1-0.3)	<u>11.7%</u> (approx)
0.75 x 16% + 0.25 x 8% (1-0.3)	<u>13.4%</u>

Computation of EVA:

376.2 - 1,460 x 11.7%	₹ 205.38
467.2 - 1,610 x 13.4%	₹ 251.46

The Company has created significant value in both 20 x 1 and 20 x 2.

20.176 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

2007 - June [6] (b) Smart Air Ltd. is a telecommunications firm that generate ₹ 300 lakh in pre-tax operating income and reinvested ₹ 60 lakh in the most recent financial year. As a result of tax deferrals, the firm has an effective tax rate of 20%, while its marginal tax rate is 40%. Both the operating income and the reinvestment are expected to grow 10% a year for 5 year and 5% thereafter. The firm's cost of capital is 9% and is expected to remain unchanged over time.

Estimate the value of Smart Air Ltd. using the different assumptions about tax rates.

- (i) The effective tax rate – 20% is to be considered.
- (ii) The marginal tax rate – 40% is to be considered. (11 marks)

Answer:

- (i) Computation of the value of Smart Air Ltd, assuming the effective tax rate to be 20%:**

	Year	Current	1	2	3	4	5	Terminal	Total
EBIT in ₹ L		300	330	363	399	439	483	507	
EBIT (1-T) in ₹ L		240	264	290	319	351	386	406	
Reinvestment in ₹ L		60	66	73	80	88	97	102	
FCFF in ₹ L		180	198	217	239	263	289	304	
Terminal value in ₹ L								7,600*	
PV factor at 9%		1.00	0.917	0.842	0.773	0.708	0.649	0.649	
PV in ₹ L			182	183	185	186	188	4,932	5,856

The value of smart Air Ltd. as per effective tax rate of 20% is (924+4,932) ₹ 5,856 Lakh.

- (ii) Value of Smart Air Ltd, assuming marginal tax rate of 40%**

	Year	Current	1	2	3	4	5	Terminal	Total
EBIT in ₹ L		300	330	363	399	439	483	507	
EBIT (1-T) in ₹ L		180	198	218	239	263	290	304	
Reinvestment in ₹ L		60	66	73	80	88	97	102	
FCFF in ₹ L		120	132	145	159	175	193	202	
Terminal value in ₹ L								5,050**	

PV factor at 9%	1.00	0.917	0.842	0.773	0.708	0.649	0.649
PV in ₹ L		121	122	123	124	125	3,277 3,892

The value of smart Air Ltd. as per effective tax rate of 40% is (615+32.77) ₹ 3,892 Lakh.

* 304/ (9% - 5%)

** 202 / (.09 - 05)

2007 - Dec [7] A review of the results of the first quarter of the year by the top management of Sweat and Struggle Ltd., a company which makes only one product, revealed the following information:

Sales (Units)	10,000
Loss (₹)	10,000
Fixed Costs (For the Year ₹ 1,20,000) (₹)	30,000
Variable Cost per units (₹)	8

The finance manager, feeling perturbed, suggested that the company should at least break-even in the second quarter by a drive for increasing sales. For this the company should introduce a better packaging which will increase its cost by Re. 0.50 per unit. The sales manager has a different proposal. For the second quarter, additional sales promotion expenses can be incurred to the extent of ₹ 5,000 and a profit of ₹ 5,000 can aimed at during the period with increased sales. The production manager feels otherwise. To improve the demand, the selling price per units has to be reduced by 3%. As a result the sales volume can be increased to attain a profit level of ₹ 4,000 for the quarter.

You, as a cost accountant, are asked by the managing director, to evaluate these three proposals and calculate the additional sales volume that would be required in each case so that he can arrive at a decision.

(16 marks)

Answer:

Current sales revenue = FC + VC - Loss

₹ 30,000 + (10,000 x 8) - 10,000 = ₹ 1,00,000

Selling price per unit = ₹ 1,00,000 / 10,000 units = ₹ 10 per unit.

20.178 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Evaluation of the proposals -
Finance Mgr's proposal -

		₹
SP (per unit)		10
(-) VC (per unit)	8.00	
Existing	8.50	
Additional	<u>0.50</u>	<u>8.50</u>
Contribution		1.50
BEP = 30,000 / 1.50		= 20,000 units
(-) existing number of units sold	<u>10,000</u>	
Additional units required to be sold to break even		<u>10,000</u>

Sales Manager's Proposal

	₹
SP (per unit)	10
(-) VC (Per Unit)	<u>8</u>
Contribution	<u>2</u>

Total sales required to earn desired profit of ₹ 5,000
= (current fixed cost + additional promotion expenses + desired profit) / ₹ 2
= 20,000 units.

Therefore, additional sales required = 10,000 units.

Production Manager's proposal -

	₹
SP (₹ 10 - 3%) (per unit)	9.70
(-) VC (per unit)	<u>8.00</u>
Contribution	<u>1.70</u>

Desired sales volume to earn profits of ₹ 4,000 = ₹ (30,000 + 4,000) / ₹ 1.70
= 20,000 units.

Additional no. of units required to be sold to achieve desired profits of ₹ 4,000 = 10,000 units.

Explanation:

All the three proposals imply additional sales of 10,000 units to achieve the stated objectives. The profit potential as suggested by Sales and Production Managers is there, while in the Finance Manager's proposal only BEP will be achieved.

It is more practical to achieve higher sales based on reduction in selling price as compared to the additional promotional expenses suggested by the sales manager.

2008 - June [8] (b) True value Ltd. is planning to raise funds through issue of common stock for the first time. However, the management of the company is not sure about the value of the company and therefore it attempts to study similar companies in the same line which are comparable to True value in most of the aspects.

From the following information, you are required to compute the value of True value Ltd. using the comparable firms approach.

Company	True value Ltd.	Jewel value Ltd.	Real value Ltd.	Unique value Ltd.
Sales	250	190	210	270
Profit after tax	40	30	44	50
Book value	100	96	110	128
Market value		230	290	440

(₹ in crore)

The valuer feels that 50% weightage should be given to earnings in the valuation process; sales and book value may be given equal weightages.

(6 marks)

Answer:

The valuation multiples of the comparable firms are as follows:

Particular	Jewel-Value Ltd.	Real value Ltd.	Unique - value Ltd.	Average
Prices/Sales Ratio	1.21	1.38	1.62	1.40
Price/Earning ratio	7.67	6.59	8.8	7.6
Prices/Book value ratio	2.39	2.63	3.43	2.82

20.180 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Based on the above multiples, the value of True value Ltd. is estimated to be ₹ 311.99 crore. As per working below:

Particular	Multiple Average	Parameter ₹ Cr.	Value ₹ Cr.
Price/Sales	1.403	250	350.75
Price/Earning	7.69	40	307.6
Price/Book Value	2.82	100	282

The weighted average value of True value Ltd using the comparable firm approach is ₹ $(350.750 \times 1 + 307.600 \times 2 + 282.000 \times 1) / 4 = ₹ 311.99$ crore.

Alternative:

₹ $(350.750 \times 0.25 + 307.600 \times 0.50 + 282.000 \times 0.25) = 311.99$ ₹ 311.99 Crore.

2008 - Dec [5] ABC Co. Ltd. an engineering company, is considering the purchase of a new machine for its immediate expansion program. There are three possible machines at the same cost, which are suitable for the purpose; the details of these are given with estimated cost and sale values.

ITEMS	Machine A (₹)	Machine B (₹)	Machine C (₹)
Capital cost	3,00,000	3,00,000	3,00,000
Sales (at stand. Prices)	5,00,000	4,00,000	4,50,000
Net cost of production:			
Direct material	40,000	50,000	48,000
Direct Labour	50,000	30,000	36,000
Factory Overheads	60,000	50,000	58,000
Administration costs	20,000	10,000	15,000
Selling & District costs	10,000	10,000	10,000

The economic life of machine 1 is 2 years, while it is 3 years for other two machines, after which the scrap value of ₹ 40,000, ₹ 25,000 and ₹ 30,000 respectively. Sales are expected to be at the rates shown for each year during the life time of machines. The cost relates to the annual

expenditure resulting from each machine. Average tax rate is 45%. Payables and receivables are settled promptly. Return on capital to be on an uniform basis of 8% p.a.

