# P-17 – Strategic Performance Management
# Section – A

**Q1. Read the following Case Study and answer the following questions:**
Candy making is a fun business, and so it's no surprise that it's fun to work at the Jelly Belly Candy Company of Fairfield, California. But at this family-owned company, there's no fooling around when it comes to promoting employee performance and job satisfaction. So when Jelly Belly decided to overhaul and automate its antiquated employee performance and talent management process, it was looking for a serious solution to help give its employees across the United States fair, accurate performance appraisals.
Herman Goelitz Candy was founded in 1869 by Albert and Gustav Goelitz, whose great-grandsons own and run Jelly Belly today. The Jelly Belly Candy Company makes Jelly Belly brand jelly beans in over 50 flavors, as well as candy corn and other treats. Introduced in 1976 and named by former U.S. president Ronald Reagan as his favorite candy, the company's jelly beans are exported worldwide.

Like almost every smart company, Jelly Belly recognizes that employees are more likely to stay with their employer when they feel connected and recognized for their efforts. Programs for managing and evaluating employee performance are critical to aligning corporate and employee values and priorities.

Jelly Belly's search for a new employee performance and talent management system began several years ago, when two branches of the family business were reunited into a single company. One branch was using an outdated performance management software program. The other was doing its employee performance appraisals manually, using paper forms.
Having a variety of jelly bean flavors is great — a variety of employee appraisal processes in a single company is not. The task of updating and consolidating the performance management process fell to Margie Poulos, HR Manager of Jelly Belly's Midwest operations. She and a small team of Jelly Belly HR staff were charged with finding a single automated system that could be used for all of Jelly Belly's 600 employees in three locations.

The driving factor behind Jelly Belly's performance management automation was the belief that thorough, accurate reviews help employees to better understand what's expected of them, so that they can set clear, measurable objectives. That translates into higher employee satisfaction, said Jeff Brown, Jelly Belly's Director of Human Resources. "When employees feel they have gotten a thorough and accurate review, it boosts their morale," Brown said. It also leads to improved talent management and makes it easier to retain valuable employees, which management experts know is a key factor in corporate growth and market leadership.

To meet their strategic goals, Poulos and her team drew up a list of the criteria that a new system had to meet. Top on the list was ease of use. "We didn't want to end up with a system that is so complicated that the managers wouldn't use it," Poulos said. A new system also had to save time. Because employees were in multiple locations, it needed to be web-based for accessibility. And it had to be flexible, easily incorporating core competencies into different forms.
Jelly Belly's selection committee looked at products from different software vendors. "We eliminated right away those that were geared to very large companies and those that were not web-based," Poulos said. "We also eliminated those that offered too many options for customization. It's one thing to offer options, but another thing when the product requires so much customization that it becomes overwhelming."

The committee selected Halogen eAppraisal, a web-based application for managing employee performance from Halogen Software. "We liked the way it looked, and we really liked the user-friendliness of it. It's easy for the managers to use and it's customizable without overwhelming them," Poulos said. After two days of training by Halogen staff, four members of Jelly Belly's HR team set out to train the company's supervisors on the new system. About 50

managers received a crash course in using Halogen eAppraisal, and then used it to complete annual employee evaluations in May. Jelly Belly's HR team is now customizing the software to include more relevant competencies and to respond to comments from managers and staff on the new system.

"The feedback has been really positive, from both managers and employees as well. Some staff said this was the best appraisal they've had," Poulos said, "They felt the evaluations were fair and realistic, and supervisors had the scope to provide more relevant and legitimate comments than they could before. Rather than just clicking on a bunch of canned comments, they were accurately reviewing the employee."

The new automated employee performance appraisal system has completely formalized and organized Jelly Belly's employee evaluation process. "It allows us to standardize competencies across job classifications, add signature and comment sections to make our process more interactive, and increase accessibility for remote managers," Brown said.
Under Jelly Belly's old system, employees conducting reviews started from scratch once a year with new performance journals. Halogen eAppraisal will let them log notes throughout the year and regularly update their on-line appraisals. Employees use one consistent employee evaluation form to add comments and to sign their appraisals.

The web-based product helps remote and traveling managers maintain access to the forms and the data they need to evaluate their staff. "In our old system, a few folks in Chicago would have access to the system. But we have managers in California with Chicago subordinates. It's important that they can share the same forms across the board. And we have folks who are on the road a lot or are working out of home offices, so having them be able to access this is a huge point for us," Brown explained.

Organizing and automating the appraisal process results in performance appraisals that are more accurate and fair, Brown noted. "This is important because, after all, an employee appraisal is a legal document," he said.

The new system is also helping Jelly Belly track training requirements and development in its staff, Poulos added. "We've always had a separate training manual. Now we can go in to the evaluations and more easily monitor employees' skills development, see what training is needed by individuals and check the due dates for training and renewal. That makes it much easier for us to keep track," Poulos noted.

The new employee performance and talent management system has proven to be a big time-saver for Jelly Belly's HR team. "Since this year was the first time using the new system, it took us a little longer than it will next year. But the process was a whole lot faster," Poulos said. "It has already saved us a lot of time, and we got everybody's appraisals done in one shot."
The new system is also helping Jelly Belly to better align employee goals with the company's business objectives. And for one of America's best-known candy companies, it doesn't get any sweeter than that.

Required:
   (a) Discuss the challenged faced by the company.
   (b) What was the strategy adopted by the company to solve the problem?
   (c) What was the result of the company after adopting the strategies?

Answer 1:
(a) Jelly Belly's search for a new employee performance and talent management system began several years ago, when two branches of the family business were reunited into a single company. One branch was using an outdated performance management software program. The other was doing its employee performance appraisals manually, using paper forms.
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(b) To meet their strategic goals, Poulos and her team drew up a list of the criteria that a new system had to meet. Top on the list was ease of use. "We didn't want to end up with a system that is so complicated that the managers wouldn't use it," Poulos said. A new system also had to save time. Because employees were in multiple locations, it needed to be web-based for accessibility. And it had to be flexible, easily incorporating core competencies into different forms.
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(c) The new automated employee performance appraisal system has completely formalized and organized Jelly Belly's employee evaluation process. "It allows us to standardize competencies across job classifications, add signature and comment sections to make our process more interactive, and increase accessibility for remote managers," Brown said.
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**Q 2. (a) Define Benchmarking. Outline the different types of Bench-marking.**
**(b) List the pre-requisites of Bench Marking?**

**Answer 2(a) :**

**Benching Marking:** Traditionally control involves comparison of the actual results with an established standard or target. The practice of setting targets using external information is known as 'Bench marking'.

Benching marking is the establishment - through data gathering of targets and comparatives, with which performance is sought to be assessed.

After examining the firm's present position, benchmarking may provide a basis for establishing better standards of performance. It focuses on improvement in key areas and sets targets which are challenging but evidently achievable. Bench marking implies that there is one best way of doing business and orients the firm accordingly. It is a catching-up exercise and depends on the accurate information about the comparative company – be it inside the group or an outside firm.

Benchmark is the continuous process of enlisting the best practices in the world for the process, goals and objectives leading to world-class levels of achievement.

**Types of Benchmarking**:
The different types of Benchmarking are:
   i. Product Benchmarking (Reverse Engineering)
   ii. Competitive Benchmarking
   iii. Process Benchmarking
   iv. Internal Benchmarking
   v. Strategic Benchmarking
   vi. Global Benchmarking

   i. **Product Benchmarking (Reverse Engineering)**: is an age old practice of product oriented reverse engineering. Every organization buys its rival's products and tears down to find out how the features and performances etc., compare with its products. This could be the starting point for improvement.
   ii. **Competitive Benchmarking:** This has moved beyond product-oriented comparisons to include comparisons of process with those of competitors. In this type, the process studied may include marketing, finance, HR, R&D etc.,

iii. **Process Benchmarking:** is the activity of measuring discrete performance and functionality against organization through performance in excellent analoguous business process e.g. for supply chain management – the best practice would be that of Mumbai Dubbawallas.

iv. **Internal Benchmarking:** is an application of process benchmarking, within an organization by comparing the performance of similar business units or business process.

v. **Strategic Benchmarking:** differs from operational benchmarking in its scope. It helps to develop a vision of the changed organizations. It will develop core competencies that will help sustained competitive advantage.

vi. **Global Benchmarking:** is an extension of Strategic Benchmarking to include benchmarking partners on a global scale. E.g. Ford Co. of USA benchmarked its A/c payable functions with that of Mazada in Japan and found to its astonishment that the entire function was managed by 5 persons as against 500 in Ford.

**Answer 2(b) :**

**Following are the pre-requisites of Benchmarking.**

i. **Commitment**: Senior Managers should support benchmarking fully and must be omitted to continuous improvements.

ii. **Clarity of Objectives**: The objectives should be clearly defined at the preliminary stage. Benchmarking teams have a clear picture of their Firm's performance before approaching others for comparisons.

iii. **Appropriate Scope**: The scope of the work should be appropriate in the light of the objectives, resources, time available and the experience level of those involved.

iv. **Resources**: Sufficient resources must be available to complete projects within the required time scale.

v. **Skills**: Benchmarking teams should have appropriate skills and competencies.

vi. **Communication**: Stakeholders, and also staff and their representatives, are to be kept informed of the reasons for benchmarking.

