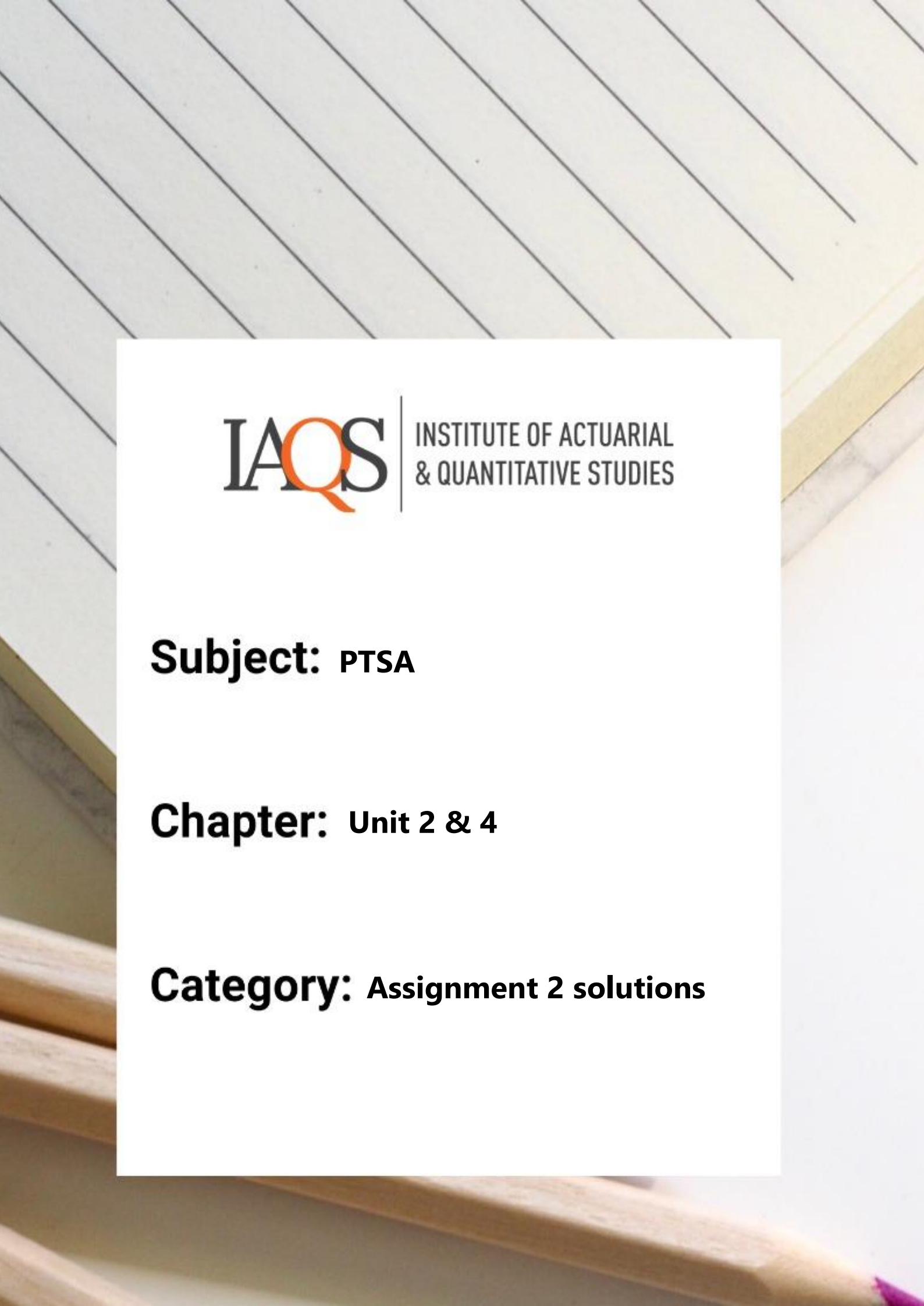

IAQS | INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Subject: PTSA

Chapter: Unit 2 & 4

Category: Assignment 2 solutions

Answer 1:

1. Defined benefit pension plans

Defined benefit pension plans (DB plans) are company- sponsored plans that offer employees a predefined benefit on retirement. The future benefit is defined because the DB plan requires the plan sponsor to specify the obligation stated in terms of the retirement income benefits owed to participants.