You are required to value the proposals and show which machine would be the most profitable investments on the basis of net cash flows. (State the assumptions, if any, made in arriving at the answer) (15 marks)

Answer:

Item	Machine A (₹)	Machine B (₹)	Machine C (₹)
Capital Cost	3,00,000	3,00,000	3,00,000
Sales	5,00,000	4,00,000	4,50,000
Cost of Production	1,50,000	1,30,000	1,42,000
Administration Cost	20,000	10,000	15,000
Selling and Distribution Cost	10,000	10,000	10,000
Total Cost	1,80,000	1,50,000	1,67,000
PBDI (Sales-Cost)	3,20,000	2,50,000	2,83,000
Depreciation: Cost less Scrap value/life	1,30,000	91,667	90,000
Interest on borrowings	24,000	24,000	24,000
PBT	1,66,000	1,34,333	1,69,000
Taxation @ 45%	74,700	60,451	76,050
Profit after tax	91,300	73,882	92,950
Add Depreciation + Interest	1,54,000	1,15,667	1,14,000
Net Cash Flow	2,45,300	1,89,549	2,06,950
No. of years for cost recovery	1.21 years	1.58 years	1.45 years

The following are the assumptions made while arriving at the answer :

- Factory overheads do not include depreciation.
- Interest will have to be paid on borrowings for machine purchased during the life of the machine.
- No borrowings have been made for working capital.

20.182 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

2009 - June [2] The following table gives accounting data from the 2008 annual reports of six companies in the IT sector. The market value of equity of five of the firms is also given. From these data, estimate a value for Softech Solutions Ltd. Softech Solutions had a book value of ₹ 1349 millions in 2008.

Company	Market value of Equity (₹ million)	Price/Book ratio	Revenue (₹ million)	R & D Expenses (₹ million)	Net Income (₹ million)
Infotech Ltd.	8096.71	5.6	1571.0	307.0	406.0
Wiprotech Ltd.	1379.00	3.6	152.0	101.0	15.0
Satyatech Ltd.	2233.00	4.6	413.0	158.0	28.0
Relitech Ltd.	925.00	2.5	138.0	109.0	-7.0
Goldtech Ltd.	588.53	4.5	151.0	81.0	-34.0
Softech Solution Ltd.	?	?	795.4	314.3	124.4

(15 marks)

Answer:

Company	Mv of Equity value	Price / Bk value	Bk value	Revenue Mv of Eq /Revenue	R & D expns.	Mv of R&D assets /R&D expns.	Net Income IN /Mv of Eq		
	a	b	c [a/b]	d	e [a/d]	f	g[(a-c)f]	h	i [h/a]
	₹	ratio	₹	₹	ratio	₹	ratio	₹	ratio
Infotech	8,096.71	5.6	1,445.84	1,571.0	5.15	307.0	21.66	406.0	0.0501
Wiprotech	1,379.00	3.6	383.05	152.0	9.07	101.0	9.86	15.0	0.0109
Satyatech	2,233.00	4.6	485.43	413.0	5.41	158.0	11.06	28.0	0.0125
Relitech	925.00	2.5	370.00	138.0	6.70	109.0	5.09	-7.0	-
Goldtech	588.53	4.5	130.78	151.0	3.90	81.0	5.65	-34.0	-
		20.8			30.23		53.32		0.0735
		÷ 5			÷ 5		÷ 5		÷ 3
Average @		4.16			6.05		10.66		0.0245
Softech	4.16×1349			6.05×795.4		10.66×314.3		(1/0.0245)×124.4	
	=₹5,611.8m			=₹4,812.2m		=₹3,350.4m**		=₹5,077.6m	

* Converted to P/E

** Total value = ₹(R&D assets 3350.4+ other assets 1349) = ₹ 4,699.4m.[see Note 2 below]

The estimated value of Soft tech Solutions Ltd. by Comparable Companies Approach (Relative Valuation Approach) is taken as the average of all these means

$$= ₹(5611.8 + 4812.2 + 4699.4 + 5077.6) ÷ 4 = ₹ 5,050.25 m.$$

Notes on working:

1. E/P is used rather than P/E because a very high P/E due to very small earnings can affect the mean (average) considerably. Since Softech's Solutions did not have losses, the mean E/P also excludes the loss firms.
2. Research and development (R&D) expenditures are compared to price minus book value. As the R&D asset is not on balance sheets, its missing value is in this difference. The ratio of 10.66 is applied to Softech's R&D expenditures to yield a valuation for its R&D asset of ₹ 3,350.4m which, when added to the book value of the other net assets, gives a valuation of ₹ 4,699.4m for Softech.

2009 - Dec [8] A firm has the following summary balance sheet (₹ in Crores):

Net Operating assets	441
Net Financial Obligations	52
Common Shareholders' Equity	389

The firm is currently earning a return on net operating assets (RNOA) of 14 percent from sales of ₹ 857 Crores and after tax operating income of ₹ 60 Crores. Its required return on operations is 10%. Forecasts indicate that RNOA is likely to continue at the same level in the future with growth in sales of 3 per cent per year and growth in net operating assets to support the sales growth of 3 per cent per year. Management is considering a plan to introduce new products that are expected to increase the sales growth rate to 4 per cent a year and maintain the current profit margin of 7 per cent. But the plan will require additional investment in net operating assets that will reduce the firm's asset turnover to 1.67.

What effect will this plan have on the value of the firm? (20 marks)

Answer:

**Effect on value of the firm
Analysis of Value Added**

Pro forma and valuation under the status quo:

	0	1	2	3	
Sales	857	883	909	936	(grows at 3%)
Operating income (PM = 7%)	60	61.8	63.6	65.6	(grows at 3%)

20.184 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Net operating assets	441	454	468	482	(grows at 3%)
PM	7%	7%	7%	7%	
ATO	2	2	2	2	
RNOA	14%	14%	14%	14%	
ReOI		17.6	18.2	18.7	(grows at 3%)

Value of operations under the status quo

$$\text{Value of NOA} = 441 + (17.64) / (1.10 - 1.03) = 693$$

	0	1	2	3	
Sales	857	891	927	964	(grows at 4%)
Operating income (PM = 7%)	60	62.4	64.9	67.5	(grows at 4%)
Net operating assets	535	556	578	602	(grows at 4%)
PM	7%	7%	7%	7%	
ATO	1.67	1.67	1.67	1.67	
RNOA	11.67%	11.67%	11.67%	11.67%	
ReOI		8.93	9.29	9.66	(grows at 4%)

Value of operations under the plan:

$$\text{Value of NOA} = 534.8 + (8.93) / (1.10 - 1.04) = 684$$

The plan (marginally) losses value. The additional growth (that generates additional profit margin) is not sufficient to cover the required return on the additional investments in net operating assets.

2010 - Dec [3] (a) While evaluating a capital project, a company is considering an option to buy a business from a third party at the cost of ₹ 50 crores. It is expected that in next one year, the value of such business will increase to ₹ 60 crores with probability 70% or decline to ₹ 45 crores with probability of 30%. The company may enter into an agreement with a party

to sell the said business at ₹ 48 crores after one year if the company so desires. Assuming that this real option is like a European Call, with the strike price of the underlying real asset is ₹ 48 crores and the risk free interest rate is 9% p.a. Determine the value of this real option. (5 marks)

Answer:

To solve this problem, one can use any approach of the following three:

- No Arbitrage Method
- Hedging Portfolio Method
- Risk Neutral Probability Method

Here, answer is given using Risk Neutral Probability Method:

Let p be the risk neutral probability that the value of the business will increase to ₹ 60 crores and $1-p$ will be the risk neutral probability that value of the business will be ₹ 45 crores if it declines.

$$\begin{aligned} \text{Then, } 50 &= [60p + 45(1-p)] / 1.09 \text{ and solving for } p \text{ we get } p \\ &= 0.6333 \text{ and } 1-p \\ &= 0.3667. \end{aligned}$$

Using these risk neutral probabilities we get the valuation of the OPTION as -
 Value of the Real Option = $\{(60-48) \times 0.6333 + 0 \times 0.3667\} / 1.09$
 = ₹ 6.97 crores

2011 - June [3] (a) M/s Radha Industries is planning to issue a Bonds series on the following terms-

- Face value ₹ 100
- Terms of maturity 10 years
- Yearly Coupon Rate.