**Q 3. Case Study: Brookfield Zoo**
The Brookfield Zoo is one of the top zoological institutions in the country. Yet their ability to generate strong customer loyalty had dropped over several decades. In supporting the organization in moving to a different direction, key leaders from Brookfield came to Orlando for a week-long retreat. From there a customer loyalty strategy was crafted that included a number of strategies. Leaders were trained to lead customer-focused initiative. Zoo facilitators were selected and trained to deliver customer service programming. The trainers facilitated sessions for approximately 1,500 Crew Members and collectively spending over 900 hours on this effort. Leadership tool kits were implemented so that daily conversations could occur with staff around service excellence. Though the program was implemented late in the Spring of 2005, according to summer surveys, non-member ratings for overall zoo visit – those who were "extremely satisfied" -- increased 18% over 2004. Some other significant improvements include:

- Non-member ratings of overall value for cost – those who said the visit was an "excellent value" -- increased nearly 12% over 20
- Non-member ratings of the helpfulness of zoo staff – those who thought we "exceeded expectations" -- increased nearly 8% over 2004.
- Non-member ratings of "definitely will visit the Zoo again next year" – increased nearly 7% over 2004.
- Nearly 65% of non-members listened to or interacted with zoo staff or volunteers regarding animals during their visit, compared to only 9% in 2004. This is an enormous behavioral change among staff.

**Required:**
**(a) What is Benchmarking? List the steps of Benchmarking.**
**(b) In the present case how Brookfield Zoo benchmarked its activities?**
**(c) What are the positive results that are derived from such benchmarking?**

**Answer 3:**

(a) Benchmarking is the continuous process of measuring products, services or activities against the best levels of performance that may be found either inside or outside the organization. It is a process of comparing a firm's activities with best practices.

Following are the ten steps for Benchmarking:

| | |
|---|---|
| 1 | Identification of benchmark outputs |
| 2 | Identification of best competitors |
| 3 | Determination of data collection method. |
| 4 | Determination of current competitive "gap" |
| 5 | Projection of future performance level. |
| 6 | Establishment of functional goals; |
| 7 | Communication of data / acceptance of analysis. |
| 8 | Development of functional action plan. |
| 9 | Implementation on specific actions |
| 10 | Monitoring the results / report progress And then recalibrate benchmarks |

(b) Brookfield Zoo was lacking their ability to generate strong customer loyalty over several decades. To rejuvenate its ability the key leaders from Brookfield went to Orlando for a week-long retreat, from there a customer loyalty strategy was crafted which included a number of strategies.

All those strategies that supported the institution to achieve benchmarking are:

- Training of leaders to lead the customer focused initiative.
- Selection of zoo facilitators.
- Training of zoo facilitators to deliver customer service programming.
- Conducting trainers facilitated sessions for approximately 1,500 Crew members and it spent collectively over 900 hours on that effort .
- Implementation of leadership tool kit so that daily conversation can occur with the staff around service excellence.

(c) Benchmarking resulted in a very positive situation. Though the program was implemented late in the Spring of 2005, according to summer surveys, non-member ratings for overall zoo visit – those who were "extremely satisfied" -- increased 18% over 2004.

Other significant improvements include:

- Non-member ratings of overall value for cost – those who said the visit was an "excellent value" -- increased nearly 12% over 20
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**Q 4. (a) Discuss the steps in Target Costing procedure**

**(b) Amit Co. manufactures and sells 15,000 units of a product. The Full Cost per unit is ₹ 200. The Company has fixed its price so as to earn a 20% Return on an Investment of ₹18,00,000.**

**Required:**

(i) Calculate the Selling Price per unit from the above. Also, calculate the Mark-up % on the Full Cost per unit.

(ii) If the Selling Price as calculated above represents a Mark-up % of 40% on Variable Cost per unit, calculate the Variable Cost per unit.

(iii) Calculate the Company's Income if it had increased the Selling Price to ₹ 230. At this Price, the Company would have sold 13,500 units. Should the Company have increased the Selling Price to ₹ 230?

(iv) In response to competitive pressures, the Company must reduce the price to ₹ 210 next year, in order to achieve sales of 15,000 units. The Company also plans to reduce its investment to ₹ 16,50,000. If a 20% Return on Investment should be maintained, what is the Target Cost per unit for the next year?

**Answer 4(a)** :

Target Costing is viewed as integral part of the design and introduction of new products. It is part of an overall Profit Management Process, rather than simply a tool for cost Reduction and Cost Management.

**Steps in Target Costing:**

**Step 1: Customer product Design Specification:**

i. The customer requirements as to the functionality and quality of the product is of prime importance

ii. The design specification of the new product is based on customer's tastes, expectations and requirements.

iii. Competitor's products and the need to have extra features over competitor's products are also considered. However the need to provide improved products, without significant increase in prices, should be recognized as charging a higher price may not be possible in competitive conditions.

**Step 2 & Step 3: Market – Target Selling Price and Production Volume:**

i. The Target Selling Price is determined using various sales forecasting techniques.

ii. The price is also influenced by the offers of competitors, product utility, prices, volumes and margins.

iii. In view of competition and elasticity of demand, the Firm has to forecast the price volume relationship with reasonable certainty. Hence the Target Selling Price is market driven and should encompass a realistic reflection of the competitive environment.

iv. Establishment of Target Production Volumes is closely related to Target Selling price, given the relationship between price and volume.

v. Target Volumes are also significant in computation of unit costs particularly Capacity Related Costs and Fixed Costs. Product Costs are dependent upon the production levels over the life cycle of the product.

**Step 4: Profitability – Target Profit Margin:**

i. Since profitability is Critical for survival, a Target Profit Margin is established for all new products.
ii. The Target Profit Margin is derived from the company's long term business plan, objectives and strategies.
iii. Each product or product line is required to earn at least the Target Profit Margin.

**Step 5: Setting Target Costs:**

i. The difference between the Target Selling Price and Target Profit Margin indicates the "Allowable Cost" for the product.
ii. Ideally, the Allowable Cost becomes the "Target Cost for the product". However, the Target Cost may exceed the Allowable Cost, in light of the realities associated with existing capacities and capabilities.

**Step 6: Computing Current Costs:**

i. The "Current Costs" for producing the new product should be estimated.
ii. The estimation of Current Cost is based on existing technologies and components, taking into account the functionalities and quality requirements of the new product.
iii. Direct Costs are determined by reference to design specifications, materials prices, labour processing time and wage rates. Indirect Costs may be estimated using Activity Based Costing Principles.

**Step 7: Setting Cost Reduction Targets:**

i. The difference between Current Cost and Target Cost indicates the required cost reduction.
ii. This amount may be divided into two constituents namely – a) Target Cost – Reduction Objective and b) Strategic Cost – Reduction Challenge.
iii. The former is viewed as being achievable (yet still a very challenging target) while the latter acknowledges current inherent limitations.
iv. After analyzing the Cost Reduction Objective, a Product-Level Target Cost is set which is the difference between the current cost and the target cost –reduction objective.

**Step 8: Identifying Cost Reduction Opportunities:**

i. After the Product-Level Target Cost is set, a series of analytical activities, commence to translate the cost challenge into reality.
ii. These activities continue from the design stage until the point when the new product goes into production.
iii. The total target is broken down into its various components, each component is studied and opportunities for cost reductions are identified.
iv. These activities are referred to as a) Value Engineering (VE) and b) Value Analysis (VA).

**Answer 4(b) :**

**Statement showing the Target costing of the product**

| | |
|---|---|
| (i) Target sale Price per unit = Full Cost + Target profit = ₹200 + $\dfrac{₹18,00,000 \times 20\%}{15,000\,units}$ | **₹ 224** |
| So, Mark-up on Full Cost = ₹ (24 ÷ 200) x 100 | **12%** |
| (ii) Above sale price ₹224 = VC + 40% thereon, i.e. 140% on VC. So, Var. Cost $\dfrac{₹224}{140\%}$ | **₹160** |
| (iii) Present Contribution at 15,000 units = (₹ 224 – ₹160) x 15,000 units =<br>Revised Contribution at 13,500 units = (₹ 230 – ₹160) x 13,500 units = | ₹ 9,60,000<br>₹ 9,45,000 |
| Hence, Increase in Sale Price is not beneficial, due to reduction in Contribution by | **₹ 15,000** |

| | |
|---|---|
| (iv) Target profit for next year = $\dfrac{₹16,50,000 \times 20\%}{15,000 \text{units}} = ₹22$ <br><br> So, Target cost for next year = New sale price less Target Profit = ₹210 – ₹22 | **₹ 188** |

**Q 5. (a) Discuss the basic components of Supply Chain Management?**
   **(b) List the steps of Business Process Re- Engineering.**
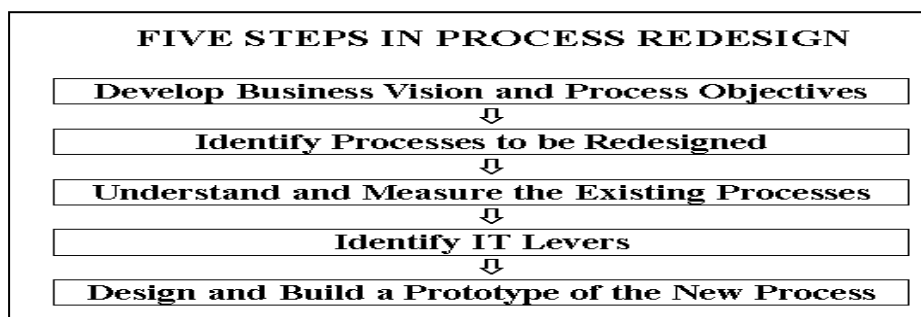
**Answer 5(a):**

