Time Allowed: 3 Hours   **Full Marks: 100**

The figures in the margin on the right side indicate full marks.

Where considered necessary, suitable assumptions may be made and

clearly indicated in the answer.

SECTION – A : STRATEGIC PERFORMANCE MANAGEMENT

Answer to Question No. 1 and 5 are compulsory; answer any two from Question No. 2, 3 & 4.

1.   **(a)**

Sl. No.	Answer	Justification
(i)	d	Tactical CRM is not a form of CRM There are, as such, three main forms of CRM; strategic, operational and analytical. In the following lines a brief note follows. • **Strategic CRM -** this is specifically a managerial concept and CRM is defined as a customer centric business strategy for attracting new customers and retaining old profitable customers. The main issue is development of a customer-centric business culture which is mainly reflected in leadership behaviour and the design of formal systems of the company, • **Operational CRM -** this advocates partial automation of those aspects which are interfaces with the customer such as selling, marketing and after sales service. • **Analytical CRM -** this is a technology driven definition, applicable mainly for larger organisation.
(ii)	b	Administered prices are the prices which are fixed and enforced by the Government. The term administered prices was introduced by Keynes. These prices are regulatory in nature.
(iii)	b	Shareholder wealth maximisation popularly known as SWM is a traditional theory of the firm and is considered a modern theory. It became prominent during the 1980s and 1990s. It is not considered as a modern theory of the firm which basically

		propagates theory beyond 'profit maximisation' theory and the 'shareholder wealth maximisation' theory.

(iv)	a	π = TR –TC
		
		$\Rightarrow \pi = 4000Q - 33Q^2 - (2Q^3 - 3Q^2 + 400Q + 5000)$
		
		$\Rightarrow \pi = 4000Q - 33Q^2 - 2Q^3 + 3Q^2 - 400Q - 5000$
		
		$\Rightarrow \pi = -30Q^2 - 2Q^3 + 3600Q - 5000$
		
		Step One: calculate the first order derivative of the profit (π) function and set it equal to zero.
		
		$\frac{d(\pi)}{dQ}$ = -60Q -6Q^2 +3600 = 0 (setting the first order derivative equal to zero).
		
		     = -6(Q^2 + 10Q – 600) = 0
		
		     = -6(Q+30) (Q – 20) = 0
		
		Thus, Q = -30, Q =20 are the critical points. (Q cannot be negative, thus critical point is Q =20)
		
		Step two: calculate the second order derivative ($\frac{d^2\pi}{dQ^2}$) and check whether $\frac{d^2\pi}{dQ^2}$ is greater than or less than zero.
		
		$\frac{d^2\pi}{dQ^2} = \frac{d(-60Q -6Q^2 +3600)}{dQ}$ = -12Q -60
		
		At Q = 20, $\frac{d^2\pi}{dQ^2}$ = -12(20) – 60 < 0,
		
		This implies that Profit (π) is at its relative maximum at critical point Q = 20.
		
		Maximum profit at Q = 20, is given as,
		
		$\pi = -30Q^2 - 2Q^3 + 3600Q - 5000$
		
		At Q =20, $\pi = -30(20)^2 - 2(20)^3 + 3600(20) - 5000 = 39000$.

(v)	a	$Average\ Cost\ =\ x^3 + 12x^2 - 11x$ ----- (1) $Total\ Cost\ (TC)\ =\ x^4 + 12x^3 - 11x^2$ --------- equation 1 multiplied by x $Thus, Marginal\ Cost\ =\ \frac{d(TC)}{dx}\ =\ 4x^3 + 36x^2 - 22x$

2.   (a)   The components of the Decision Grid Analysis (DGA) are:

       1.   Identify the Decision Problem: This involves clearly defining the decision problem and its alternatives.

       2.   Build the Decision Grid: This involves constructing a decision grid that includes the decision problem, criteria, and alternatives.

       3.   Evaluate the Alternatives: This involves assessing each alternative against each criterion and assigning weights to each criterion.

       4.   Score the Alternatives: This involves scoring each alternative on each criterion, based on the weights assigned.

       5.   Make a Decision: This involves making a final decision by choosing the alternative with the highest score.

The four segments of Decision Grid Analysis (DGA) are as follows;

       1.   **Loser** - this is a segment where the sales volume generated by a customer is low and along with this the contribution as a percentage of sales is also negative. This is the segment identified as the least profitable and the strategy is surely elimination of customers who fall in this segment.

       2.   **Problem** - this segment comprises customers who generate negative percentage contribution but the sales volume is on the higher side and thus a turnaround strategy may be recommended. But the customers also destroy value and the company sometimes prefer a elimination strategy especially when the company is optimistic about acquisition of new customers

       3.   **Potential -** this segment comprises of group of customers who generate positive contribution and are thus classified as profitable but their contribution to the total sales volume is low and thus they are referred as potential as various promotional schemes including loyalty programmes would help increase the volume of sales to these customers which would make them winners (fourth segment)

       4.   **Winner -** this segment comprises customers who generate positive contribution as well the sales volume is the highest. These are the top profitable customers and the company strategy is to retain customers.