Years	Rate
1-4	9%
5-8	10%
9-10	14%

The current market rate of similar bonds is 15% per annum. The company proposes to price the issue in such a manner that it can yield 16% compounded rate of return to the investors. The Company also proposes to redeem the bonds at 5% premium on maturity. You are required to determine the issue price of the bonds :

20.186 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Year 1 2 3 4 5 6 7 8 9 10
P.V. 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227
factor of ₹1 @ 16% (10 marks)

Answer:

The issue price of the bonds will be the sum of present value of interest payments during 10 years up to its maturity and present value of redemption value of bonds, discounted at the rate of planned yield

Year	Cash Outflow	PVIF@16%	PV
1	9	0.862	7.758
2	9	0.743	6.687
3	9	0.641	5.769
4	9	0.552	4.968
5	10	0.476	4.760
6	10	0.410	4.100
7	10	0.354	3.540
8	10	0.305	3.050
9	14	0.263	3.682
10	14	0.227	3.178
11	105	0.227	23.835

Bonds should be priced at 71.327
Issue price of Bonds ₹ 71.33

2012 - June [3] (b) The following data are available for a bond:

Face Value ₹ 1,000
Coupon rate 16%
Years to Maturity 6
Redemption Value ₹1,000
Yield to Maturity 17%

Calculate the current market price of the bond.

PV Factor @ 17% year wise (1st yr 0.855, 2nd yr 0.730, 3rd yr 0.624, 4th yr 0.534, 5th yr 0.456, 6th yr 0.390) (6 marks)

Answer:

Calculation of MKT price —

$$YTM = \frac{\text{Coupon Interest} + \frac{\text{Discount or Premium}}{\text{Yearsleft}}}{\frac{(\text{Face Value} + \text{MKT value})}{2}}$$

Let X be the market price

$$0.17 = \frac{160 + \frac{(1,000 - x)}{6}}{\frac{(1,000 + x)}{2}}$$

$$X = 960.26$$

Alternatively the candidate may attempt by 160 (PV @ 17% yearly cumulative 1 to 6 years) + 1000(PV @ 17% in 6th year)

$$\begin{aligned} &= 160 (3.589) + 1000 (0.390) \\ &= 574.24 + 390 \\ &= 964.24 \end{aligned}$$

2012 - Dec [6] The directors of Hi Value Fund are keen on acquiring the business of G Ltd. They have approached you given your valuation expertise for mergers and acquisitions for help. G Ltd. has an invested capital of ₹ 50 million. Its return on invested capital (ROIC) is 12% and its weighted average cost of capital (WACC) is 11%. The expected growth rate in G Ltd.'s invested capital will be 20% for the first three years, 12% for the following two years and 8% there after for ever. The forecast of G Ltd's free cash flows is given below:

	(₹ in Million)						
Year	1	2	3	4	5	6	7
InvestedCapital	50	60	72	86.4	96.77	108.38	117.05
Net operating profit less adjusted tax	6	7.2	8.64	10.37	11.61	13	14.05
Net investment	10	12	14.4	10.37	11.61	8.67	9.36
Free cash flow	(-)4.00	(-)4.80	(-)5.76	—	—	4.33	4.69
Cost of Capital (%)	11	11	11	11	11	11	11

20.188 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Capital charge	5.5	6.6	7.92	9.5	10.64	11.92	12.88
Economic Profit	0.5	0.6	0.72	0.87	0.97	1.08	1.17
Growth rate (%)	20	20	20	12	12	8	8

Value G Ltd. under (i) Discounted cash flow method and (ii) present value of economic profit method. Can the consideration paid for the shares exceed the valuation, if so, under what circumstances? (15 marks)

Answer:

The present value of free cash flow during the planning period is:

$$PV(\text{FCF}) = \frac{-4.00}{1.11} + \frac{-4.80}{(1.11)^2} + \frac{-5.76}{(1.11)^3} + \frac{0}{(1.11)^4} + \frac{0}{(1.11)^5} + \frac{4.33}{(1.11)^6}$$

$$= (-) 9.4 \text{ million}$$

The horizon value at the end of six years, applying constant growth model, is

$$V_{+1} = \frac{\text{FCF}_{H+1}}{\text{WACC} - g} = \frac{4.68}{.11 - .08} = 156.0 \text{ million}$$

The present value of VH is

$$= \frac{156.0}{(1.11)^6}$$

$$= 83.4 \text{ million}$$

Adding the present value of free cash flow during the planning period and present value of horizon value, gives the enterprise DCF value

$$V_0 = -9.4 + 83.4$$

$$= 74.0 \text{ million.}$$

The present value of Economic profit stream is.

$$\frac{0.50}{1.11} + \frac{0.60}{(1.11)^2} + \frac{0.72}{(1.11)^3} + \frac{0.87}{(1.11)^4} + \frac{0.97}{(1.11)^5} + \frac{1.08}{(1.11)^6} + \frac{1.17}{(0.11 - .08)} \times \frac{1}{(1.11)^6}$$

$$= 24.0 \text{ million}$$

Adding the invested capital to the present value of EP stream given the enterprise value:

$$V_0 = 50 + 24$$

$$= 74 \text{ million.}$$

Thus, the two models lead to identical valuation.

In the case of Mergers and Acquisitions the actual consideration paid for the shares can exceed the valuation of shares under the DCF method and /or under the Present Value of Economic Profit method in situations where the merger /acquisition is likely to result in synergy providing additional benefits arising out of the M&A. Examples are where the target company has patents or other key facilities/factors like access to resources, raw material, location, markets etc. which can be better utilized by the existing acquirer company, thereby enhancing its profitability. This can also arise where the target company is a key competitor. In such situations the consideration paid can exceed the valuation based on present value using DCF or PV of economic profit.

2013 - June [6] The following projections for T Ltd., have been developed based on internal estimates and market information:

₹ In million					
Year	1	2	3	4	5
Free cash flow to the firm	200	250	300	340	380
Interest bearing debt	500	400	300	200	100
Interest expenses	60	48	36	24	12

You are required to calculate the enterprise value of T Ltd., using the following assumptions:

- Beyond year 5, the free cash flow to the firm will grow at a constant rate of 10 percent per annum
- T Ltd.'s unlevered cost of equity is 14%
- After year 5, T Ltd. will maintain a debt equity ratio of 4:7
- The borrowing rate for T Ltd. will be 12 percent
- The tax rate for T Ltd. is 30%
- The risk free rate of return is 8%
- The market risk premium is 6%

(15 marks)

Answer:

The present value of the unlevered equity free cash flow (which is the same as the free cash flow to the firm) during the planning period is:

20.190 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

$$\sum_{t=1}^n \frac{\text{FCFF}_t}{(1+r_{UE})^t} = \frac{200}{1.14} + \frac{250}{(1.14)^2} + \frac{300}{(1.14)^3} + \frac{340}{(1.14)^4} + \frac{380}{(1.14)^5} = ₹ 969 \text{ million}$$

The present value of the interest tax shield during the planning period is:

$$\sum_{t=1}^n \frac{I_t \cdot T}{(1+r_D)^t} = \frac{60 \times 0.3}{1.12} + \frac{48 \times 0.3}{(1.12)^2} + \frac{36 \times 0.3}{(1.12)^3} + \frac{24 \times 0.3}{(1.12)^4} + \frac{12 \times 0.3}{(1.12)^5} = ₹ 41.9 \text{ million}$$

The Present value of the terminal value at the end of the planning period is:

$$\frac{\text{FCFF}_n(1+g)}{\text{WACC} - g} \left[\frac{1}{1+r_{UE}} \right]^n = \frac{380(1.10)}{0.1349 - 0.10} \left[\frac{1}{1.14} \right]^5 = ₹ 6220.5 \text{ million}$$