**Following are basic components of Supply Chain Management:**

i.  **Plan** – This is the strategic portion of SCM. You need a strategy for managing all the resources that go toward meeting customer demand for your product or service. A big piece of planning is developing a set of metrics to monitor the supply chain so that it is efficient, costs less and delivers high quality and value to customers.

ii. **Source** – Choose the suppliers that will deliver the goods and services you need to create your product. Develop a set of pricing, delivery and payment processes with suppliers and create metrics for monitoring and improving the relationships. And put together processes for managing the inventory of goods and services you receive from suppliers, including receiving shipments, verifying them, transferring them to your manufacturing facilities and authorizing supplier payments.

iii. **Make** – This is the manufacturing step. Schedule the activities necessary for production, testing, packaging and preparation for delivery. As the most metric-intensive portion of the supply chain, measure quality levels, production output and worker productivity.

iv. **Deliver** – This is the part that many insiders refer to as logistics. Coordinate the receipt of orders from customers, develop a network of warehouses, pick carriers to get products to customers and set up an invoicing system to receive payments.

v.  **Return** – The problem part of the supply chain. Create a network for receiving defective and excess products back from customers and supporting customers who have problems with delivered products.

**Answer 5 (b) :**

**Steps of Business process Re- Engineering:**

Assuming that a company has decided its processes are inefficient or ineffective, and therefore in need of redesign, how should it proceed? This is a straight forward activity, but Davenport & Short (1990) prescribe a five-step approach to BPR:



(i)  **Develop Business Vision and Process Objectives:**

BPR is driven by a business vision which implies specific business objectives such as Cost Reduction, Time Reduction, Output Quality Improvement, Quality of Work life (QWL)/Learning/Empowerment.

(ii) **Identify Processes to be Redesigned:**
Most firms use the *High-Impact* approach which focuses on the most important processes or those that conflict most with the business vision. Lesser number of firms use the *Exhaustive* approach that attempts to identify all the processes within an organization and then prioritize them in order of redesign urgency.

(iii) **Understand and Measure the Existing Processes:**
Understanding and measuring the existing processes before redesigning them is especially important, because problems must be understood so that they are not repeated. On the other hand, accurate measurement can serve as a baseline for future improvements.
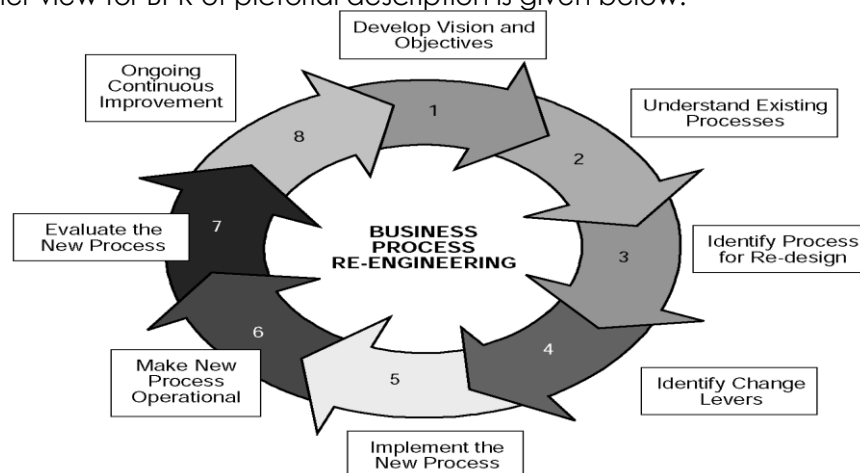
(iv) **Identify IT Levers:**
In the broadest sense, all of IT's capabilities involve improving coordination and information access across organizational units, thereby allowing for more effective management of task interdependence. An awareness of IT capabilities can -and should influence process design. Therefore, the role of IT in a process should be considered in the early stages of its redesign.

(v) **Design and Build a Prototype of the New Process:**
The actual design should not be viewed as the end of the BPR process. Rather, it should be viewed as a prototype, with successive iterations expected and managed. Key factors and tactics to consider in process design and prototype generation include using IT as a design tool, understanding generic design criteria, and creating organizational prototypes.

These prototypes of business process changes and organizational redesign initiatives, after agreement by owners and stakeholders, would be implemented on a pilot basis, examined regularly for problems and objective achievement, and modified as necessary. As the process approached final acceptance, it would be phased into full implementation.

Another view for BPR of pictorial description is given below:



Q6.(a) **Explain about Decision tree? Mention the rules to be followed while drawing a decision tree?**

(b) **ABC Ltd. have two alternative projects (A & B) under consideration, the company can select the project and loose the other, as all the projects have to be done now. The information on the projects is given below:**

**Project A – Capital investment of ₹60,000 is required. If the project is completed in time then revenues of ₹1,00,000 will be received. If not completed on time, a penalty of ₹5,000 per day of delay will be deducted from ₹1,00,000 with a maximum penalty of ₹15,000. The probabilities of delay are:**

| 0 days delay | 0.75 |
| 1 day delay | 0.10 |
| 2 day delay | 0.10 |
| 3 or more day delay | 0.0.5 |

**Project B - ₹75,000 are required as initial investment. After the first phase is completed, the company will get ₹75,000. If completed in 2 days , ABC Co. , have the option of getting a follow up project that will require expenditure of ₹20,000 and revenues of ₹50,000 with 70% chances and ₹75,000 with 30% chances. If more than 2 days are required for the first, the option for follow up project will not be there. ABC Co. feel that they have equal chances of completing the first phase in 2 days. Construct the decision tree , analyze and give the conclusion.**

**Answer 6 (a) :**

(a) **DECISION TREE:** Decision Tree is a tool which helps to choose between several courses of action. It provides a highly effective structure within which options can be laid out and the possible outcomes of choosing those options can be investigated. It also helps to form a balanced picture of the risks and rewards associated with each possible course of action.
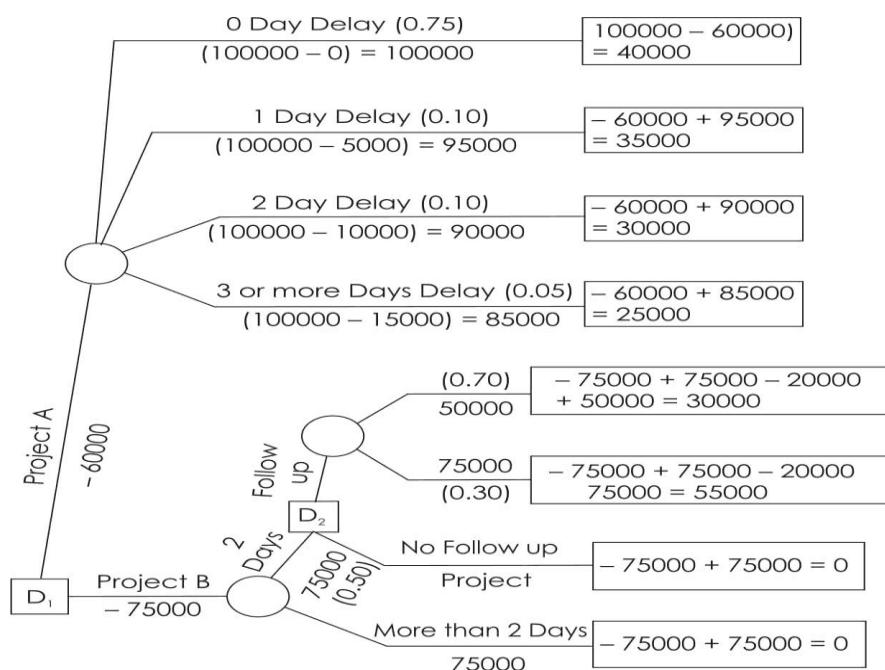
It is a graphic representation of the sequence of action-event combinations available to the decision-maker. It depicts in a systematic manner all possible sequences of decisions and consequences. Each alternative course of action is represented by a branch, which leads to subsidiary branches for further courses of action or possible events. Decision trees are designed to illustrate the full range of alternatives and events that can occur under all envisaged conditions. Decision tree brings out logical analysis of a problem and enables a complete strategy to be drawn up to cover all eventualities before a firm becomes committed to a scheme. Following rules and conventions are kept in view in drawing a decision tree:

  i.  First of all, decisions (i.e., all alternatives) should be identified and they should be arranged in an order in which they are likely to occur.
  ii. Chance events that can occur after each decision should also be identified.
  iii. A tree diagram should be developed showing the sequence of decisions and chance events. The tree is constructed starting from left and moving towards right. The square box '□' denotes a decision point at which all the available strategies are considered. The circle '○' represents chance mode or event the various states of nature or the outcome.
  iv. Probability estimate of the chances of each outcome's occurrences should be obtained.
  v.  Expected value of all possible outcomes and actions should be obtained.
  vi. The action offering most attractive expected value should be selected.