   (b)   **(i)**   Analytical Customer Relationship Management (CRM) is a technology driven definition, applicable mainly for larger organizations. All possible

data related to the customer are captured and extracted from various sources, stored in a centralized database, distributed and interpreted as and when required to enhance customer value. A repository is created which stores purchase, sales data, financial data and marketing data, which is retrieved in accordance. It is Analytical Customer Relationship Management (CRM) is the process of utilizing customer data and applying analytical techniques to gain insights into customer behavior, preferences and expectations. With the advent of big data, companies are now able to capture a wealth of customer data and use it to gain valuable insights into customer behavior. This enables them to better serve their customers and create more tailored experiences that are more likely to result in higher customer loyalty and satisfaction. CRM has become a strategic tool for businesses to better understand their customers and build meaningful relationships with them. This can ultimately lead to increased revenue and profitability.

The emergence of 'big data' is a big thing in the business environment. Though the same arose to prominence during early 2000, it is only since 2010 that 'big data' coupled with IT enabled analytics, became a novelty. Big data extends beyond structured data, including unstructured data of all varieties: text, audio, video, click streams, log files and more. The tools for searching, making sense of, and acting on unstructured data differ from those available for data-mining structured datasets. With the advent of big data and business data analytics analytical CRM gained superior strategic importance.

Analytical Customer Relationship Management (CRM) and big data are linked because CRM is used to analyze and interpret customer data in order to better understand customer behavior and preferences. Big data is a collection of large, unstructured datasets that can be used to uncover patterns and trends. By combining the two, companies can use big data to gain insights into customer behavior and preferences, allowing them to make more informed decisions and improve their overall customer experience.

(ii)   Balanced Score Card (BSC) emphasizes that financial and non-financial measures must be part of the information system for employees at all levels of the organization. BSC can be used to improve strategic performance in several ways:

- The process of developing activity measures will make individuals and divisions more aware of how their work fits in with the strategy of the business. Individuals and divisions should receive regular reports of

their performance against BSC measures relevant to their area of work. This will help them moderate their own performance.

- Senior management should receive regular information on the organization's overall accomplishments against BSC measures to ensure that strategy is being followed.
- Outside stakeholders may also have access to BSC measures help them form a fuller impression of the organization's value.

The steps in the process of developing of BSC are:

- Identify the key outcomes to the success of the organization.
- Identify the process that leads to these outcomes.
- Develop key performance indicators for these processes.
- Develop reliable data capture and measurement systems.
- Develop a mechanism for reporting these to the relevant managers and staff.
- Enact improvement programs to ensure that performance improves.

The main types of information required by the managers to implement the balanced score card approach to performance measurement are:

A. Customer perspective - How do customers see us? – price, quality, delivery, customer support etc.

B. Internal perspective - where we must excel at? – efficiency of manufacturing process, sales penetration, new production introduction, skilled manpower etc.

C. Learning and growth perspective - can we continue to improve and create value? - Technology leadership, cost leadership, market leadership, research and development, cost reduction etc.

D. Financial perspective - How do we look to the shareholders? - Sales, cost of sales, return on capital employed, profitability, prosperity etc.

3. (a) In DuPont analysis the ROE is segregated (3-way classification) as follows
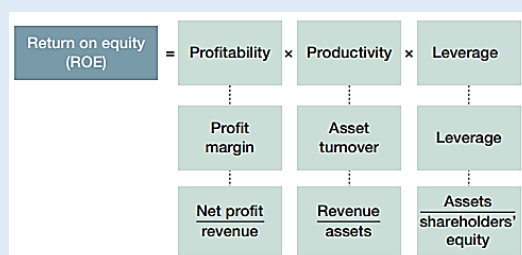
(here leverage is also referred as equity multiplier)

- **Calculation of ROE**

		Tinku LLP.		Pinku LLP.	
		2021	**2022**	**2021**	**2022**
1	Net Income	1000	1200	2100	2100
2	Revenue from operation	10000	10000	17500	17500
3	**Profit Margin (1 ÷ 2) (%)**	**0.1**	**0.12**	**0.12**	**0.12**
4	Revenue from operation	10000	10000	17500	17500
5	Average Assets	5000	4800	8750	8750
6	**Asset Turnover (4 ÷ 5) (%)**	**2**	**2.08**	**2**	**2**
7	Average Assets	5000	4800	8750	8750
8	Average Equity	2000	2000	5000	3500
9	**Equity Multiplier (7 ÷ 8) (%)**	**2.5**	**2.4**	**1.75**	**2.5**
10	ROE (3 ×6 × 9)	50%	60%	42%	60%

- **DuPont Analysis of the above (Tinku LLP and Pinku LLP)**

  It is important to note that the key elements of the 3 – way DuPont analysis which are

  1.   The DuPont analysis is a model created by the DuPont Corporation and is used to analyse a company's fundamental financial performance – profitability.