Hence, the enterprise value of the Optex Ltd. is:

$$969.0 + 41.9 + 6220.5 = ₹ 7231.4 \text{ million}$$

It may be noted that the WACC value of 13.49% used above has been arrived as follows:

1. Given that r_{UE} is 14%, β_{UE} , the unlevered equity beta, was calculated by solving the following equation:

$$r_{UE} = \text{Risk-free rate} + \beta_{UE} \cdot \text{market risk premium}$$

$$14 = 8 + \beta_{UE} \cdot 6$$

$$\beta_{UE} = 1$$

2. Given $\beta_{UE}=1$, β_{UE} , the levered equity beta was calculated:

$$\beta_{UE} = \beta_{UE} \left[1 + (1-T) \frac{D}{E} \right]$$

$$= 1[1 + 4/7(1-0.3)]$$

$$= 1.4$$

3. Given $\beta_{UE} = 1.4$, r_{LE} , the cost of levered equity was calculated:

$$r_{LE} = 8 + 1.4 \cdot 6 = 16.4\%$$

4. Given $r_{LE}=16.4\%$, WACC, the weighted average cost of capital was calculated.

$$\text{WACC} = \frac{7}{11} \cdot 16.4 + \frac{4}{11} \cdot 12 \cdot (1-0.3) = 10.44 + 3.05 = 13.49\%$$

2013 - June [8] A company is trying to decide whether to invest in a new project. Two mutually exclusive projects are available, each requiring an investment of ₹ 3,00,000. Project A is expected to generate cash inflows of ₹ 2,00,000 per year in the next two years. It is estimated that the cash inflows

associated with project B would either be ₹ 1,80,000 or ₹ 2,20,000 (each with 0.5 probability of occurrence) in the first year. If ₹ 1,80,000 is received in the first year, the cash inflow for the second year is likely to be ₹ 1,50,000 (probability of 0.3) ₹ 1,80,000 (Probability of 0.4) and ₹ 2,00,000 (probability of 0.3).

In case the first year's cash inflow is ₹ 2,20,000, the second year's likely cash inflow would be ₹ 1,80,000 and ₹ 2,70,000 (each with 0.3 probability) and ₹ 2,20,000 (Probability 0.4). The firm uses a 14% minimum required rate of return for deciding whether to invest in projects comparable in risk to the ones under consideration.

Required:

- (a) Calculate the risk adjusted expected NPV for projects A and B. (10 marks)
- (b) Identify the best and the worst possible outcomes for Project B. (3 marks)
- (c) Which of the projects, if any, would you recommend? Why? (2 marks)
(The PV of 1 rupee at 14%: year 1: .877, year 2: .769, year 3: .675, year 4: .592 and year 5: .519)

Answer:

(i) **Determination of expected NPV of project A**

Year	CFAT(₹)	PV Fat 14%	Total PV(₹)
1.	2,00,000	0.877	1,75,400
2.	2,00,000	0.769	1,53,800
			3,29,200
	Less: PV of cash outflows		(-) 3,00,000
		NPV	₹ 29,200

Determination of expected NPV of Project B

Time 0		1		CFAT ₂ (₹)	NPVAT 14%(₹)	Joint Probability	Expected NPV (₹)*
Cost of the Project 3,00,000	0.5	CFAT ₹1,80,000	0.3	1,50,000	-26,790	0.15	-4,020
			0.4	1,80,000	-3,720	0.20	-740
			0.3	2,00,000	11,660	0.15	1,750

20.192 ■ Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)

	0.5	CFAT ₹ 2,20,000	0.3	1,80,000	31,360	0.15	4,700
			0.4	2,20,000	62,120	0.20	12,420
			0.3	2,70,000	1,00,570	0.15	15,090
						NPV	29,200

(*Rounded off to nearest ten ₹)

- (ii) The worst possible outcome is a CFAT of ₹ 1,80,000 (year 1) and ₹ 1,50,000 (years 2) with the maximum negative NPV as ₹ (-) 26,790. The best possible outcome is when NPV is maximum ₹ 1,00,570. It results when CFAT in year 1 is ₹ 2,20,000 followed by ₹ 2,70,000 in year 2.
- (iii) The expected NPVs (i.e. 29,200) are the same for both projects. However, from the point of view of risk aversion, project A should be chosen as there is no variability of possible outcomes and associated revenues.

2013 - Dec [7] {C} The Balance Sheets of Resurgent Ltd. for the years ended on 31.3.2011, 31.3.2012 and 31.3.2013 are as follows:

Liabilities	31.3.2011 ₹	31.3.2012 ₹	31.3.2013 ₹
3,20,000 Equity Shares of ₹ 10 each fully paid	32,00,000	32,00,000	32,00,000
General Reserve	24,00,000	28,00,000	32,00,000
Profit and Loss Account	2,80,000	3,20,000	4,80,000
Creditors	12,00,000	16,00,000	20,00,000
Total	70,80,000	79,20,000	88,80,000
Assets	31.3.2011 ₹	31.3.2012 ₹	31.3.2013 ₹
Goodwill	20,00,000	16,00,000	12,00,000
Building & Machinery (Less: Depreciation)	28,00,000	32,00,000	32,00,000

Stock	20,00,000	24,00,000	28,00,000
Debtors	40,000	3,20,000	8,80,000
Bank Balance	2,40,000	4,00,000	8,00,000
Total	70,80,000	79,20,000	88,80,000

Actual valuation were as under:

Particulars	31.3.2011 ₹	31.3.2012 ₹	31.3.2013 ₹
Building & Machinery	36,00,000	40,00,000	44,00,000
Stock	24,00,000	28,00,000	32,00,000
Net Profit (including opening balance) after writing off depreciation and goodwill, tax provision and transfer to General Reserve	8,40,000	12,40,000	16,40,000

Capital employed in the business of market values at the beginning of 2010-2011 was ₹ 73,20,000, which included the cost of goodwill. The normal annual return on Average Capital employed in the line of business engaged by Resurgent Ltd. is $12\frac{1}{2}\%$.

The balance in the General Reserve account on 1st April 2010 was ₹ 20 lakhs.

The goodwill shown on 31.3.2011 was purchased on 1.4.2010 for ₹ 20,00,000 on which date the balance in the Profit and Loss Account was ₹ 2,40,000. Find out the average capital employed each year.

Goodwill is to be valued at 5 years purchase of super profits (Simple average method). Also find out the total value of the business as on 31.3.2013.

(15 marks)

Answer:

	31.03.2011	31.03.2012	31.03.2013
Goodwill	20,00,000	16,00,000	12,00,000
Building and Machinery (revalued)	36,00,000	40,00,000	44,00,000
Stock (revalued)	24,00,000	28,00,000	32,00,000

20.194 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Debtors	40,000	3,20,000	8,80,000
Bank Balance	2,40,000	4,00,000	8,00,000
Total Assets	82,80,000	91,20,000	1,04,80,000
Less: Creditors	12,00,000	16,00,000	20,00,000
Closing Capital	70,80,000	75,20,000	84,80,000
Opening Capital	73,20,000	70,80,000	75,20,000
	1,44,00,000	1,46,00,000	1,60,00,000
Average Capital	72,00,000	73,00,000	80,00,000

Note:

1. Since goodwill has been paid for, it is taken as part of capital employed. Capital employed at the end of each year is shown.
2. Assumed that the building and machinery figure as revalued is after considering depreciation.
Maintainable profit has to be found out after making adjustments as given below:

	31.03.2011	31.03.2012	31.03.2013
Net profit as per given	8,40,000	12,40,000	16,40,000
Less: Opening Balance	2,40,000	2,80,000	3,20,000
	6,00,000	9,60,000	13,20,000
Add: Under Valuation of closing stock	4,00,000	4,00,000	4,00,000
	10,00,000	13,60,000	17,20,000
Less: Adjustment for valuation in opening stock	-	4,00,000	4,00,000
	10,00,000	9,60,000	13,20,000
Add: Goodwill written off	-	4,00,000	4,00,000
	10,00,000	13,60,000	17,20,000
Add: Transfer Reserves	4,00,000	4,00,000	4,00,000
	14,00,000	17,60,000	21,20,000
Less: 12.5% Normal Return	9,00,000	9,12,500	10,00,000
Super Profit	5,00,000	8,47,500	11,20,000

$$\begin{aligned} \text{Average super profit} &= (\text{₹ } 5,00,000 + \text{₹ } 8,47,500 + \text{₹ } 11,20,000)/3 \\ &= 24,67,500/3 = \text{₹ } 8,22,500 \end{aligned}$$

$$\text{Goodwill} = 5 \text{ years purchase} = \text{₹ } 8,22,500 \times 5 = \text{₹ } 41,12,500.$$

$$\text{Total Net Assets (31/03/2013)} = \text{₹ } 84,80,000$$

$$\text{Less: Goodwill} = \text{₹ } 12,00,000$$

$$= \text{₹ } 72,80,000$$

$$\text{Add: Goodwill} = \underline{\text{₹ } 41,12,500}$$

$$\text{Value of Business} = \underline{\text{₹ } 1,13,92,500}$$

2013 - Dec [9] (b) A share, Y, currently sells for ₹120 . It is expected that in one year it will either rise to ₹150 or decline to ₹100, with 50% probability of each. A call option is written on Y with the strike price of the underlying of ₹125 and the risk free interest rate is 10% p.a. You are required to determine the Option Premium. (5 marks)

Answer:

Method Used: Risk Neutral Probability Method

Using the given probabilities of 50% each, we get value of the Option as,

$$\begin{aligned} &= [(150-125) \times 0.5 + (0) \times 0.5] / 1.10 \\ &= 12.50 / 1.10 \\ &= \text{₹ } 11.36 \end{aligned}$$

2014 - June [6] {C} (a) Bihari Ltd. is issuing 5% ₹ 25 at par preference shares that would be convertible after three years to equity shares at ₹ 27. If the current market price of equity shares is ₹ 13.25, what is the conversion value and conversion premium?

The convertibles are trading at ₹ 17.75 in the market. Assume expected return as 8%. (6 marks)

Answer:

Bihari Ltd. Is issuing 5% ₹ 25 par preference shares that would be convertible after three years to equity shares at ₹ 27. If the current market price of equity shares is ₹ 13.25, what is the conversion value and conversion premium. The convertibles are trading at ₹ 17.75 in the market. Assume expected return as 8%.

$$\text{Conversion ratio} = \frac{\text{Par value of conversion security}}{\text{conversion price}} = 25/27 = 0.9259$$

20.196 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Conversion value = (Conversion ratio) × (Market value per share of the common stock)

$$= (0.9259) \times (\text{₹ } 13.25) = \text{₹ } 12.27$$

Now let us find the value as straight preferred stock = $1.25/8 = \text{₹ } 15.63$

Conversion premium (in absolute terms) = $\left(\text{Market price of the convertible preferred stock} \right) - \left(\text{Higher of the security value and conversion value} \right)$

$$= \text{₹ } 17.75 - \text{₹ } 15.63$$

$$= \text{₹ } 2.12.$$

2014 - June [7] {C} (a) Consider two firms that operate independently and have the following financial characteristics:

(₹ in Millions)

	Firm A	Firm B
Revenues	8000	4000
Cost of goods sold	6000	2400
EBIT	2000	1600
Expected growth rate	4%	6%
Cost of capital	9%	10%

Both firms are in steady state with capital spending offset by depreciation. Both firms have an effective tax rate of 50% and are financed only by equity.

Scenario I

Assume that the combining of the two firms will create economies of scale that will reduce the cost of goods sold to 65%.

Scenario II

Assume that as a consequence of the merger the combined firm is expected to increase its future growth to 6% while cost of goods sold remains at 70% and does not come down to 65%.

Scenario I and Scenario II are mutually exclusive.

You are required to:

- (i) Compute the value of both the firms as separate entities. (3 marks)
- (ii) Compute the value of both the firms together if there were absolutely no synergy at all from the merger (Scenario III). (1 mark)

- (iii) Compute the cost of capital and the expected growth rate for the combined entity. (2 marks)
- (iv) Compute the value of synergy in Scenario I and Scenario II. (3 marks)

Answer:

(₹ in Millions)

- (i) **Value of the firms before the merger:**

Calculation of free cash flow to each of the firm

$$\begin{aligned}\text{Free cash flow to Firm A} &= \text{BIT (1-tax rate)} \\ &= 2,000 (1-0.50) \\ &= 1,000\end{aligned}$$

$$\begin{aligned}\text{Free cash flow to Firm B} &= \text{BIT (1-tax rate)} \\ &= 1,600 (1-0.50) \\ &= 800\end{aligned}$$

Value of the two firms independently:

$$\begin{aligned}\text{Value of Firm A} &= [1,000 (1.04)] / (0.09-0.04) \\ &= 20,800\end{aligned}$$

$$\begin{aligned}\text{Value of Firm B} &= [800 (1.06)] / (0.10 - 0.06) \\ &= 21,200\end{aligned}$$

- (ii) **In the absence of synergy the combined firm value is:**

Combined Firm Value with no synergy
 $= 20,800 + 21,200 = 42,000$

- (iii) On Combining the two firm the cost of goods sold is reduced firm 70% to 65% of revenues. The revenue of the combined firm
 $= 8,000 + 4,000 = 12,000$
 $= 0.65 \times 12,000 = 7,800$

Weighted average cost of capital for the combined firm

$$= 9\% [20,800/42,000] + 10\% [21,200/42,000]$$

$$= 0.0446 + 0.0505 = 0.0951$$

$$= 9.50\% \text{ approximately}$$

Weighted average expected growth rate for the combined firm

$$= 4\% [20,800/42,000] + 6\% [21,200/42,000]$$

$$= 0.0198 + 0.0303 = 0.0501$$

$$= 5\% \text{ approximately}$$

20.198 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

(iv) Value of Synergy

Scenario I

Revenues	₹ 12,000 million
COGS (65%)	₹7,800 million
EBIT	₹4,200 million
PAT	₹ 2,100 million
Cost of Capital	9.504 %
g	5.01%

$$\text{Value} = \frac{2,100(1.0501)}{0.09504 - 0.0501} = ₹49,070.09 \text{ million}$$

$$\text{Value of synergy} = ₹ (49,070.09 - 42,000) \text{ million} = ₹7,070.09 \text{ million}$$

Scenario II

Revenues	₹ 12,000 million
COGS (70%)	₹ 8,400 million
EBIT	₹ 3,600 million
PAT	₹ 1,800 million
Cost of Capital	9.504%
g	6% (5% for combination without synergy)

$$\text{Value} = \frac{1,800(1.06)}{(0.09504 - 0.06)} = ₹ 54,452.06 \text{ million}$$

$$\text{Synergy Value} = ₹ (54,452.06 - 42,000) \text{ million} = ₹ 12,452.06 \text{ million}$$

2014 - June [8] (b) The following information is available pertaining to Smart Televisions Ltd. for the financial year ending on 31.03.2014.

Particulars	Amount (₹ in Crores)
Sales	250
Profit after tax	40
Book value	100

The valuer appointed by the company believes that 50% weightage should be given to the earnings in valuation process. He also believes that equal weightage may be given to sales and book value. He has identified three firms viz., Alpha Ltd., Beta Ltd., and Gamma Ltd., which are comparable to the operations of Smart Televisions Ltd.

Particulars	Alpha Ltd. ₹ in Crores	Beta Ltd. ₹ in Crores	Gamma Ltd. ₹ in Crores
Sales	190	210	270
Profit after tax	30	44	50
Book value	96	110	128
Market value	230	290	440

Compute the value of Smart Televisions Ltd. using the comparable firms approach. (6 marks)

Answer:

Valuation multiples for the comparable firms can be calculated as follows:

Particulars	Alpha Ltd. ₹ Crores	Beta Ltd ₹ Crores	Gamma Ltd. ₹ Crores	Average
Price/Sales Ratio	1.21	1.38	1.63	1.41
Price / Earnings Ratio	7.67	6.59	8.80	7.69
Price / Book value Ratio	2.40	2.64	3.44	2.83

Applying the multiples calculated as above, the value of Smart Televisions Ltd. can be

calculated as follows:

Particulars	Average Multiple	Parameter	Value ' Crore
Price/Sales Ratio	1.41	250	352.50
Price / Earnings Ratio	7.69	40	307.60
Price / Book value Ratio	2.83	100	283.00

20.200 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

By applying the weightage to the P/S ratio, P/E ratio and P/BV ratio we get:
[(352.50 x 1) + (307.60 x 2) + (283.00 x 1)]/(1 + 2 + 1) = 312.675, i.e.312.675 crores is the value.