**Answer 6 (b):**

**Decision Tree with Cash Flow and Probabilities**



**Evaluate of Decision Points**

| Decision point | Outcome | Probability | Net Profit (₹) | Expected Payoff (₹) |
|---|---|---|---|---|
| $D_2$ (i) Follow up project | Higher payoff | 0.30 | 55,000 | 16,500 |
| | Lower payoff | 0.70 | 30,000 | 21,000 |
| | | | | **37,500** |
| No follow up project | | | | **0** |
| | | | | |
| $D_1$ (i) Take **Project A** | 0 day delay | 0.75 | 40,000 | 30,000 |
| | 1 day delay | 0.10 | 35,000 | 3,500 |
| | 2 days delay | 0.10 | 30,000 | 3,000 |
| | 3 or more days delay | 0.05 | 25,000 | 1,250 |
| | | | | **37,750** |
| (ii) Take **Project B** | Completed in 2 days | 0.50 | 37,500 | 18,750 |
| | Completed in more than 2 days | 0.50 | 0 | 0 |
| | | | | **18,750** |

**Conclusion:** Hence we conclude that Project A must be selected, giving an expected profit of ₹37,750 as against the expected profit of ₹18,750 from Project B.

**Q7.Read the following caselet and answer the followings:**

There were a large number of computer-education companies in South Africa in 1970s. These were concentrated in big cities, having population of 1,00,000 or more, as there was a prevalent belief that a computer-education company can succeed only in big cities. Future Information (FI), a firm in computer-education business, was started by Peter Rice in Johannesburg in 1978. Peter Rice did not agree with the rest of the entrepreneurs in the industry about the location of the service centers. He decided to go to the smaller towns. According to Rice any town having at least one high school could house a successful computer-education centre. In 1983, 20 centers of FI were opened in small towns. These were like 'local' monopolies because the towns were not big enough to accommodate another centre.

In 1970s and early 1980s, there was a boom in computer-education business, but by the late1980s, a downturn started in this business and many big firms went bankrupt. On the other hand, FI kept on going from strength to strength all this while – by 1990 its centers went up from 20 to 60. Now, it dawned on other firms that FI was following a pragmatic (through unconventional) approach. Rivals, therefore also to contemplate about following FI expansion strategy, as there was still a largely number of small towns left uncovered by any computer-education centre. FI realized that if this happens, they would be left behind. So the situation was like a pre-emptive game. Where every firm would like to enter each town first. FI calculated the payoff such game as follows:

| Particulars | | Enters | Does not enter |
|---|---|---|---|
| F₁ | Enters | -50, -50 | 100, 0 |
| | Does not enter | 0,100 | 0,0 |

**Required:**

(a) Discuss the limitations of Game Theory?
(b) Describe - Mixed Strategy, optimal Strategy, Two person zero – sum Game.
(c) Write down the impact, if other companies enter into the business in the context of the above caselet.

**Answer 7:**

**(a) Limitations of the Game Theory:**
Discussion of game theory has been restricted to the two-person zero-sum games. There are practically no applications of game theory to the real world situations. This is because of the assumptions underlying the theory.

The game model that is based on the assumption that each of the individuals involved not only acts rationally but preference ordering of the outcomes is determined by the order of magnitudes of their associated pay-offs, but also he assumes that the opponent is also rational in that sense. Besides, it is also assumed that both the players are having complete and equal knowledge about the strategies available to them and the resulting pay-offs. It can easily be visualized that in real world situations, it's only but rarely that each of the persons would have complete knowledge about all the strategies available to his competitor, as also of the exact pay-off values associated with various combinations of strategies.

The limitations of the Game Theory are given below:

**Limitations**

**(i)** The assumption that players have the knowledge about their own pay-offs and pay-offs of others is not practical.
**(ii)** The techniques of solving games involving mixed strategies particularly in case of large pay-off matrix are very complicated.

**(iii)** All the competitive problems cannot be analyzed with the help of game theory.

**(b) Mixed Strategy:** When the players use a combination of strategies and each player always kept guessing as to which course of action is to be selected by the other player at a particular occasion then this is known as mixed-strategy. Thus, there is a probabilistic situation and objective of the player is to maximize expected gains or to minimize losses. Thus mixed strategy is a selection among pure strategies with fixed probabilities.

**Optimal Strategies:** A course of action or play which puts the player in the most preferred position, irrespective of the strategy of his competitors is called an optimal strategy. Any deviation from this strategy results in a decreased pay-off for the player.

**Two Person Zero-Sum Game:** There are two types of two-person zero-sum games. In one, the most preferred position is achieved by adopting a single strategy and therefore the game is known as the *pure strategy game*. The second type requires the adoption by both players a combination of different strategies in order to achieve the most preferred position and is, therefore, referred to as the mixed strategy game.

**(c)** As it can be seen from the payoff matrix that if one of the firms enters, that firm gains 100 and the other does not get anything. While both enter then both lose 50. It dawned on other firms that FI was following a pragmatic (through unconventional) approach. Rivals, therefore also to contemplate about following FI expansion strategy, as there was still a largely number of small towns left uncovered by any computer-education centre. FI realized that if this happens, they would be left behind. So the situation was like a pre-emptive game, where every firm would like to enter each town first.

**Q8. (a)** Two firms are competing for business under the conditions so that one firm's gain is another firm's loss. Firm A's pay-off matrix is given below:

|  |  | No advertising | FirmB Medium advertising | Heavy advertising |
|---|---|---|---|---|
| | No advertising | 10 | 5 | - 2 |
| Firm A | Medium advertising | 13 | 12 | 15 |
| | Heavy advertising | 16 | 14 | 10 |

**Suggested optimum strategies for the two firms and the net outcome thereof.**

**(b)** "Normally when new Investments have the same risk as existing operations, the discount rate applied is the average cost of capital of the operations, If the risk of the new project is greater………………" – Explain the above statement.

**Answer of 8 (a) :**

Clearly, the first column is dominated by the second column as all the elements of the first column are greater than elements of second column. Thus eliminating first column. We get

$$
\begin{array}{c}
\text{Firm B} \\[4pt]
\begin{array}{cc}
\text{Medium} & \text{Heavy} \\
\text{Advertising, } B_2 & \text{Advertising, } B_3
\end{array}
\end{array}
$$

$$
\text{Firm A} \quad
\begin{array}{cc}
\text{No Advertising} & A_1 \\
\text{Medium advertising} & A_2 \\
\text{Heavy advertising} & A_3
\end{array}
\left[
\begin{array}{cc}
5 & -2 \\
12 & 15 \\
14 & 10
\end{array}
\right]
$$

Again, first row is dominated by second and third row as all the elements of first row are less than the respective elements of second, and their row. Hence eliminating first row, we obtain the following 2 x 2 pay-off matrix.

$$
\begin{array}{c}
\text{Firm B} \\[4pt]
\begin{array}{cc}
\text{Medium} & \text{Heavy} \\
\text{Advertising, } B_2 & \text{Advertising, } B_3
\end{array}
\end{array}
$$

$$
\text{Firm A} \quad
\begin{array}{c}
\text{Medium advertising, } A_2 \\
\text{Heavy advertisin, } A_3
\end{array}
\left[
\begin{array}{cc}
12 & 15 \\
14 & 10
\end{array}
\right]
$$

The reduced 2 x 2 payoff matrix also does not have the saddle point. Thus, both the Firms A and B use mixed strategies.

**For Firm A**. Let $p_2$ and $p_3$ be probabilities of selecting strategy $A_2$ (Medium advertising) respectively. Then the expected gain to Firm A when Firm B uses its $B_2$ and $B_3$ strategies is given by:

$12p_2 + 14p_3$     and     $15p_2 + 10p_3$ ; $p_2 + p_3 = 1$

For Firm A, the probability $p_2$ and $p_3$ should be such that expected gains under both conditions are equal, i.e.,

$12p_2 + 14p_3 = 15p_2 + 10p_3 => 12p_2 + 14 (1 - p_2 ) = 15 p_2 + 10 (1 - p_2)$

$$
7p_2 = 4 => p_2 = \frac{4}{6} \text{ and } p_3 = 1 - p_2 = \frac{3}{7}.
$$

**For Firm B.** Let $q_2$ and $q_3$ be probabilities of selecting strategies $B_2$ (Medium advertising) and strategy $B_3$ (Heavy advertising) respectively. Then the expected loss to Firm B when Firm A uses its $B_2$ and $B_3$ strategies should be:

$12q_2 + 15q_3 = 14q_2 + 10q_3$ ; $q_2 + q_3 = 1$

=> $12q_2 + 15(1 – q_3) = 14q_2 + 10 ( 1 – q_2)$

$\therefore 7q_2 = 5 => q_2 = \dfrac{5}{7}$ and $q_3 = 1 – q_2 = \dfrac{2}{7}$

The expected gain and loss to Firm A and Firm B can be computed as shown below:

Expected gain to Firm A :    $12p_2 + 14p_3 = 12 \times \dfrac{4}{7} + 14 \times \dfrac{3}{7} = \dfrac{90}{7}$

Expected gain to Firm B :    $12q_2 + 15q_3 = 12 \times \dfrac{5}{7} + 15 \times \dfrac{2}{7} = \dfrac{90}{7}$

Hence the optimum strategies for the two firms are:

|  | No advertising | Medium advertising | Heavy advertising |
|---|---|---|---|
| $S_A = $ | $0$ | $\dfrac{4}{7}$ | $\dfrac{3}{7}$ |

|  | No advertising | Medium advertising | Heavy advertising |
|---|---|---|---|
| $S_B = $ | $0$ | $\dfrac{5}{7}$ | $\dfrac{2}{7}$ |

And the value of the game is V = $\dfrac{90}{7}$ .