  2.   The three variables of the framework are: Net Profit Margin, Asset Turnover, and Equity Multiplier.

  3.   The results of this are usually expressed as a percentage.

  4.   The DuPont analysis dissects the various factors that determines Return on Equity (ROE).

  5.   One of the major advantages of the DuPont framework is that it encompasses the equity multiplier, a measure of the financial leverage, in the measure of the profitability which is an operational ratio.

The analysis

It is obvious from the above table that, Tinku LLP. improved its profit margins by increasing net income and reducing its total assets. Shareholders' equity has remained stable at ₹ 2000. The equity multiplier h marginally fallen as the average assets is reduced. Simply, Tinku LLP. improved its profit margin and asset turnover while equity remained constant. It can be also inferred that there is partial reduction of debt since average total asset has declined while equity has remained constant.

While the situation at Pinku LLP. is very dissimilar. It may be observed that the profit margin and the asset turnover both has remained the same over the years. ROE has significantly risen from 42% to 69% over the two-year period. The entire change in ROE is due to an increase in equity multiplier which increased from 1.75 to 2.5. This is also projected in the fact that though the average asset remained same at ₹ 8750, equity decreased from ₹ 5000 to ₹ 3500 implying that there is debt instrument in the capital structure.

The investors of Pinku LLP should be concerned because the additional borrowings has increased the ROE but actually it didn't change the company's net income, revenue, or profit margin, which means that high financial leverage makes the firm more lucrative to the shareholders' but fails to create real value.

(b)   (i)   Six Sigma is a set of techniques and tools for process improvement. It was introduced by Motorola in the 1980s. The focus of Six Sigma is on improving the quality of process outputs by identifying and removing the causes of defects and minimizing variability in manufacturing and business processes. Yes, Six Sigma is a part of Total Quality Management (TQM). Six Sigma is an approach to continuous process improvement that focuses on reducing variations in processes and products. It is a data-driven approach that seeks to reduce defects and waste in order to improve customer satisfaction and profitability. It is based on the principles of Lean Manufacturing and is a key component of TQM.

(ii)   There are two methodologies for deployment of Six Sigma; DMAIC (**d**efine, **m**easure, **a**nalyze, **i**mprove, and **c**ontrol) and DMADV (**d**efine, **m**easure, **a**nalyze, **d**esign, and **v**erify). The DMAIC process is used when an **existing process** fails to meet the specification and the is looking for improvement to uplift the system. Whereas the DMADV process is an improvement system used to develop **new processes or products** at Six Sigma quality levels. Both the Six Sigma processes (DMAIC and DMADV) are executed by professionals who are categorized as Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

For deployment of **DMAIC** the following five steps are in order;
1.   Define the process improvement goals that are consistent with customer demands and enterprise strategy.

2.   Measure the current process and collect relevant data for future comparison.

3.   Analyze to verify relationship and causality of factors. Determine what the relationship is, and attempt to ensure that all factors have been considered.

4.   Improve or optimize the process based upon the analysis using techniques like Design of Experiments.

5.   Control to ensure that any variances are corrected before they result in defects. Set up pilot runs to establish process capability, transition to production and thereafter continuously measure the process and institute control mechanisms.

For deployment of **DMIADV** the following five steps are in order;

1.   Define the goals of the design activity that are consistent with customer demands and enterprise strategy.

2.   Measure and identify CTQs (critical to qualities), product capabilities, production process capability, and risk assessments.

3.   Analyze to develop and design alternatives, create high-level design and evaluate design capability to select the best design.

4.   Design details, optimize the design, and plan for design verification. This phase may require simulations.

5.   Verify the design, set up pilot runs, implement production process and handover to process owners

4.   (a)   (i)   Price and output determination with discrimination

To maximize profits under price discrimination, the producer will set prices so that MC = MR in each market. Thus, $MC = MR_1 = MR_2$.

Given TC= 2000 +10Q, $MC = \dfrac{d\,(2000+10Q)}{dQ} = 10$ (this is same for both the markets)   ------- (1)

In Market A, $Q_1 = 21 - 0.1P_1$

$\Rightarrow$ $P_1 = 210 - 10\,Q_1$

$TR_1 = P_1 \times Q_1 = (210 - 10\,Q_1) \times Q_1 = 210\,Q_1 - 10\,Q_1^2$

$\Rightarrow$ $MR_1 = \dfrac{d(210\,Q1 - 10\,Q_1^2)}{dQ_1} = 210 - 20\,Q_1$ -------------------------- (2)

In Market B, $Q_2 = 50 - 0.4\,P_2$

$\Rightarrow$ $P_2 = 125 - 2.5\,Q_2$

$TR_2 = P_2 \times Q_2 = 125Q_2 - 2.5\,Q_2^2$

$\Rightarrow$ $MR_2 = \dfrac{d(125\,Q_2 - 2.5\,Q_2^2)}{dQ_2} = 125 - 5Q_2$ -------------------------- (3)