Working Notes:

$$\text{Price/Sales Ratio} = \frac{\text{Market Value}}{\text{Sales}}$$

$$\text{Price/Earnings Ratio} = \frac{\text{Market Value}}{\text{Profit after Tax}}$$

$$\text{Price/Book value ratio} = \frac{\text{Market Value}}{\text{Book Value}}$$

2014 - June [9] Following information is available in respect of XYZ Ltd. which is expected to grow at a higher rate for four years after which growth rate will stabilize at a lower level:

Base year information:

Revenues ₹ 2,000 crores

EBIT ₹ 300 crores

Capital expenditure ₹ 280 crores

Depreciation ₹ 200 crores

Information for high growth and stable growth period is as follows:

	High Growth	Stable Growth
Growth in Revenue & EBIT	20%	10%
Growth in capital expenditure and depreciation	20%	Capital expenditure is offset by depreciation
Risk free rate	10%	9%
Equity beta	1.15	1
Market risk premium	6%	5%
Pre-tax cost of debt	13%	12.86%
Debt equity ratio	1:1	2:3

For all time, working capital is 25% of revenue and corporate tax rate is

30%. What is the value of the firm? Use rate of discounting @ 13%.

Year	1	2	3	4
P.V. Factor @ 13%	0.885	0.783	0.693	0.613

(10 marks)

Answer:

High growth phase:

$$k_e = 0.10 + 1.15 \times 0.06 = 0.169 \text{ or } 16.9\%.$$

$$k_d = 0.13 \times (1-0.3) = 0.091 \text{ or } 9.1\%.$$

$$\text{Cost of capital} = 0.5 \times 0.169 + 0.5 \times 0.091 = 0.13 \text{ or } 13\%.$$

Stable growth phase:

$$k_e = 0.09 + 1.0 \times 0.05 = 0.14 \text{ or } 14\%$$

$$k_d = 0.1286 \times (1-0.3) = 0.09 \text{ or } 9\%.$$

$$\text{Cost of capital} = 0.6 \times 0.14 + 0.4 \times 0.09 = 0.12 \text{ or } 12\%.$$

Determination of forecasted Free Cash Flow of the Firm (FCFF)

(₹ in crores)

	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Terminal Year
Revenue	2,400	2,880	3,456	4,147.20	4,561.92
BIT	360	432	518.40	622.08	684.29
EAT	252	302.40	362.88	435.46	479.00
Capital Expenditure	96	115.20	138.24	165.89	-
Less Depreciation					
Increase Working Capital	100.00	120.00	144.00	172.80	103.68
Free cash Flow (FCF)	56.00	67.20	80.64	96.77	375.32

Present value (PV) of FCFF during the explicit forecast period is:

20.202 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

FCFF (₹ in crores)	PVF @ 13%	PV (₹ in crores)
56.00	0.885	49.56
67.20	0.783	52.62
80.64	0.693	55.88
96.77	0.613	59.32
		₹ 217.38

PV of the terminal, value is: $\frac{375.32}{0.12-0.10} \times \frac{1}{(1.13)^4} = ₹ 18.766 \text{ Crores} \times 0.613$
 $= ₹ 11,504 \text{ Crores.}$

The value of the firm is: ₹ 217.38 Crores + ₹ 11,504 Crores = 11,721 Crores.

2014 - June [10] Following is the information collected for a company, provided to you: BALANCE SHEET OF XYZ LTD. AS AT 31ST MARCH.....

(₹ in Crores)

Particular	2013
EQUITY AND LIABILITIES:	
Shareholders' Funds	
share capital	36.37
Reserves and Surplus	2,225.66
NON-CURRENT LIABILITIES	2,262.03
Long-term Borrowings	6,322.76
Deferred tax liabilities (Net)	39.39
Other long-term liabilities	7.09
Long-term provisions	355.03
	6,724.27
CURRENT LIABILITIES	
Trade payables	1797.88
Other current liabilities	12.24
Short-term provisions	19.00

	1829.12
Total	10,815.42

ASSETS	
NON-CURRENT ASSETS	
FIXED ASSETS:	
Tangible assets	4,535.68
Capital work-in-progress	898.83
Intangible assets	550.00
	5,984.51
Non-current investments	1,664.30
Long-term loans and advances	891.97
Other non-current assets	3.03
	2,559.30
CURRENT ASSETS	
Current investments	142.50
Inventories	1,389.92
Trade receivables	585.77
Cash and bank balances	38.41
Short-term loans and advances	115.00
	2,271.60
Total	10,815.41

STATEMENT OF PROFIT AND LOSS OF XYZ LTD.
FOR THE YEAR ENDING ON 31ST MARCH.....

(₹ in Crores)

Particulars	2013
Revenue from operations	295.00
Less: Excise Duty	26.39
	268.61
Other Operating Income	0.30
Other Income	0.13
Total Revenue	269.04

20.204 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

EXPENSES	
Raw materials consumed	132.79
Power & Fuel Cost	21.37
Changes in inventories of finished goods; work-in-progress, and stock-in-trade	(1.63)
Employee benefits expense	5.97
Depreciation and amortization expense	20.77
Interest cost	32.19
Other expenses	34.23
Total Expenses	245.69
PROFIT/(LOSS) BEFORE TAX AND EXTRA-ORDINARY ITEMS	23.35
LESS: Extra-Ordinary items	0.64
PROFIT/(LOSS) BEFORE TAX	22.71
Tax expenses	
Tax paid @ 32.50%	7.38
Deferred Tax	1.37
	8.75
PROFIT/(LOSS) AFTER TAX	13.96

If the Weighted Average Cost of Capital (WACC) is 15% then you are required to calculate EVA for the year 2012-13. (10 marks)

Answer:

EVA = NOPAT — Capital Employed × Cost of Capital

Calculation of NOPAT

(₹ in crores)

Profit / (Loss) Before Tax and Extra – Ordinary Items	₹ 23.35
Adjustments for.....	
Add: Interest Cost	₹ 32.19
Less: Non - Operating Income	(₹ 0.13)
Operating Profit Before Tax	₹ 55.41
Less: Income Tax @ 32.50%	₹ 18.01

Net Operating Profit After Tax (NOPAT)	₹ 37.40
--	---------

Calculation of Capital Employed:

(₹ in crores)	
Share Capital	₹ 36.37
Reserves and Surplus	₹ 2,225.66
Long - Term Borrowings	₹ 6,322.76
Other long term liabilities	₹ 7.09
Long term provisions	₹ 355.03
Capital Employed	₹ 8,946.91
Net Operating Profit After Tax (NOPAT)	₹ 37.40
Less: The cost of Capital Employed (8,946.91 × 15%)	₹ 1,342.04
EVA	₹ (1,304.64)

2014 - Dec [3] {C} (b) (i) Dhyam Ltd. has announced issue of warrants on 1 : 1 basis for equity shareholders. The warrants are convertible at an exercise price of ₹ 12. Warrants are detachable and trading at ₹ 7. What is the minimum price of the warrant and what is the warrant premium if the current price of the stock is ₹ 16? (4 marks)

(ii) Calculate economic value added (EVA) with the help of the following information of Moon Ltd.