Firm B

|  |  | Medium Advertising, $B_2$ | Heavy Advertising, $B_3$ |  |
|---|---|---|---|---|
| Firm A | $A_2$ | $12$ | $15$ | $14 - 10 = 4,\ P(A_2) = \dfrac{4}{4+3} = \dfrac{4}{7}$ |
|  | $A_3$ | $14$ | $10$ | $15 - 12 = 3,\ P(A_3) = \dfrac{3}{4+3} = \dfrac{3}{7}$ |
|  |  | $15 – 10 = 5$ | $14 – 12 = 2$ |  |
|  |  | $P(B_2) = \dfrac{5}{5+2} = \dfrac{5}{7}$ | $P(B_3) = \dfrac{2}{5+2} = \dfrac{2}{7}$ |  |

Hence, Firm, A should adopt strategies $A_2$ and $A_3$ with 57% of time and 43% of time respectively, (or with 57% and 43% probability on any one play of the game respectively).

Similarly, Firm B should adopt strategies B₂ and B₃ with 71% of time and 29% of time respectively (or with 71% and 29% probability on any one play of the game respectively).

| Expected gain of Firm A | Expected gain of Firm B |
|---|---|
| (i) $12 \times \dfrac{4}{7} + 14 \times \dfrac{3}{7} = \dfrac{90}{7}$ <br><br> Firm B adopts B₂ | (i) $12 \times \dfrac{5}{7} + 15 \times \dfrac{2}{7} = \dfrac{90}{7}$ <br><br> Firm A adopts A₂ |
| (ii) $15 \times \dfrac{4}{7} + 10 \times \dfrac{3}{7} = \dfrac{90}{7}$ <br><br> Firm B adopts B₃ | (ii) $14 \times \dfrac{5}{7} + 15 \times \dfrac{2}{7} = \dfrac{90}{7}$ <br><br> Firm A adopts A₃ |

**Answer 8 (b) :**

Above statement explained about Risk Adjusted Discount Rate Method. This method is very much akin to certainty equivalent method that is more popular. This is due to the fact that quantification of the risk premium is more concrete in this method. Normally when new investments have the same risk as existing operations, the discount rate applied is the average cost of capital of the operations. If the risk of the new project is greater, then a formula is applied for the computation of the risk adjusted discount rate, as follows:

$r_p = r_f + n + d_p$

Where,

$r_p$ = Risk adjusted discount rate for project 'p'

$r_f$ = Risk free rate of interest

$n$ = Premium for normal risk

$d_p$ = Premium for additional risk differential for project 'p'

The risk premium so computed is based on the perception regarding the project risk and risk-return preference. Such premiums are normally calculated by comparing the returns obtained from different investments currently. The risk premium, normally varies between one per cent to 10 per cent, based on the risk assessment of such investments.

The offshoot of this method is the Risk Adjusted Return on Capital (RAROC). This computation is a risk-based profitability measurement framework for understanding the risk adjusted financial performance and providing an appropriate view. The RAROC can be represented as follows:

RAROC = Expected return/Economic capital or

RAROC = Expected return/Value at risk

**Q9. S. V. Ltd. manufactures a product which uses three components viz. A, B and C, one each being required for each unit of the product. The factory is working to its full machine capacity of 56,000 hours per annum . The machines are capable of making all the components.**

**The product is made in batches of 50 units and the data relating to the current production per batch are as under:**

| Components | Machine Hours | Variable Costs | Fixed Costs | Total Costs |
|---|---|---|---|---|
| | | ₹ | ₹ | ₹ |
| A | 15 | 375 | 150 | 525 |
| B | 25 | 450 | 175 | 625 |
| C | 30 | 450 | 450 | 900 |
| Assembly | | 800 | 325 | 1,125 |
| Total | | 2,075 | 1,100 | 3,175 |
| Profit | | | | 575 |

| Selling Price | | | | 3,750 |
|---|---|---|---|---|

During the next year the machine capacity cannot be increased even though the assembly capacity can be increased as per requirement without increasing its fixed costs. The budget for the next year envisages an increased production and so the purchase of one of the components or the other has to be considered. The company has received the following quotations for the purchase of the components during the next year.

| Per batch of 50 components | | | |
|---|---|---|---|
| Component | A | B | C |
| Purchase price (₹) | 550 | 700 | 850 |

The company has estimated that its sales could go up by 50% more than the present sales and probably even 75% more if the production capacity was available.

**Required:**

(i) Determine the production and profits earned by the company during the current year.

(ii) Indicate which of the components should be purchased and in what quantities at the two enhanced levels of output viz (a) increase by 50% of existing production and (b) increase by 57% of existing production during the next year.

(iii) Prepare statements showing the compnay's profitability at the two volumes of output referred to in (ii) above Assume no change in machine time, costs and prices.

**Answer 9:**

| Per batch of 50 Units | | | | |
|---|---|---|---|---|
| | A | B | C | Total |
| Hours/batch | 15 | 25 | 30 | 70 |

Batches produced = $\dfrac{56,000}{70} = 800$

No. of units produced 800 x 50 = 40,000

| S. V. Ltd. Profit Statement | |
|---|---|
| | ₹ |
| Sales 800 batches @ ₹ 3750 per batch | 30,00,000 |
| Variable Costs | |
| A 800 x 375 | 3,00,000 |
| B 800 x 450 | 3,60,000 |
| C 800 x 450 | 3,60,000 |
| Assembly 800 x 800 | 6,40,000 |
| Total | 16,60,000 |
| Contribution | 13,40,000 |
| Fixed Costs | |
| A 800 x 150 | 1,20,000 |
| B 800 x 175 | 1,40,000 |
| C 800 x 450 | 3,60,000 |
| Assembly 800 x 325 | 2,60,000 |
| Total | 8,80,000 |
| Profit | 4,60,000 |
| **Production increases** | |

| | |
|---|---|
| $50\% = 800 \times \dfrac{150}{100} = 1,200$ batch | |
| $75\% = 800 \times \dfrac{175}{100} = 1,400$ | |

| Component contribution per key factor (per batch) | | | |
|---|---|---|---|
| | **A (₹)** | **B(₹)** | **C(₹)** |
| Price Quoted | 550 | 700 | 850 |
| Variable Costs | 375 | 450 | 450 |
| Contribution | 175 | 250 | 400 |
| Machine Hours | 15 | 25 | 30 |
| Contribution/ Mech. Hr. | 11.67 | 10.00 | 13.33 |
| Rank for manufacture | 2 | 3 | 1 |

### (i) At 50% increase in volume

| Component | Requirement | Hrs/batch | Production Planned | Hours | Balance Hours |
|---|---|---|---|---|---|
| C | 1203 | 30 | 1,200 | 36,000 | 20,000 |
| A | 1200 | 15 | 1200 | 18,000 | 2,000 |
| B | 1200 | 25 | 80 | 2,000 | - |

Purchase of B 1200 – 80 = 1120 batches

| S. V. Ltd. Profit Statement | |
|---|---|
| | ₹ |
| Sales   1200 batches x 3750 | 45,00,000 |
| Variable Costs | |
| C 1200 x 450 | 5,40,000 |
| A 1200 x 375 | 4,50,000 |
| B  80   x 450 | 36,000 |
| B 1120 x 700 (Purchase) | 7,84,000 |
| Assembly 1200 x 800 | 9,60,000 |
| Total | 27,70,000 |
|       Contribution | 17,30,000 |
| Fixed Costs | 8,80,000 |
| Profit | 8,50,000 |

### (ii) At 75% increase in volume

| Component | Requirement | Hrs/batch | Production Planned | Hours | Balance Hours |
|---|---|---|---|---|---|
| C | 1,400 | 30 | 1,400 | 42,000 | 14,000 |
| A | 14,000 | 15 | 933 | 13,995 | 5 |
| Purchase: | | | | | |
| A 1400 – 933 = | | 467 batches | | | |
| B | | 400 batches | | | |

| S. V. Ltd. |
|---|

**Profit Statement**

| | ₹ |
|---|---|
| Sales         1400 batches x 3750 | 52,50,000 |
| | |
| Variable Costs | |
| C 1400 x 450 | 6,30,000 |
| A  933  x 375 | 3,49,000 |
| B  467  x 550 Purchase | 2,56,000 |
| B 1400 x 700 | 9,80,000 |
| Assembly 1400 x 800 | 11,20,000 |
| Total | 33,36,725 |
| Contribution | 19,13,275 |
| Fixed Costs | 8,80,000 |
| Profit | 10,33,275 |

**Q10.** A large Company is organized into several manufacturing divisions. The policy of the company is to allow the Divisional managers to choose their sources of supply and when buying from or selling to sister divisions, to negotiate the prices just as they will for outside purchase or sales.