Thus, $MR_1 = MR_2 = MC$

$\Rightarrow$ $210 – 20 Q_1 = 125 - 5Q_2 = 10$ ------------------ (4)

Therefore, in Market A,

$\Rightarrow$ $210 – 20 Q_1 = 10$ -------------- (5) {from equation 4}

$\Rightarrow$ $Q_1 = 10$ (from equation 5) and

$\Rightarrow$ $P_1 = (210 - 10 Q_1) = 210 – 10 \times 10 = 110$

$\Rightarrow$ $TR1 = P_1 \times Q_1 = 10 \times 110 = 1100$

Therefore, in Market B,

$\Rightarrow$ $125 – 5 Q_2 = 10$ -------------- (6) {from equation 5}

$\Rightarrow$ $Q_2 = 23$ (from equation 6) and

$\Rightarrow$ $P_1 = (125 – 2.5 Q_2) = 125 – 2.5 \times 23 = 67.5$

$\Rightarrow$ $TR2 = P_2 \times Q_2 = 67.5 \times 23 = 1552.5$

The discriminating producer charges a lower price ($P_2 = 67.5$) in the market B where the demand is relatively more elastic and a higher price ($P_1 = 110$) in the market A where the demand is relatively less elastic. And his total profit is calculated below which is also the maximum under given condition.

$\pi = (TR1 + TR2) – TC$

TR1 and TR2 is calculated as 1100 and 1552.5 respectively. And calculation of total cost is given as

Given, $TC = 2000 + 10Q$ where $Q = Q_1 + Q_2$

$\Rightarrow$ $TC = 2000 + 10 \times 33$, $[Q = 10 + 23 = 33]$

$\Rightarrow$ $TC = 2330$

Therefore, profit (π) is given as

$\pi = (1100 + 1552.5) - 2330 = \textbf{322.5}$ ---------------- (7)

(ii)   Price and output determination without discrimination

If the producer does not discriminate, $P1 = P2$ and the two demand functions (D) and (E) may simply be aggregated. Thus,

$Q = Q_1 + Q_2$ and

$\Rightarrow$ $Q = Q_1 + Q_2 = (21 - 0.1P) + (50 - 0.4 P)$ $[P = P1 = P2]$ (same price for both the markets).

$\Rightarrow$ $Q = 71 - .5P$

$\Rightarrow$ $P = 142 - 2Q$

$TR = P \times Q = (142 - 2Q) \times Q = 142Q - 2Q^2$

$MR = \dfrac{d(142Q - 2Q^2)}{dQ} = 142 - 4Q$

Setting $MR = MC$

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142 - 4Q = 10 {MC= 10, refer to equation (1) above}

Therefore, Q = 33 and P = 142 -2Q = 142 – 2 × 33 = 76

Thus when the monopolist does not discriminate then the equilibrium is set at Q =33 and P =76 (for both the markets A and B). In that case,

TR = P × Q

$\Rightarrow$ 33 × 76 = 2508

And TC = 2000 + 10 Q = 2000 × (10 × 33) = 2330. Therefore

π = TR – TC = 2508 – 2330 = **178**

From the above discussion it is clear that when no discrimination takes place, the price (P = 76) is between the relatively high price of the market A (P_1 =110) and the relatively low price of the market B (P_2 = 67.5) Notice, however, that the quantity sold remains the same: at P = 76, Q1 = 13.4[1], Q2 = 19.6[2], and Q = 33.

(b) **A comparison of the profit differential between discrimination and nondiscrimination is presented below**

Profit when the monopolist follows price discrimination between the two markets

$$\pi = \mathbf{322.5} \text{ ------------ (from equation 7)}$$

Profit when the monopolist does not follow discrimination between the two markets

$$\pi = \mathbf{178} \text{ -----------------------(from equation 8)}$$

thus profit of the monopolist is higher when he follows price discrimination.

(b) The NCAER Study on Corporate Distress Prediction prescribed the following three parameters for predicting the stage of Corporate Sickness:

i. Cash profit position (a profitability measure)
ii. Net working capital position (a liquidity measure)
iii. Net worth position (a solvency measure)

In the given case, we need to judge the above-mentioned parameters to ascertain the stage of sickness of the company.

i. Cash profit = Net profit + (Non-cash expenses/losses debited to Profit & Loss A/c) – (Non-cash incomes/Gains credited to Profit & Loss A/c)

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[1] From D, Q_1 = 21- 0.1P = 21 - 0.1 (76) = 13.4
[2] From E, Q_2 = 50 -.4P = 50 - 0.4 (76) = 19.6

Here, Cash Profit = Net Profit + Depreciation Written Off + Preliminary Expenses Written Off

$= ₹ [(25.60) + 8 + 1.60]\ crores = (₹\ \textbf{16 crores})$

ii. Net Working Capital = Current Assets – Current Liabilities

$= ₹ [57.60 - 78.40]\ crores = (₹\ \textbf{20.80 crores})$

iii. Net Worth = Share Capital + Reserves & Surplus - Miscellaneous Expenditure - Profit & Loss A/c (Dr.) Here, Net Worth = Equity Share Capital - Profit & Loss A/c (Dr.)