Financial Leverage: 1.4 times;

Equity capital ₹ 170 lakhs;

Reserve and surplus ₹ 130 lakhs;

10% debentures ₹ 400 lakhs;

Cost of equity: 15%

Income tax: 30%

(4 marks)

Answer:

(b) (i) Minimum Price = (Market price of common stock – Exercise price) × (Exercise ratio) = ₹ (16-12) × 1
= ₹ 4

Warrant Premium = Market price of warrant - Minimum price of warrant

20.206 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

$$= ₹ (7 - 4)$$

$$= ₹ 3$$

(ii) Calculation of EVA

$$\begin{aligned} \text{Financial Leverage} &= \text{PBIT} / \text{PBT} \\ 1.4 &= \text{PBIT} / (\text{PBIT} - \text{Interest}) \\ 1.4 &= \text{PBIT} / (\text{PBIT} - 100) \\ 1.4 (\text{PBIT} - 100) &= \text{PBIT} \\ 1.4 \text{ PBIT} - 140 &= \text{PBIT} \\ 1.4 \text{ PBIT} - \text{PBIT} &= 140 \\ 0.4 \text{ PBIT} &= 140 \\ \text{PBIT} &= 140 / 0.4 = 350 \text{ lacs} \\ \text{NOPAT} &= \text{PBIT} - \text{Tax} \\ &= ₹ 350 \text{ lacs} (1 - 0.30) \\ &= ₹ 245 \text{ lacs.} \end{aligned}$$

Weighted average cost of capital (WACC)

$$\begin{aligned} &= 15\% (300 / 700) + (1 - 0.30) \times (10\%) \times (400 / 700) \\ &= 10.4\% \end{aligned}$$

$$\begin{aligned} \text{EVA} &= \text{NOPAT} - (\text{WACC} \times \text{Total Capital}) \\ &= ₹ 245 \text{ lacs} - 0.104 \times ₹ 700 \text{ lacs} \\ &= ₹ 245 - 72.8 \text{ lacs} \\ &= ₹ 172.2 \text{ Lacs.} \end{aligned}$$

2014 - Dec [4] (c) ABC Ltd. is engaged in power projects. As part of its diversification plans, the company proposes to put up a windmill to generate electricity. The details of the scheme are as follows:

Sl. No.	Particulars
1	Cost of the windmill, ₹ 300 lakhs
2	Cost of the land, ₹ 15 lakhs
3	Subsidy from State Govt. to be received at the end of 1 st year of installation ₹ 15 lakh.
4	Cost of electricity will be ₹ 2.25 per unit in year 1. This will increase

	by ₹ 0.25 per unit every year till year 7. After that, it will increase every year by ₹ 0.50 per year till year 10.
5	Maintenance cost will be ₹ 4 lakh in year 1 and the same will increase by ₹ 2 lakh every year.
6	Estimated life is 10 years
7	Cost of capital is 15%
8	Residual value is nil. However, land value will go up to ₹ 60 lakh at the end of year 10.
9	Depreciation will be 100% of the cost of the windmill in year 1 and the same will be allowed for the tax purpose.
10	The windmills are expected to work based on wind velocity. The efficiency is expected to be on an average 30%. Gross electricity generated at this level will be 25 lakhs unit per annum; 4% of which will be committed to the State Electricity Board as per the agreement.
11	Tax rate is 35%

From the above information you are required to compute the net present value. Ignore tax on capital profit. Use present value up to 2 digit.

(15 marks)

Answer:

Determination of NPV of Windmill

Amount in Lakhs

Incremental cash outflows	
Cost of Land	15
Cost of the windmill	300
Less: Subsidy from State Government (₹15 lakhs × 0.87)	13
Total	302

20.208 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Incremental CFAT and PV							
Year	Gross Savings on 24 Lakhs units	Maintenance Costs	Net Savings	Taxes	CFAT	PVF (0.15)	Total PV
1	54	4	50	-87.5	137.5	0.87	119.62
2	60	6	54	18.9	35.1	0.76	26.68
3	66	8	58	20.3	37.7	0.66	24.88
4	72	10	62	21.7	40.3	0.57	22.97
5	78	12	66	23.1	42.9	0.5	21.45
6	84	14	70	24.5	45.5	0.43	19.56
7	90	16	74	25.9	48.1	0.38	18.28
8	102	18	84	29.4	54.6	0.33	18.02
9	114	20	94	32.9	61.1	0.28	17.11
10	126	22	104	36.4	67.6	0.25	16.9
10	Land				60	0.25	15
Total Present Value							320.47
Less: Incremental cash outflow							302.00
NPV							18.47

Assuming taxable income from other sources, there will be tax savings of ₹ 87.5 lakhs on negative EAT of ₹ 250 lakhs (₹ 300 lakhs, depreciation – ₹ 50 Lakhs, net savings).

2015 - June [3] {C} (a) (ii) The following information is available of a concern. Calculate Economic Value Added (EVA).

12% Debt ₹ 2,000 crores

Equity capital ₹ 500 crores

Reserves and Surplus ₹ 7,500 crores

Risk-free rate 9%

Beta factor 1.05

Market rate of return 19%

Equity (market) risk premium 10%
 Operating profit after tax ₹ 2,100 crores
 Tax rate = 30%

(4 marks)

Answer:

Particulars	
Cost of Debt (K_d)= Interest \times (1-tax rate)	12% \times (1-0.3)= 8.40%
Cost of Equity(K_e)= Risk free rate +(Beta \times Market Risk Premium)	9% +1.05(19%-9%)=19.5%
Debt equity ratio(as given in the question)	20% & 80%
WACC= [(K_d) \times Debt% + (K_e) \times Equity %]	(8.40 \times 20%) + (19.5 \times 80%) = 17.28%
Operating Profit before tax	₹ 2,100 crores

EVA = NOPAT – Cost of Capital Employed
 = [(₹ 2,100 cr.) – (17.28%) \times ₹10,000 cr.]
 = ₹ 2,100 cr. – ₹ 1,728 cr.
 = ₹ 372 cr.

2015 - June [4] (b) (ii) There are a number of factors both macro economic and micro economic which have an impact on business. Valuation of a business involves making forecasts for the future. Comment on the sources of uncertainties in business valuation in the light of the above. (5 marks)

Answer:

Sources of uncertainties:

Uncertainty is part and parcel of the valuation process, both at the point in time that we value a business and in how that value evolves over time as we get new information that impacts the valuation. That information can be specific to the firm being valued, more generally about the sector in which the firm operates or even be general market information (about interest rates and the economy).

When valuing an asset at any point in time, we make forecasts for the future.

20.210 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Since none of us possess crystal balls we have to make our best estimates, give the information that we have at the time of the valuation. Our estimates of value can be wrong for a number of reasons, and we can categorize these reasons into three groups.

- **Estimation Uncertainty:** Even if our information sources are impeccable, we have to convert raw information into inputs and use these inputs in models. Any mistakes or mis-assessments that we make at either stage of this process will cause estimation error.
- **Firm-specific Uncertainty:** The path that we envision for a firm can prove to be hopelessly wrong. The firm may do much better or much worse than we expected it to perform and the resulting earnings and cash flows will be very different from our estimates.
- **Macroeconomic Uncertainty:** Even if a firm evolves exactly the way we expected it to, the macroeconomic environment can change in unpredictable ways. Interest rates can go up or down and the economy can do much better or worse than expected. These macroeconomic changes will affect value.

2015 - Dec [4] (b) A firm is considering a project for introducing a new product line for which the acceptance in the market is uncertain. The relevant particulars are as follows:

(all amounts are in ₹ Lakhs)

	Probability	Estimated Cash Flows		
		Year 0	Year 1	Terminal Value at the end of Year 1
Investment		(26)		
Market Acceptance High	0.75		8	26
Market Acceptance Low	0.25		2	6

The project is not flexible to change according to the market acceptance of the product.