Division X buys all of its requirements of its main raw material R from Division Y. The full manufacturing cost of R for Division Y is ₹ 88 per kg at normal volume.

Till recently, Division Y was willing to supply R to Division X at a transfer price of ₹ 80 per kg. The incremental cost of R for Division Y is ₹ 76 per kg. Since Division Y is now operating at its full capacity, it is unable to meet the outside customers' demand for R at its market price of ₹ 100 per kg. Division Y therefore threatened to cut off supplies to Division X unless the latter agree to pay the market price for R.

Division X is resisting the pressure because its budget based on the consumption of 1,00,000 per kg per month at a price of ₹ 80 per kg. is expected to yield a profit at ₹ 25,00,000 per month and so a price increase to ₹ 100 per kg. will bring the Division X close to breakeven point.

Division X has even found an outside source for a substitute material at a price of ₹ 95 per kg. Although the substitute material is slightly different from R, it would meet the needs of Division X. Alternatively; Division X is prepared to pay Division Y even the manufacturing cost of ₹ 88 per kg.

**Required**
(i) Using each of the transfer price of ₹ 80, ₹ 88, ₹ 95 and ₹100 show with supporting calculations, the financial results as projected by the
  (a) Manager of Division X
  (b) Manager of Division Y
  (c) Company

(ii) Comment on the effect of each transfer price on the performance of the Managers of Division X and Division Y.

(iii) If you were to make a decision in the matter without regard to the view of the individual       Divisional Managers, where should Division X obtain its material from and at what price.

**Answer 10:**

**(i)    Statement showing impact on Divisional profit with different transfer prices:**

| Division X (Transferee) | ₹ | Division Y (Transferor) | ₹ |
|---|---|---|---|
| (a)Transfer Price ₹ 80 | | | |
| | | Sales | 100000 x 80 = 8000000 |
| | | VC | 100000 x 76 = 7600000 |
| Profit Budgeted | 2500000 | Profit | 400000 |
| **Company Profit** | **2900000** | | |
| | | | |
| (b)Transfer price ₹ 88 | | | |
| Profit Budgeted | 2500000 | Sales | 100000 x 88 = 8800000 |
| Addl cost | 100000 x 8 =800000 | VC | 100000 x 76 = 7600000 |
| Net profit | 1700000 | | 1200000 |
| **Company profit** | **₹ 2900000** | | |
| | | | |
| (c)Transfer Price ₹ 95 | | | |
| Profit Budgeted | 2500000 | Sales | 100000 x 95 = 9500000 |
| Addl cost | 100000 x 15=1500000 | VC | 100000 x 76 = 7600000 |
| Net profit | 1000000 | | 1900000 |
| **Company profit** | **₹ 2900000** | | |
| | | | |
| (d)Transfer Price ₹100 | | | |
| Profit Budgeted | 2500000 | Sales | 100000 x 100 = 10000000 |
| Addl cost | 100000 x 20=2000000 | VC | 100000 x 76 = 7600000 |
| Net profit | 500000 | | 2400000 |
| **Company profit** | **₹ 2900000** | | |

**(ii)   Comment on the different transfer prices**

(a) Transfer price of ₹ 80 given a good incentive to Manager of Div. X whether no incentive to Manager of Div. Y even though he can sell outside and show better profits.

(b) Transfer prices of ₹ 88 reduce the profit of Division X and boosts the performance of Div. Y.

(c) Transfer prices of ₹ 95 further reduced the profits of Division X and improves the profit of Div. Y.

(d) Transfer price of ₹ 100 put Division X to stand on its own feet vis-à-vis market price and the performance of Div. Y improves.

(e) Regardless of the view of the individual managers, the position may be as under: X to buy substitute at ₹ 95 per kg. from market (additional cost ₹ 15 per unit). Y to sell entire quantity of R at the market price ₹ 10 to outsiders.

| X | ₹ | Y | ₹ |
|---|---|---|---|
| Budgeted Profit | 2500000 | Sales | 100000 x 100 = 1000000 |
| Addl. Cost | 100000 x 15 =1500000 | VC | 100000 x 76 = 7600000 |
| Net profit | 1000000 | Profit | 2400000 |
| | | | |
| Company's profit | 3400000 | | |

**Q11. XYZ Ltd manufactures four products namely A, B, C and D using the same plant and process. The following information relates to a production period –**

| Product | A | B | C | D |
|---|---|---|---|---|
| Output in units | 720 | 600 | 480 | 504 |
| Costs per unit: | | | | |
|    Materials | ₹42 | ₹45 | ₹40 | ₹48 |
|    Labour | ₹10 | ₹9 | ₹7 | ₹8 |
| Machine hours per unit | 4 hours | 3 hours | 2 hours | 1 hour |

The four products are similar and are usually produced in production runs of 24 units and sold in batches of 12 units. The Company presently uses machine hour rate for absorbing production overhead. The total overheads incurred by the company for the period is –
(a) Machine Operation and Maintenance Cost = ₹63,000,
(b) Set Up Costs = ₹20,000,
(c) Stores Receiving = ₹15,000,
(d) Inspection = ₹10,000, and
(e) Material Handling and Despatch = ₹2,592.

During the period, the following Cost Drivers are to be used for the Overhead

| Cost | Setup | Stores Receiving | Inspection | Materials Handling |
|---|---|---|---|---|
| Cost Driver | No. of production runs | Requisitions raised | No. of production runs | Orders executed |

It is also determined that -
• Machine Operation and Maintenance Cost should be apportioned between Set-Up Cost, Stores Receiving and Inspection Activity in the ratio 4:3:2.

• Number of Requisitions raised on Stores is 50 for each product and the number of orders executed is 192, each order being for a batch of 12 of a product.

Required:
• Calculate the Total Costs for each product if all Overhead costs are absorbed on a machine hour basis.
• Calculate the total costs for each product, using Activity-Based Costing system.
• Comment briefly on differences disclosed between OH traced by present system and those traced by ABC.

**Answer 11:**

### A. OH Recovery Rate under Absorption Costing

Total OH = ₹63,000 + ₹20,000 + ₹15,000 + ₹10,000 + ₹2,592 = ₹1,10,592
Total Machine Hours = (720 x 4) + (600 x 3) + (480 x 2) + (504 x 1) = 6,144 machine hours.
OH Recovery Rate = Total OH ÷ Total Machine Hours = ₹1,10,592 ÷ 6,144 = ₹18 per hour.

### B. *Cost Statement under Absorption Costing*

| Product | A | B | C | D | Total |
|---|---|---|---|---|---|
| Output in units | 720 | 600 | 480 | 504 | |
| Costs per unit:<br>Materials<br> Labour<br>Overheads | ₹42<br>₹10<br>4x18 = ₹72 | ₹45<br>₹9<br>3 x 18 = ₹54 | ₹40<br>₹7<br>2x18 =₹36 | ₹48<br>₹ 8<br>1 x 18 = ₹l8 | |
| **Total Costs per unit** | **₹124** | **₹108** | **₹83** | **₹74** | |
| Total Costs for prodn:<br>Materials<br>Labour<br>Overheads | ₹30,240<br>₹ 7,200<br>₹51,840 | ₹27,000<br>₹ 5,400<br>₹32,400 | ₹ 19,200<br>₹ 3,360<br>₹ 17,280 | ₹24,192<br>₹ 4,032<br>₹ 9,072 | ₹ 1,00,632<br>₹ 19,992<br>₹1,10,592 |
| **Total Costs** | **₹89,280** | **₹64,800** | **₹39,840** | **₹37,296** | **₹2,31,216** |

## C. Computation of ABC Recovery Rates

| Activity | Activity Cost Pool (₹) | Cost Driver | Quantity | ABC Rate |
|---|---|---|---|---|
| Set Up | 20,000+28,000=48,000 | No. of production runs | 96 | ₹500 per run |
| Stores Receiving | 15,000+21,000=36,000 | Requisition raised | 50×4=200 | ₹500 per reqn. |
| Inspection | 10,000+14,000=24,000 | No. of production runs | 96 | ₹250 per run |
| Material Handling | Given=2,592 | Order executed | 192 | ₹13.50 per batch |

- Machine Operation and Maintenance Cost of ₹63,000 is apportioned to the first three activities in the ratio 4:3:2 i.e. ₹28,000, ₹21,000 and ₹ 14,000
- One production run = 24 units. So, the no. of production runs are - Product A = 720 ÷ 24 = 30 runs, Product B = 600 ÷ 24 = 25 runs, Product C = 480 ÷ 24 = 20 runs, Product D = 504 ÷ 24 = 21 runs.
  Total = 96 runs.
- One Batch Order = 12 units. So, the no. of batches are - Product A = 720 ÷ 12 = 60 batches, Product B = 600 ÷12 = 50 batches, Product C = 480 ÷ 12 = 40 batches, Product D = 504 ÷ 12 = 42 batches,  Total = 192.
- 