$= ₹ [20.80 - 40.00]\ crores = (₹\ \textbf{19.20 crores})$

Prediction about Corporate Sickness:

As per NCAER Research Study, out of mentioned three parameters, if any one parameter becomes negative in case of a firm, it can be predicted that the firm has a tendency towards sickness. In the given company, all the three parameters [as calculated under (i), (ii) and (iii)] show negative value. Therefore, it can strongly be predicted that the company is a sick company and its stage of sickness is 'fully sick'. Immediate necessary drastic revival measures are essentially required for the survival of the company.

5. **Implications of Z-Scores**

This models is such developed that the lower the Z-score, the higher the odds that a company is heading for bankruptcy. A Z-score that is *lower than 1.8 means* that the company is in financial distress and with a high probability of going bankrupt.

On the other hand, *a score of 3 and above* means that the company is in a safe zone and is unlikely to file for bankruptcy.

A score of *between 1.8 and 3* means that the company is in a grey area and with a moderate chance of filing for bankruptcy.

The model of Altman Z-Score has historically proven to be highly effective in determining the actual course of action for companies, primarily because of the reason that it gives a much-needed insight to the investors regarding their investment decisions in the company. Thus investors use Altman's Z-score to make a decision on whether to buy or sell a company's stock, depending on the assessed financial strength. If a company shows a Z-score closer to 3, investors may consider purchasing the company's stock since there is minimal risk of the business going bankrupt in the next two years.

However, if a company shows a Z-score closer to 1.8, the investors may consider selling the company's stock to avoid losing their investments since the score implies a high probability of going bankrupt. From the above discussion the suggested rules for interpretation of the financial health of the firms, based on their Z scores are inferred;

1. Z score above 2.99 – The firms are financially safe and healthy.
2. Z score between 1.81 and 2.99 – The Company is on alert and is said to be in the *Gray zone*.

3. Z scoreless than 1.81 – At this stage there is chance of the firm going into bankruptcy in the next two years. This is also referred as the *Distress zone*.

Implication of Beneish M

Thus in order to make an assessment of the financial distress and corporate bankruptcy a model which is able to identify the effect of fraud is of prime importance. Thus Beneish M score. This mathematical model was created by Professor Messod Beneish in 1999. it is used for the purpose of finding out that whether the company has done any sort of manipulation with its earning. Simply, Beneish M score is used to detect earnings manipulation in the financial statements reported by the company.

The Beneish M model is developed on eight financial ratios which considers eight different variables that are mentioned below.

The eight variables required for calculating the M-Score are calculated using the data from the income statement, balance sheet, and cash flows of the company, and then M-Score is calculated to know the degree of manipulation in earnings by the company. The degree of manipulation is represented through a score. The cut off score is - 2.22. The following is the inference of the model.

Beneish M-score < - 2.22 $\Rightarrow$ it suggests that the company is not a manipulating the earnings.

Beneish M-score > - 2.22 $\Rightarrow$ it provides a signal that the company is (may be) manipulating its earnings.

The model specifies

Beneish M-score $= -4.84 + 0.92 \times DSRI + 0.528 \times GMI + 0.404 \times AQI + 0.892 \times SGI + 0.115 \times DEPI - 0.172 \times SGAI - 0.327 \times LVGI + 4.679 \times TATA$

The individual score for a manipulator and a non-manipulator are given below

Index	Non Manipulator	Manipulator
DSRI	1.030	1.460
GMI	1.041	1.190
AQI	1.040	1.250
SGI	1.134	1.610
DEPI	1.001	1.077
SGAI	1.001	1.041
LVGI	1.037	1.111
TATA	0.018	0.031

It is important to note that

• M-Score has two versions, i.e., 8 variable models and 5 variable models. The most widely used out of two versions is 8 variable Beneish M model.

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- Being the probabilistic model, the manipulation cannot be detected with the 100 % accuracies. As such the model identifies between 38% and 76% of the manipulated reporting companies correctly and misclassified between 3.5% and 17.5% of the manipulated companies as non-fraudulent companies (Beneish, 1999).

- The companies resort to various means of increasing their reported earnings like capitalization of the revenue natures expenses, premature booking of the sales in accounts, etc. These are often considered as aspects of creative accounting. Although these are not illegal by the law the same signifies the unethical operations of the company and are often considered as manipulations of operations. Beneish M-Score is calculated to assess the degree of manipulation in earnings by the company. The Beneish M-Score model helps analysts in predicting these high profile failures.