2. Endowments

Endowments are funds of non- profit institutions that help the institutions provide designated services. In contrast, foundations are grant- making entities.

3. Banks

Banks are financial intermediaries that accept deposits and lend money. Banks often have excess reserves that are invested in relatively conservative and very short- duration fixed- income investments, with a goal of earning an excess return above interest obligations due to depositors.

4. Insurance companies

Insurance companies receive premiums for the policies they write, and they need to invest these premiums in a manner that will allow them to pay claims.

5. Sovereign wealth funds

Sovereign wealth funds (SWFs) are state- owned investment funds or entities that invest in financial or real assets. SWFs do not typically manage specific liability obligations, such as pensions, and have varying investment horizons and objectives based on funding the government's goals.

Answer 2:

The distinguishing characteristics of different types of investors are as follows:

1. Investment horizon – the length of time the investor expects to hold the portfolio.
2. Risk tolerance - the degree of variability in returns that the investor is able and willing to withstand.
3. Liquidity needs – to meet unexpected claims or withdrawals from the portfolio.
4. Income needs – the degree of withdrawal needs expected from the portfolio.

Client	Time Horizon	Risk Tolerance	Income Needs	Liquidity Needs
Individual investors	Varies by individual	Varies by individual	Varies by individual	Varies by individual
Defined benefit pension plans	Typically long term	Typically quite high	High for mature funds; low for growing funds	Varies by maturity of the plan
Endowments and foundations	Very long term	Typically high	To meet spending commitments	Typically quite low
Banks	Short term	Quite low	To pay interest on deposits and operational expenses	High to meet repayment of deposits
Insurance companies	Short term for property and casualty; long term for life insurance companies	Typically quite low	Typically low	High to meet claims
Investment companies	Varies by fund	Varies by fund	Varies by fund	High to meet redemptions
Sovereign wealth funds	Varies by fund	Varies by fund	Varies by fund	Varies by fund

Answer 3:

The constraints section covers factors that need to be taken into account when constructing a portfolio for the client that meets the objectives. The typical categories are liquidity requirements, time horizon, regulatory requirements, tax status, and unique needs. The constraints may be internal (i.e., set by the client), or external (i.e., set by law or regulation). These are discussed in detail below.

1. Risk tolerance

When constructing a portfolio for a client, it is important to ensure that the risk of the portfolio is suitable for the client. The IPS should state clearly the risk tolerance of the client.

2. Return objective

The return objective could be a required return—that is, the amount the investor needs to earn to meet a particular future goal—such as a certain level of retirement income.

3. Time horizon

It may be the period over which the portfolio is accumulating before any assets need to be withdrawn; it could also be the period until the client's circumstances are likely to change.

4. Tax exposure

Tax status varies among investors. Some investors will be subject to taxation on investment returns and some will not. Typically, when there is a differential, income is taxed more highly than gains. Income may be

taxed as it is earned, whereas gains may be taxed when they are realized. The portfolio should reflect the tax status of the client.

5. Liquidity requirements

The IPS should state what the likely requirements are to withdraw funds from the portfolio.

6. Legal constraints

The IPS should state any legal and regulatory restrictions that constrain how the portfolio is invested.

7. Unique circumstances

IPS should cover any other aspect of the client's circumstances, including beliefs and values, that is likely to have a material impact on the composition of the portfolio. A client may have considerations derived from his or her religion or ethical values that could constrain investment choices. A client may have personal objections to certain products (e.g., weapons, tobacco, gambling) or practices (e.g., environmental impact of business activities, human impact of government policies, labor standards), which could lead to the exclusion of certain companies, countries, or types of securities.

Answer 4:

A is correct. Environmental considerations should be incorporated in the industry analysis of Company A. It operates in a sector that has high exposure to greenhouse gas emissions, as well as water management and waste and hazardous materials management, which could incur additional costs to running businesses in this sector.