## D. Cost Statement under Activity Based Costing

| Product | A | B | C | D | Total |
|---|---|---|---|---|---|
| Output in units | 72 | 600 | 480 | 504 | |
| Total Costs:<br>I Materials<br>H Labour<br>Overheads | ₹30,240<br>₹ 7,200 | ₹27,000<br>₹ 5,400 | ₹ 19,200<br>₹ 3,360 | ₹24,192<br>₹ 4,032 | 1,00,632<br>19,992 |
| • Setup | 500x 30 = 15,000 | 500x 25 = 12,500 | 500x20= 10,000 | 500x 21 = 10,500 | 48,000 |
| • Stores Recvg. | 9,000 | 9,000 | 9,000 | 9,000 | 36,000 |
| • Inspection | 250 x 30 = 7,500 | 250 x 25 = 6,250 | 250 x 20 = 5,000 | 250x21=5,250 | 24,000 |
| • Matl. Handling | 13.50x60 = 810 | 13.50 x 50 = 675 | 13.50x40 = 540 | 13.50 x 42 = 567 | 2,592 |
| Total OH Cost | ₹32,310 | ₹28,425 | ₹24,540 | ₹25,317 | 1,10,592 |
| **Total Costs** | **₹69,750** | **₹60,825** | **₹47,100** | **₹53,541** | **2,31,216** |

| Costs per unit: | | | | | |
|---|---|---|---|---|---|
| Materials | ₹42.000 | ₹45.000 | ₹40.000 | ₹48.000 | |
| Labour | ₹ 10.000 | ₹ 9.000 | ₹ 7.000 | ₹ 8.000 | |
| Overheads | ₹44.875 | ₹47.375 | ₹51.125 | ₹50.232 | |
| **Cost p. u.** | **₹96.875** | **₹101.375** | **₹98.125** | **₹106.232** | |

### E. Comparison of OH Cost differences

| Product | A | B | C | D |
|---|---|---|---|---|
| **OH Cost p.u. – Absorption System** | ₹72,000 | ₹54,000 | ₹36,000 | ₹18,000 |
| **OH Cost p.u. – ABC System** | ₹44,875 | ₹47,375 | ₹51,125 | ₹50,232 |
| **OH Cost Difference** | **₹27,125** | **₹6,625** | **₹(15,125)** | **₹(32,232)** |
| **% of Difference to Absorption System Nature** | -37.68% Overcosted | -12.27% Overcosted | +42.01% Undercosted | +179.07% Undercosted |

### F. Comments:

- There is a wide difference between the OH cost as traced by the two systems. ABC is comparatively a superior method of tracing OH costs since it relates the OH Costs using activities and resources consumed, rather than just the machine hours taken.
- Products A and B have been over-costed under Absorption Costing system, since the machine hours per unit are higher than that of Products C and D. Such unrealistic cost tracing may also affect pricing decisions in case the Company following Cost Plus Pricing policy.

**Q12.(a)Modern Electronics Ltd. manufactures Electronic Regulators. It is proposing to introduce a new advanced version of the Electronic Regulator with digital display. Development of the new Regulator will begin shortly and it is expected that the new product will have a life cycle of 3 years because of continuous development in the field of Electronics.**
   **The company has prepared the following estimates for 3 years:**

| | Year I | Year II | Year III |
|---|---|---|---|
| **Advanced Regulator -  units to be manufactured & sold (nos.)** | 50,000 | 2,00,000 | 1,50,000 |
| **Advanced Regulator per batch (nos.)** | 400 | 500 | 500 |
| **Price per Regulator (₹)** | 45 | 40 | 35 |
| **Development Cost (₹)** | 8,50,000 | 1,50,000 | |
| **Production Costs** | | | |
| **Variable Cost/unit (₹)** | 16 | 15 | 15 |
| **Variable Cost/batch (₹)** | 700 | 600 | 600 |
| **Fixed Costs (₹)** | 5,50,000 | 5,50,000 | 5,50,000 |
| **Marketing Costs** | | | |

| | | | |
|---|---|---|---|
| Variable Cost/unit (₹) | 3.60 | 3.20 | 2. 80 |
| Fixed Costs (₹) | 4,00,000 | 3,00,000 | 3,00,000 |
| Distribution Costs | | | |
| Regulators/batch (nos.) | 200 | 160 | 120 |
| Variable Cost/unit (₹) | 1 | 1 | I |
| Other variable cost/batch (₹) | 120 | 120 | 100 |
| Fixed Cost (₹) | 2,30,000 | 2,30,000 | 2,30,000 |
| Sales Promotion expenses/unit (₹) | 2 | 1.50 | 1.50 |

You are requested to calculate:

(i) Life Cycle Operating Profit and

(ii) Comment/evaluate on a proposal to decrease selling price by ₹ 3, which will increase sales volume by 10%. In such a case, production and distribution batch size will increase by 10%.

(b) Your company fixes the inter-divisional transfer prices for its products on the basis of cost plus a return on investment in the division. The Budget for Division A for 2012-13 appears as under:

| Particulars | ₹ | |
|---|---|---|
| Fixed assets | 5,00,000 | |
| Current assets | 3,00,000 | |
| Debtors | 2,00,000 | |
| Annual Fixed Cost of the Division | 8,00,000 | |
| Variable Cost per unit of Product | 10 | |
| Budgeted Volume | 4,00,000 | Units/year |
| Desired ROI | 28% | |

Determine the transfer Price for Division A.

**Answer 12 (a) :**

(i) Modern Electronics Limited Preparation of Life Cycle Operating Profit     (₹in '000)

| Particulars | Year-I | Year-II | Year-III | Total |
|---|---|---|---|---|
| **Sales Revenue** (Year I - 50 x 45), (Year II - 200 x 40), (Year III - 150 x 35) **(A)** | 2,250 | 8,000 | 5,250 | 15,500 |
| **Development Cost:** | 850 | 150 | - | 1,000 |
| **Production Cost:** | | | | |
| Variable Cost | 800 | 3,000 | 2,250 | 6,050 |
| Variable Cost per batch | | | | |

| | | | | |
|---|---|---|---|---|
| $\dfrac{\text{Unit manufactured} \times \text{Variable Cost per batch}}{\text{Advanced Regulator per batch}}$ | 87.5 | 240 | 180 | 507.5 |
| Fixed Cost | 550 | 550 | 550 | 1,650 |
| **Marketing Cost:** | | | | |
| Variable Cost | 180 | 640 | 420 | 1,240 |
| Fixed Cost | 400 | 300 | 300 | 1,000 |
| **Distribution Cost:** | | | | |
| Variable Cost | 50 | 200 | 150 | 400 |
| Variable Cost for batch | | | | |
| $\dfrac{\text{Unit manufactured} \times \text{Variable Cost per batch}}{\text{Advanced Regulator per batch}}$ | 30 | 150 | 125 | 305 |
| Regulator per batch | | | | |
| Fixed Cost | 230 | 230 | 230 | 690 |
| Sales Promotion Expenses | 100 | 300 | 225 | 625 |
| **Total Cost (B)** | 3,277.50 | 5,760.00 | 4,430.00 | 13,467.50 |
| **Operating Profit (A-B)** | **(1,027.5)** | **2,240.00** | **820.00** | **2,032.50** |

**(ii) Evaluation on a proposal to decrease selling price by ₹ 3**

**Preparation of Life Cycle Operating Profit**

(₹ in '000)

| Particulars | Year-I | Year-II | Year-III | Total |
|---|---|---|---|---|
| **Sales Revenue** (Year I - 55 x 42), (Year II - 220 x 37), (Year III - 165 x 32) **(A)** | 2,310 | 8,140 | 5,280 | 15,730 |
| **Development Cost:** | 850 | 150 | — | 1,000 |
| **Production Cost:** | | | | |
| Variable Cost | 880 | 3,300 | 2,475 | 6,655 |
| Variable Cost per batch | | | | |
| $\dfrac{\text{Unit manufactured} \times \text{Variable Cost per batch}}{\text{Regulators per batch}}$ | 87.5 | 240 | 180 | 507.5 |
| Fixed Cost | 550 | 550 | 550 | 1,650 |
| **Marketing Cost:** | | | | |
| Variable Cost | 198 | 704 | 462 | 1,364 |
| Fixed Cost | 400 | 300 | 300 | 1,000 |
| **Distribution Cost:** | | | | |
| Variable Cost | 55 | 220 | 165 | 440 |
| Variable Cost for batch | | | | |
| $\dfrac{\text{Unit manufactured} \times \text{Variable Cost per batch}}{\text{Regulators per batch}}$ | 30 | 150 | 125 | 305 |
| Fixed Cost | 230 | 230 | 230 | 690 |
| Sales Promotion Expenses | 110 | 330 | 247.5 | 687.5 |
| **Total Cost (B)** | 3.390.5 | 6,174 | 4,734.5 | |
| **Operating Profit (A-B)** | **(1,080.50)** | **1,966.00** | **545.50** | **1,431.00** |

**Comment:**

From the above analysis it is observed that the decrease in selling price is not permissible as it results in the decrease in the profit and increase in the loss during the respective years and in total. Therefore, decrease of selling price of ₹ 3 is not a feasible practice

**Answer 12 (b) :**

**Statement Showing the transfer price of Division A**

| Particulars | | ₹ |
|---|---|---|
| Variable Cost = | | 10.00 |
| Fixed Cost per unit | = 8,00,000 ÷ 4,00,000 | 2.00 |
| Required Return | 10,00,000 × 28%/4,00,000 | 0.70 |
| Total Cost or Transfer price | | 12.70 |

**Q13. (a) How do you calculate Economic Value Added (EVA)?**
**(b)**

| Equity Share Capital | ₹ 10,00,000 |
|---|---|
| Reserves & Surplus | ₹ 3,00,000 |
| 12% Preference Share Capital | ₹ 2,00,000 |
| 10% Debenture | ₹ 4,00,000 |
| Immovable property (held as investment) | ₹ 1,00,000 |
| Profit after tax | ₹ 2,00,000 |
| Rate of tax | 40% |

**Companies with Beta factor of 1 in similar business have market rate of return 15% . Beta factor of Anant Ltd. is 1.1. Calculate EVA assuming Risk Free Return-7%.**

**Answer 13 (a) :**

EVA is Net Operating Profit after Taxes (or NOPAT) less the money cost of capital. Any value obtained by employees of the company or by product users is not included in the calculations. The basic formula is:

Where: $$r = \frac{NOPAT}{K}$$

- r is the Return on Invested Capital (ROIC);
- K is capital employed;
- NOPAT is the Net Operating Profit after Tax, with adjustments and translations for the amortization of goodwill, the capitalization of brand advertising and others.