(ii) Implications and conclusion from the study undertaken by Mr Sharma

Table 1 shows the computation of Enron Corp Z-score from the secondary data collected from 1996 to 2000. Altman Z-score calculation revealed that, the company was financially distressed as far back as 1996 and remained in distressed zone in 1997 before moving out of the distress zone to the grey zone from 1998 to 2000. The scores of 2.00, 2.45 and 2.49 for 1998, 1999 and 2000 respectively showed that, the company was in grey zone. The results provided the evidence that, Altman Z-score was not a sufficient model to have caught the failure of Enron Corp especially if the financial statements were manipulated.

Altman Z-model requires companies must remain distressed for three years, and then go into bankruptcy after two years. However, in this particular case, Enron moved out of distress zone in the third year to grey zone making it difficult to predict the bankruptcy, especially if its financial statements were manipulated. The average score for the five-year period was 2.07 which is an indication that the company was not distressed but in the distressed zone. Therefore, using year-on-year variables to determine distress revealed that Enron was distressed for only two years but by the third year which was critical in the determination of distress, the company moved out of distressed zone to grey zone. Secondly, using the average of the first three years also confirmed that, the company was not distressed but in the grey-zone.

Table 2 showed that, the M-score for the year 1997 was negative 2.46, a figure below the benchmark M-Score for non-manipulated earnings. The four-year score in Table 2 was above the mean score of a non-manipulated figure of negative 2.22 with the exception of 1997. However, a detailed overview of the eight variables in 1997 also revealed that TATAI was manipulated. This implies that all the five-year

financial statements were manipulated. This indicates that earnings of 1997 were not manipulated, but immediately after 1997 till 2000, the M-score was below negative 2.22, an indication that the earning figures were all manipulated from 1998 to 2000 to conceal the picture that the company was distressed.

A closer look at Table 2 revealed that only one variable is manipulated in 1996 and 1997 but the manipulation became more intense after 1998, where two variables were manipulated and then finally three variables in 2000. Consistently, Beneish M-model showed that, most of the independent variables were manipulated prior to the collapse. The manipulation started gradually from 1996 with only one variable TATAI, then it rose to two in 1998 (TATAI and DEPI). The manipulation of the independent variable remained two out of the eight variables manipulated in 2000, representing over 25% of the financial statement prepared by the management of Enron Corp.

This imply that because the financial statements of Enron Corp were manipulated to hide the true financial position of the company, Altman Z-score model failed to predict the true picture that Enron was distressed.

SECTION – B : BUSINESS VALUATION

Answer to Question No. 6 and 10 are compulsory; answer any two from Question No. 7, 8 & 9.

6.   (a)

Sl. No.	Answer	Justification
(i)	(a)	Explanation: Both discount rate and sales growth rate will be sensitive in a proper DCF model. But Discount rate's impact would far exceed that of operational assumption such as sales growth rate.
(ii)	(c)	Explanation: Realized gains on investment securities are reported on the income statement. The other two types of incomes may be reported as other comprehensive income under certain circumstances.
(iii)	(a)	Explanation: D1 = 120 D2 = 240 D3 = 360 g = 0.06 Required Return = Rf+(Rm-Rf)β = 0.02+(0.08-0.02)x1.3 = 0.098

		$$P_3 = \frac{360 \times (1.06)}{(0.098 - 0.06)} = 10042.11$$ $$V_0 = \frac{120}{(1.098)^1} + \frac{240}{1.098^2} + \frac{360 + 10042.11}{1.098^3} = 8166.4$$
(iv)	(b)	Tangible assets are usually valued using any of the premises except Going concern. If the business is a going concern then the tangible asset is valued on the basis of highest and best use and in the case the business is not a going concern then the tangible asset would be valued on the basis of orderly liquidation or forced sale.
(v)	(a)	Explanation: Synergy gain on merger: Combined value- value of Merging companies [94-(50+25)] = 19 Lac

7. (a) **Enterprise Value**

Enterprise value(EV) is one of the vital concepts in corporate valuation. It serves as a foundation for several Merger & Acquisition deals.

Enterprise Value can be described as the measure of a firm's total value and factors in the entire market value instead of the equity value. It directly ensures that all asset claims and ownership interests arising from debt and equity are included in the valuation. EV is considered to be an actual cost of purchasing a company or the theoretical price of a company before a takeover is considered. In fact, it is the minimum value that an entity would pay to purchase a company. However, in case of Mergers and Acquisitions, in a hypothetical acquisition, the acquirer would pay the enterprise value but would have access to the cash of the target company. Therefore, we often subtract Cash and Cash Equivalents in calculation of Enterprise Value.