Answer 5:

Low-cost strategy:

Companies strive to become the low-cost producers and to gain market share by offering their products and services at lower prices than their competition while still making a profit margin sufficient to generate a superior rate of return based on the higher revenues achieved. Low-cost strategies may be pursued defensively to protect market positions and returns or offensively to gain market share and increase returns. Pricing also can be defensive (when the competitive environment is one of low rivalry) or aggressive (when rivalry is intense). In the case of intense rivalry, pricing may even become predatory—that is, aimed at rapidly driving competitors out of business at the expense of near-term profitability. The hope in such a strategy is that having achieved a larger market share, the company can later increase prices to generate higher returns than before. For example, the ride-sharing industry has produced fierce competition among companies that seek to capture market share by offering incentives and discount pricing for rides. Companies seeking to follow low-cost strategies must have tight cost controls, efficient operating and reporting systems, and appropriate managerial incentives. In addition, they must commit themselves to

painstaking scrutiny of production systems and their labor forces and to low-cost designs and product distribution. In some cases, they must be able to invest in productivity-improving capital equipment and to finance that investment at a low cost of capital.

Differentiation strategies:

Companies attempt to establish themselves as the suppliers or producers of products and services that are unique either in quality, type, or means of distribution. To be successful, their price premiums must be above their costs of differentiation and the differentiation must be appealing to customers and sustainable over time. Corporate managers who successfully pursue differentiation strategies tend to have strong market research teams to identify and match customer needs with product development and marketing. Such a strategy puts a premium on employing creative and inventive people.

Answer 6:

1. Present value models (synonym: discounted cash flow models).

These models estimate the intrinsic value of a security as the present value of the future benefits expected to be received from the security. In present value models, benefits are often defined in terms of cash expected to be distributed to shareholders (dividend discount models) or in terms of cash flows available to be distributed to shareholders after meeting capital expenditure and working capital needs (free-cash-flow-to-equity models). Many models fall within this category, ranging from the relatively simple to the very complex. In Sections 4–8, we discuss in detail two of the simpler models, the Gordon (constant) growth model and the two-stage dividend discount models.

2. Multiplier models (synonym: market multiple models).

These models are based chiefly on share price multiples or enterprise value multiples. The former model estimates intrinsic value of a common share from a price multiple for some fundamental variable, such as revenues, earnings, cash flows, or book value. Examples of the multiples include price to earnings (P/E, share price divided by earnings per share) and price to sales (P/S, share price divided by sales per share). The fundamental variable may be stated on a forward basis (e.g., forecasted EPS for the next year) or a trailing basis (e.g., EPS for the past year), as long as the usage is consistent across companies being examined. Price multiples are also used to compare relative values. The use of the ratio of share price to EPS—that is, the P/E multiple—to judge relative value is an example of this approach to equity valuation.

3. Enterprise value (EV)

These multiples have the form (Enterprise value)/(Value of a fundamental variable). Two possible choices for the denominator are earnings before interest, taxes, depreciation, and amortization (EBITDA) and total revenue. Enterprise value, the numerator, is a measure of a company's total market value from which cash and short-term investments have been subtracted (because an acquirer could use those assets to pay for acquiring the company). An estimate of common share value can be calculated indirectly from the EV

multiple; the value of liabilities and preferred shares can be subtracted from the EV to arrive at the value of common equity.

4. Asset-based valuation models.

These models estimate intrinsic value of a common share from the estimated value of the assets of a corporation minus the estimated value of its liabilities and preferred shares. The estimated market value of the assets is often determined by making adjustments to the book value (synonym: carrying value) of assets and liabilities. The theory underlying the asset-based approach is that the value of a business is equal to the sum of the value of the business's assets

Answer 7:

Step 1 – Find the present value of dividends for years 1 and Year 2.

- PV (year 1) = \$20/((1.15)^1)
- PV(year 2) = \$20/((1.15)^2)

In this example, they come out to be \$17.4 and \$16.3, respectively, for 1st and 2nd-year dividends.

Step 2 – Find the present value of the future selling price after two years.