A modified project is also under consideration where after having knowledge

about the market acceptance of the product in the first year the firm would enjoy Real Options to expand or to terminate the project. Accordingly, cash flows are modified for inclusion of the Real Option embedded in the modified project as stated below:

The Initial Outlay would increase from 26 to 30 (₹ lakh) and the first year Cash Flow would remain same. However, there would be additional cost for expansion/termination at the end of first year and Terminal Value at the end of the first year would also be different as stated below:

	Probability	Options Available at the end of first year	Additional Costs (₹ lakh)	Terminal Value at the end of first year (₹ lakh)
Market Acceptance High	0.75	Continue as before		26
		Real Option: Expand	(3)	49
Market Acceptance High	0.25	Continue as before		6
		Real Option: Terminate	(1)	13

The discounting rate to be applied in all cases is 10% per annum. You are required to:

- I. Find Expected NPV of the original project and comment on its acceptability. (3 marks)
- II. Draw a Decision Tree and Expected NPV of the modified project and comment on its acceptability. (3 + 6 = 9 marks)
- III. Find Net Value of Real Options embedded in the modified project. (3 marks)

Answer:

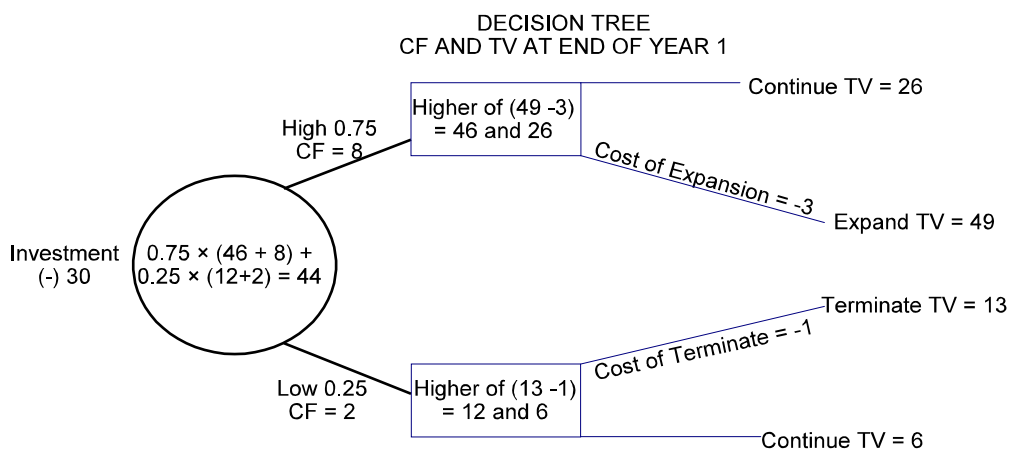
(₹ in lakh)

I.	Market Acceptance	High	Low	Total	Comment
	Probability	0.75	0.25		
	First Year Cash Flows	8	2		
	Terminal Value (TV)	26	6		
	Total CF at first year end	34	8		

20.212 ■ **Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)**

Expected Value (Total CF × Probability)	25.5	2	27.5	
Expected PV at discounted value @ 10%			25	(27.5-1.1)
Initial Outlay			26	
Expected NPV			-1	Not Acceptable

II.



(₹ in lakh)

Market Acceptance	High	Low	Total	Comments
Probability	0.75	0.25		
First Year Cash Flows	8	2		
TV for Continuing without expansion/Termination	26	6		
TV for Expansion/Termination	49	13		
Additional Costs for Expansion	3	1		
Net TV for Expansion/Termination #	46	12		
Total CF at first year end	54	14		
Expected Value = (CF X Probability)	40.5	3.5	44	

Expected PV = (Expected value discounted @ 10%)			40	(44+1.1)
Initial Outlay			30	
Expected NPV			10	Acceptable

#: Since Net TVs for Real Options of Expansion/Termination are greater than TVs for continuation without Real Options, Real Options are exercised to compute Expected NPV of Modified Project.

<p>III. Net Value of Real Option = Expected NPV of Modified Project - Expected NPV of the Original Project = 10 - (-1) = 11 (₹ in lakh)</p>

2015 - Dec [4] (c) (i) Hajela Ltd. had earned a Profit after tax of ₹ 48 lakhs for the year just ended. It wants you to ascertain the value of its business, based on the following information:

- (1) Tax rate for the year just ended was 36%. Future tax rate is estimated at 34%.
- (2) The company's equity shares are quoted at ₹ 120 at the balance sheet date. The company had an equity capital of ₹ 100 lakhs, divided into shares of ₹ 50 each.
- (3) Profit for the year has been calculated after considering the following in the Profit & Loss account-
 - Subsidy ₹ 2,00,000 received from Government towards fulfillment of certain social obligation. The Government has now discontinued this subsidy and hence, this amount will not be received in future.
 - Interest ₹ 8,00,000 on term loan. The final installment of this term loan was fully settled in the last year.
 - Managerial remuneration ₹ 15,00,000. The shareholders have approved an increase of ₹ 6,00,000 in the overall managerial remuneration from the next year onwards.
 - Loss on Sale of fixed assets and investments amounting to ₹ 8,00,000. (Ignore tax effect thereon) (10 marks)

Answer:

1. Computation of Future Maintainable Profits

Particulars	₹ in lakhs
Profit after tax for the year just ended	48,00,000
Add: Tax Expense (Tax is 36%, so PAT = 64%. Hence, Tax = 48,00,000 X 36/64)	27,00,000
Profit before tax for the year just ended	75,00,000
Add/(Less): Adjustments in respect of Non-Recurring items	
Subsidy Income not received in future	(2,00,000)
Interest on Term Loan not payable in future, hence saved	8,00,000
Additional Managerial Remuneration	(6,00,000)
Loss on Sale of Fixed Assets and Investments (non-recurring)	8,00,000
Future Maintainable Profits before Tax	83,00,000
Less: Tax Expense at 34%	28,22,000
Future Maintainable Profits after Tax Equity Earnings	54,78,000

2. Computation of Capitalization Rate and Value of Business

Particulars	
(a) Profit after tax for the year just ended	₹ 48 Lakhs
(b) Number of Equity Shares (₹ 100 Lakhs ÷ ₹ 50 per Share)	2 Lakhs
(c) Earnings Per Share (EPS) = PAT ÷ Number of Equity Shares = 48/2	₹ 24
(d) Market Price per Share on Balance Sheet Date	₹ 120
(e) Price Earnings Ratio = MPS ÷ EPS = 120/24	5
(f) Capitalization Rate = 1 ÷ PE Ratio = 1/5	20%
(g) Value of Business = Future Maintainable Profits ÷ Capitalization Rate = ₹ 54.78 Lakhs ÷ 20%	₹ 273.90 Lakhs

2016 - June [1] {C} (a) Answer the following:

- (v) SMITH LTD. has PAT of ₹ 400 lakh with extra ordinary income of ₹ 60 lakh. The cost of capital and the applicable tax rate of the company are 20% and 30% respectively. What is the value of SMITH LTD.?
(2 marks)

2016 - June [7] (a) For Goal Ltd. the FCFE projected for next 3 years are stated below along with the immediately past year FCFE. You are required to value equity share by DCF approach. From Year 4 FCFE is expected to grow at 3% p.a. Cost of equity is measured at 15% p.a. Number of shares outstanding is 1,00,000.

	Past Year	Projected		
		Year 1	Year 2	Year 3
FCFE (₹ Lakhs)	160	180	200	220

Discounting Factor @ 15% p.a. Year 1 = 0.869565, Year 2 = 0.756144, Year 3 = 0.657516.
(8 marks)

- (b) Calculate Economic Value Added (EVA) with the help of the following information of Moon Ltd.:
- Financial leverage: 1.4 times;
 - Equity capital ₹ 170 lakhs;
 - Reserve and surplus ₹ 130 lakhs;
 - 10% debentures ₹ 400 lakhs;
 - Cost of equity: 15%
 - Income tax: 30%
- (4 marks)
- (c) Sun Ltd. has announced issue of warrants on 1:1 basis for its equity shareholders. The warrants are convertible at an exercise price of 12. Warrants are detachable and trading at ₹ 7. What is the minimum price of the warrant and what is the warrant premium if the current price of the stock is ₹ 16?
(4 marks)

20.216 ■ Solved Scanner CMA Final Gr.IV Paper 20B (New Syllabus)

Repeatedly Asked Questions		
No.	Question	Frequency
1	What are the misconceptions about valuation? 13 - June [5] (b), 14 - Dec [4] (a) (i)	2 Times

Table Showing Marks of Compulsory Questions										
Year	11 D	12 J	12 D	13 J	13 D	14 J	14 D	15 J	15 D	16 J
Descriptive							2	4		
Practical					15	15	8	4		2
Total					15	15	10	8		2