EV=Market Capitalisation + Market value of Debt-Cash

EV= (Common Shares + Preferred Shares + Minority Interest) + Market Value of Debt-Cash

Components of Enterprise Value

The major components of enterprise value are as follows-

a) **Equity value**- The equity value of a company is generally determined by multiplying its fully-diluted shares outstanding with the current market price of a stock. Here, fully-diluted means they are inclusive of warrants and convertible securities besides basic shares outstanding. In the event of a company acquisition, the acquirer needs to pay the company's shareholder at

least the market capitalization value. This alone is not deemed enough to provide a company's accurate value: as a result, other items are added in the EV equation.

b) **Preferred stock** - Being hybrid securities, these stocks have features of both debt and equity. Regardless, preferred stocks are treated more like debt as a component in EV. It is primarily because they pay out a fixed amount of dividend and are given more priority in terms of assets and earnings than common stocks. In case of an acquisition, they are paid off like debt.

c) **Total debt**-It can be described as the contribution made towards financial institutions and creditors. They make up the interest-bearing liabilities and include short-term and long-term debt. The debt value is adjusted by simply deducting cash because when a company is acquired, acquirers use the company's cash to pay off a share of assumed debt. The book value of debt is used in the case where its market value is unknown.

d) **Non-controlling interest (minority interest)**-It is a part of a subsidiary which is not owned by any parent company. Typically, the financial statements of such a subsidiary are consolidated with the financial report of their parent company. Generally, the minority interest is added in the calculation of EV because the parent company includes the total revenue earned, expenses incurred, and cash flow generated in its financial numbers.

e) **Cash and Cash equivalents**- These are among the most liquid assets in a company's financial statement. Cash and cash equivalents like short term investments, commercial paper, marketable securities, etc., are subtracted from EV. It is done because they tend to lower the acquiring cost of a company. It is believed that the acquirer uses the cash to pay off at least some Portion of the theoretical price or to pay for buyback debt.

Significance of Enterprise Value
- EV enables business entities to find out the worth of a target company.
- It signifies the economic value of a business firm in question.
- It is more like the theoretical takeover price of a company in question and accounts for the cash and debt that will be pocketed by the acquirer.
- Enterprise value makes it possible to compare companies of different capital structures with greater ease.
- It comes in handy to neutralise the stock market risk and helps to compare expected returns effectively.

(b) Fair Market Value is calculated as=(A+B+C+D-L)/(PE x PV)

Where, A= Assets, L= Liabilities, PE=Amount of Paid-up Equity Share,

PV=Paid up value of Equity Share

Statement of computation of FMV of Unquoted Shares as on 31.3.2023

Particulars	Amount		
Book Value of Assets (A)		2,27,35,97,154	
Less: Book value of Immovable Property		(10,00,00,000)	
Less: Book Value of Shares and Securities		(25,00,000)	
Add: Fair Value of Immovable Property		12,00,00,000	
Add: Fair Value of Shares and Securities	25000x79	19,75,000	
Value of A			2,29,30,72,154
Book Value of Liabilities (L) (Note No. 1)			1,65,08,81,475
A + B + C + D - L			64,21,90,679
Amount of Paid-up Equity Shares (PE)			50,01,12,400
Paid up Value of Equity Share (PV)			10
Fair market value of Equity Shares			12.84

Note No. 1

Particulars	Amount
Total value of liabilities	2,27,35,97,154
Less: Paid Up Share Capital	50,01,12,400
Reserves and surplus (except depreciation)	12,26,03,279
Book Value of Liabilities(L)	**1,65,08,81,475**

8.   (a)

Year		1	2	3	4	5
Revenue		6,84,000	697680	711634	725866	740384
Royalty Expenses@ 10%		68400	69768	71163	72587	74038
Brand specific revenue @ 3%		2,052	2,093	2,135	2,178	2,221
PV factor		0.893	0.797	0.712	0.636	0.567
PV Cash flows		1,832.14	1,668.56	1,519.58	1,383.90	1,260.34
Net present value of the Brand	**7,665**					

(b)

Particulars	Dean Limited	Dale Limited
Earnings after tax	284 lakhs	30 Lakhs

Number of shares outstanding	30 Lakhs	10 Lakhs
P/E ratio	10	5
EPS	INR 9.47	INR 3
Market Price = (PE x EPS)	INR 94.7	INR 15

Particulars	
(i) Swap Ratio $= \dfrac{MPS\ of\ target\ firm}{MPS\ of\ acquiring\ firm}$	0.16
(ii) EPS of Dean Limited after acquisition $\dfrac{E_A+E_B}{[S_A+S_B(ER_A)]} = \dfrac{284+30}{30+10\times0.16}$	INR 9.94
(iii) Expected Market Price per share of Dean Limited with the same P/E ratio of 10 will be $[EPS\ x\ P/E]$ [9.94x10]	INR 99.4
(iv) Market value of the merged firm Total number of outstanding shares x market price (32x 99.4)	INR 3,140 Lakhs

(v) Gain / Loss accruing to shareholders of both companies

Particulars	Dean Limited	Dale Limited	Total
Number of shares after acquisition	30 Lakhs	2 Lakhs	32 Lakhs
Market Price after acquisition	INR 99	INR 99	INR 99
Total Market Value after acquisition	INR 2982 Lakhs	INR 158 Lakhs	INR 3140 Lakhs
Existing Market Value	INR 2840 Lakhs	INR 150 Lakhs	INR 2990 Lakhs
Gain To the shareholders	INR 142 Lakhs	INR 8 Lakhs	INR 150 Lakhs

9. (a) Economic value added (EVA) is the performance measure most directly linked to the creation of shareholder wealth overtime and Market Value Added is the difference between the current market value and the capital contributed by the investors. The market value of a firm not only reflects the Expected EVA of Assets in place but also the Expected EVA from future projects. To the extent that the actual economic value added is smaller than the expected EVA the market value can decrease even though the EVA is higher.