- PV(Selling Price) = \$333.3 / (1.15^2)

Step 3 – Add the present value of dividends and the present value of selling price

- \$17.4 + \$16.3 + \$252.0 = \$285.8

Answer 8:

i) The Gordon (constant) growth model (Gordon, 1962) is a simple and well- recognized DDM. The model assumes dividends grow indefinitely at a constant rate.

The Gordon growth model is particularly appropriate for valuing the equity of dividend- paying companies that are relatively insensitive to the business cycle and in a mature growth phase.

$$V_0 = \sum_{t=1}^{\infty} \frac{D_0(1+g)^t}{(1+r)^t} = D_0 \left[\frac{(1+g)}{(1+r)} + \frac{(1+g)^2}{(1+r)^2} + \ldots + \frac{(1+g)^{\infty}}{(1+r)^{\infty}} \right]$$

With a constant growth assumption, where g is the constant growth rate:

If required return r is assumed to be strictly greater than growth rate g, then the square- bracketed term in above formula is an infinite geometric series and sums to [(1 + g)/(r – g)].

$$V_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

The assumptions of the Gordon model are as follows:

1. Dividends are the correct metric to use for valuation purposes.
2. The dividend growth rate is forever: It is perpetual and never changes.
3. The required rate of return is also constant over time.
4. The dividend growth rate is strictly less than the required rate of return.

ii) By using the stock – PV with constant growth formula, we get –

- $P_0 = Div_1 / (r – g)$
- Or, P_0 = \$40,000 / (8% – 4%)
- Or, P_0 = \$40,000 / 4%
- Or, P_0 = \$40,000 * 100/4 = \$10, 00,000.

Answer 9:

i.

Common shares represent an ownership interest in a company and are the predominant type of equity security. As a result, investors share in the operating performance of the company, participate in the governance process through voting rights, and have a claim on the company's net assets in the case of liquidation.

Companies may choose to pay out some, or all, of their net income in the form of cash dividends to common shareholders, but they are not contractually obligated to do so.

Voting rights provide shareholders with the opportunity to participate in major corporate governance decisions, including the election of its board of directors, the decision to merge with or take over another company, and the selection of outside auditors.

As a result of geographic limitations and the large number of shareholders, it is often not feasible for shareholders to attend the annual meeting in person. For this reason, shareholders may vote by proxy, which allows a designated party—such as another shareholder, a shareholder representative, or management—to vote on the shareholders' behalf.

ii.

Regular shareholder voting, where each share represents one vote, is referred to as statutory voting. Although it is the common method of voting, it is not always the most appropriate one to use to elect a board of directors.

To better serve shareholders who own a small number of shares, cumulative voting is often used. Cumulative voting allows shareholders to direct their total voting rights to specific candidates, as opposed to having to allocate their voting rights evenly among all candidates. Total voting rights are based on the number of shares owned multiplied by the number of board directors being elected. For example, under

cumulative voting, if four board directors are to be elected, a shareholder who owns 100 shares is entitled to 400 votes and can either cast all 400 votes in favor of a single candidate or spread them across the candidates in any proportion. In contrast, under statutory voting, a shareholder would be able to cast only a maximum of 100 votes for each candidate.

iii.

The key benefit to cumulative voting is that it allows shareholders with a small number of shares to apply all of their votes to one candidate, thus providing the opportunity for a higher level of representation on the board than would be allowed under statutory voting.

iv.

Private equity securities are issued primarily to institutional investors via non-public offerings, such as private placements. Because they are not listed on public exchanges, there is no active secondary market for these securities. As a result, private equity securities do not have "market determined" quoted prices, are highly illiquid, and require negotiations between investors in order to be traded. In addition, financial statements and other important information needed to determine the fair value of private equity securities may be difficult to obtain because the issuing companies are typically not required by regulatory authorities to publish this information.

There are three primary types of private equity investments:

1. **Venture capital** investments provide "seed" or start-up capital, early-stage financing, or mezzanine financing to companies that are in the early stages of development and require additional capital for expansion. These funds are then used to finance the company's product development and growth. Venture capitalists range from family and friends to wealthy individuals and private equity funds. Because the equity securities issued to venture capitalists are not publicly traded, they generally require a commitment of funds for a relatively long period of time; the opportunity to "exit" the investment is typically within 3 to 10 years from the initial start-up. The exit return earned by these private equity investors is based on the price that the securities can be sold for if and when the start-up company first goes public, either via an initial public offering (IPO) on the stock market or by being sold to other investors.
2. A **leveraged buyout** (LBO) occurs when a group of investors (such as the company's management or a private equity partnership) uses a large amount of debt to purchase all of the outstanding common shares of a publicly traded company. In cases where the group of investors acquiring the company is primarily comprised of the company's existing management, the transaction is referred to as a management buyout (MBO). After the shares are purchased, they cease to trade on an exchange and the investor group takes full control of the company. Companies that are candidates for these types of transactions generally have large amounts of undervalued assets (which can be sold to reduce debt) and generate high levels of cash flows (which are used to make interest and principal payments on the debt). This does not seem appropriate for Tanvi's business.

3. **Private investment in public equity** - This type of investment is generally sought by a public company that is in need of additional capital quickly and is willing to sell a sizeable ownership position to a private investor or investor group. For example, a company may require a large investment of new equity funds in a short period of time because it has significant expansion opportunities, is facing high levels of indebtedness, or is experiencing a rapid deterioration in its operations. Depending on how urgent the need is and the size of the capital requirement, the private investor may be able to purchase shares in the company at a significant discount to the publicly-quoted market price

Since Tanvi requires additional capital for expansion, raising it through venture capitalists is the best option for her.

Answer 10:

i

A cash dividend is a cash distribution made to a company's shareholders.

Cash dividends are typically paid out regularly at known intervals; such dividends are known as regular cash dividends.

By contrast, an extra dividend or special dividend is a dividend paid by a company that does not pay dividends on a regular schedule or a dividend that supplements regular cash dividends with an extra payment.

A stock dividend (also known as a bonus issue of shares) is a type of dividend in which a company distributes additional shares of its common stock (typically, 2%–10% of the shares then outstanding) to shareholders instead of cash. A stock dividend divides the "pie" (the market value of shareholders' equity) into smaller pieces without affecting the value of the pie or any shareholder's proportional ownership in the company.

Stock splits and reverse stock splits are similar to stock dividends in that they have no economic effect on the company or shareholders. A stock split involves an increase in the number of shares outstanding with a consequent decrease in share price.

A reverse stock split involves a reduction in the number of shares outstanding with a corresponding increase in share price.

Share repurchases are an alternative to cash dividend payments. A share repurchase (or buyback) is a transaction in which a company uses cash to buy back its own shares.

ii

Three major categories of equity valuation models are as follows:

1. **Present value models** (discounted cash flow models). These models estimate the intrinsic value of a security as the present value of the future benefits expected to be received from the security. In present value models, benefits are often defined in terms of cash expected to be distributed to shareholders (dividend discount models) or in terms of cash flows available to be distributed to

shareholders after meeting capital expenditure and working capital needs (free-cash-flow-to-equity models).

2. **Multiplier models** (market multiple models). These models are based chiefly on share price multiples or enterprise value multiples. The former model estimates intrinsic value of a common share from a price multiple for some fundamental variable, such as revenues, earnings, cash flows, or book value. Examples of the multiples include price to earnings (P/E, share price divided by earnings per share) and price to sales (P/S, share price divided by sales per share).
3. **Asset-based valuation models:** These models estimate intrinsic value of a common share from the estimated value of the assets of a corporation minus the estimated value of its liabilities and preferred shares. The estimated market value of the assets is often determined by making adjustments to the book value (carrying value) of assets and liabilities. The theory underlying the asset-based approach is that the value of a business is equal to the sum of the value of the business's assets.

iii

The most appropriate model which could be used is the discounted cash flow model.

Ola has provided historical cash flows and dividends declared which can be used for this purpose.

Since Ola is a service oriented company, it may not have a lot of physical assets driving its intrinsic value and hence asset based valuation models may not be appropriate.

Similarly, market multiple models may not be appropriate since the relevant information required for other players in the market may not be readily available.