There are some findings that show that High EVA companies do not earn excess Returns. There are others that show that increases in EVA do not earn excess returns. However, this does not imply that increasing EVA is bad from a corporate finance standpoint. In fact, given a choice between delivering a "below-expectation" EVA and no EVA at all, the firm should deliver the "below-expectation" EVA. It does suggest that the correlation between increasing year-to-

year EVA and market value will be weaker for firms with high anticipated growth (and excess returns) than for firms with low or no anticipated growth. It does also suggest that "investing strategies" based upon EVA have to be carefully constructed, especially for firms where there is an expectation built into prices of "high" surplus returns.

(b)

Particulars (INR Lakhs)	2023	2024	2025	2026	2027
Profit After Tax	1612	1788	1914	2040	2169
Add: Net Interest x (1- Tax)	361	343	326	310	294
Unlevered Net Income	1973	2131	2240	2350	2464
Add: Depreciation	420	454	494	539	587
Less: Change in Non-Cash Working Capital	384	415	452	493	537
Less: Capex	1104	1192	1300	1417	1544
Free Cash Flows	905	978	982	979	970

The free cash flows should be discounted using cost of capital to arrive at the present value of free cash flows.

Particulars (INR Lakhs)	2023	2024	2025	2026	2027
Free Cash Flows	$905/1.095^1$	$978/1.095^2$	$982/1.095^3$	$979/1.095^4$	$970/1.095^5$
Present Value	827	815	748	681	616

The terminal Value can be calculated as:

Free cash Flows 2027 x (1+ Growth Rate) / Cost of Capital – Growth Rate)

970 x (1+0.06)/ (0.095-0.060) = 29362

However, this value is arrived as on the end of year 2027. This needs to be further discounted to arrive at the Present Value.

Accordingly, this value should be further discounted to bring the cash flows to their present values.

PV of Terminal Value= 29362 /(1+0.095)^5 = 18,652 Lakhs

The Enterprise Value is given by: (827+815+748+681+616+18,652) Lakhs = 22,339 Lakhs

10. (i) Determination of EPS, P/E ratio, ROE and BVPS of Summer Ltd. and Monsoon Ltd.

Particulars	Summer Ltd.	Monsoon Ltd.

Profit after tax	1,76,000	60,000
No. of shares	5000	4000
EPS (PAT/No. of shares)	35	15
Market Price per share (MPS)	300	100
P/E ratio (MPS/EPS)	9	7
Equity Funds	16,00,000	12,00,000
Book Value per share (Equity funds/ No. of shares)	320	300
Return on Equity (PAT/Equity Funds) x 100	11%	5%

(ii) Determination of Growth rates in EPS for each firm

Particulars	Summer Ltd.	Monsoon Ltd.
Retention Ratio (1- dividend pay-out ratio)	60%	40%
Growth rate (ROE X Retention Ratio)	6.6%	2%

(iii) Determination of justifiable equity share exchange ratio

a) Market Price based MPS$_M$/ MPS$_S$ = INR 100/INR 300	0.33:1 (Lower limit)
b) Intrinsic Value based =INR 200/ INR 300	0.67:1 (Upper limit)

Since Summer Ltd. has higher EPS, ROE, P/E ratio, and even a higher EPS growth expectation, the negotiated terms would be expected to be closer to the lower limit based on the existing share prices.

(iv) Calculation of Post-merger EPS and other effects

Particulars	Summer Ltd	Monsoon Ltd.	Combined
PAT (i) (INR)	1,76,000	60,000	2,36,000
Shares Outstanding (ii)	5000	4000	6600 *
EPS (i)/(ii) (INR)	35	15	36
EPS Accretion (Dilution) (INR)	1	0.70 *	-

Note :		
Shares outstanding (combined)	5000+(4000*0.40)	6600
EPS claimed per old share	36*0.40%	14.30
EPS dilution of Monsoon Ltd.	15-14.3	0.70

(v) Estimation of Post- merger Market Price and other effects

Particulars	Summer ltd.	Monsoon Ltd	combined
EPS (i) INR	35	15	36

P/E Ratio (ii)	8.52	6.67	8.52
MPS (i) x (ii)	300	100	305
MPS Accretion (Dilution) (INR)	5	21.90 *	

Note:		
MPS claim per old share	305*0.4	121.90
Less: MPS per old share		100
MPS accretion of Monsoon ltd.		21.90