EVA Calculation
EVA = (r x Capital) – (c x Capital)
EVA = (NOPAT- c x Capital
EVA = operating profits – a capital charge
where: r = rate of return, and  c = cost of capital, or the weighted average cost of capital.

NOPAT is profits derived from a company's operations after taxes but before financing costs and noncash-bookkeeping entries. It is the total pool of profits available to provide a cash return to those who provide capital to the firm.

Capital is the amount of cash invested in the business, net of depreciation. It can be calculated as the sum of interest-bearing debt and equity or as the sum of net assets less

noninterest-bearing current liabilities. Capital charge is the cash flow required to compensate investors for the riskiness of the business given the amount of capital invested. The cost of capital is the minimum rate of return on capital required to compensate debt and equity investors for bearing risk.

Another perspective on EVA can be gained by looking at a firm's Return on Net Assets (RONA). RONA is a ratio that is calculated by dividing a firm's NOPAT by the amount of capital it employs (RONA = NOPAT/Capital) after making the necessary adjustments of the data reported by a conventional financial accounting system.

EVA = (Net Investments)(RONA – Required minimum return)
If RONA is above the threshold rate, EVA is positive.

**Answer 13 (b) :**

EVA = (Return on operating capital – weighted average cost of capital) X Operating Capital
=(12.44%-13.33%) X ₹18,00,000 = ₹ (16,020)

**Working Note – 1**

| Operating Capital | ₹ |
|---|---|
| Equity Share Capital | 10,00,000 |
| Reserves & Surplus | 3,00,000 |
| 12% Preference Share Capital | 2,00,000 |
| 10% Debenture | 4,00,000 |
| Total | 19,00,000 |
| Less: Non operating Investment | 1,00,000 |
| Operating Capital | 18,00,000 |

**Working Note – 2**
**Calculation of Return on operating Capital**

| | ₹ |
|---|---|
| NOPAT = Profit after Tax | 2,00,000 |
| + Taxes $(2,00,000 \times 40/60)$ | 1,33,333 |
| | 3,33,333 |
| +Interest Expense | 40,000 |
| Operating EBIT | 3,73,333 |
| (-) Economic taxes @ 40% | 1,49,333 |
| NOPAT | 2,24,000 |

**Working Note – 3**

| Calculation of WACC | | |
|---|---|---|
| $K_d$ = 10% (1-0.40) X 4,00,000/19,00,000      =1.26 | | |
| $K_p$ = 12% X 2,00,000/19,00,000      = 1.26 | | |
| $K_e$ = 7% + 1.1(15%-7%) = 15.8% X 13/19      = 10.81 | | 13.33% |

**Working Note – 4**
Return on operating capital (%) = (₹2,24,000/₹18,00,000)×100=12.44%

**Q 14 (a) Explain about Balanced Score Card.**
   **(a) Mention the Advantages of Balanced Score Card?**

**Answer 14 (a):**

The Balanced Score Card approach emphasizes the need to provide management with a set of information, which deals with all relevant areas of performance in an objective and unbiased fashion. The information provided may be both financial and non-financial. It covers areas such as profitability, customer satisfaction, internal efficiency and innovation. This approach looks at both internal and external matters concerning the organization.

A number of benefits have materialized from this approach. It is a more effective reporting process. There is greater clarity and focus and the issues to be tackled.
There will be improved understanding of the key issues and it helps the managers to focus resources and take action more effectively.
Balanced Score Card is a performance management and strategy development methodology that helps executives translate on organization's mission statement and overall business strategy into specific, qualifiable goals and monitors the organization's performance in terms of these goals. Balance Score Card also aligns budgets to strategy and helps in developing an enterprise performance management system.

It is a set of financial and non-financial measures relating to company's critical success factors. As a management tool it helps companies to assess overall performance, improve operational processes and enable management to develop better plans for improvements. It offers managers a balanced view of their organization upon which they can base real change.

Balanced Score Card has the following four perspectives:

a) **Customer perspective:** To achieve the company's vision and strategy, how should the company appear its customers
b) **Internal business perspective:** To satisfy the company's shareholders and customers and what business processes must the company excel
c) **Learning and growth perspective:** To achieve the vision, how will the company sustain its ability to change and improve
d) **Financial perspective:** To succeed financially how should the company appear to the company's share holders

**Answer 14 (b):**

**Advantages of Balanced Scorecard**
   i. **Holistic approach:** It brings strategy and vision as the center of Management focus. It helps Companies to assess overall performance, improve operational processes and enable Management to develop better plans for improvement. It provides Management with a comprehensive picture of business operations.
  ii. **Overall Agenda:** It brings together in a single Management Report, various aspects like customer oriented, shortening response time, and improving quality etc. of competitive agenda.
 iii. **Objectivity:** It emphasizes the need to provide the user with a set of information, which address all relevant areas of performance in an objective and unbiased manner.
  iv. **Management by Objectives:** The methodology of BSC facilitates communication and understanding of business goals and strategies at all levels of the Firm. Thus it enables Management by Objective.

v. **Feedback and Learning:** It provides strategic feedback and learning.  BSC guards against sub-ordination. It emphasizes an integrated combination of traditional and non-traditional performance measures.

vi. **System Approach:** It helps Senior Managers to consider all the important performance measures together and allows them to see whether an improvement in one area has been achieved at the expense of another.

**Q 15 (a) Let the demand curve be $P = \dfrac{10}{q}$ & $C = 5 + 2q + 5q^2$. If the objective of the firm is profit maximization only, will the firm produce?**

**(b) A monopolist faces the demand curve $P = 100 - \dfrac{1}{2}q$ and he produces the same product in 2 plants. The cost functions for these plants are $C_1 = 10q_1$, $C_2 = 0.25q_2^2$.**
   **(i)  How much will he allocate in both the markets?**
   **(ii) How large are the profits?**

**(b) For a monopolist, the demand curve is q = 100 - 2q and total cost (c) = 0.05q² +2q+ 300. Find profit maximizing output and price.**

**Answer 15 (a):**

Here $P = \dfrac{10}{q} \Rightarrow TR = pq = 10 \Rightarrow MR = zero$

Again, $C = 5 + 2q + 5q^2 \Rightarrow MC = 2 + 10q.$

At equilibrium, $MR = MC \Rightarrow 0 = 2 + 10q$

$\Rightarrow q = -\dfrac{1}{5} < 0.$

**Answer 15 (b):**

**(i)** This problem relates to the multiple plant monopolist where at equilibrium $MR = MC_1 - MC_2.$

As $P = 100 - \dfrac{1}{2}q, MR = 100 - q = 100 - (q_1 + q_2)$

As $q = q_1 + q_2$

Now $MC_1 = \dfrac{d}{dq_1}(TC_1) = 10$ and $MC_2 = \dfrac{d}{dq_2}(TC_2) = \dfrac{1}{2}q_2.$

$\therefore MR = MC_1 \Rightarrow 100 - q_1 - q_2 = 10 \Rightarrow q_1 + q_2 = 90 ....... (1)$

$MR = MC_2 \Rightarrow 100 - q_1 - q_2 = \dfrac{1}{2}q_2 \Rightarrow + q_1 + 1.5q_2 = 100 ....... (2)$

Solving equation (1) and (2) we get, $q_1 = 70$ and $q_2 = 20$ which is the optimal allocation.

**(ii)**      We observe $P = 100 - \dfrac{1}{2}q$

$\Rightarrow P = 100 - \dfrac{1}{2}(q_1 + q_2) = 55.$

$\therefore \pi = TR - TC_1 - TC_2 = pq - 10q_1 - 0.25q_2$

$= 55 \times 90 - 10 \times 70 - 0.25(20)^2$  [as $q = q_2 + q_2 = 90$]

$= 4150.$

**Answer 15 (c):**

We have $q = 100 - 2q \Rightarrow p = 50 - \dfrac{1}{2}q \Rightarrow MR = 50 - q.$

Also $MC = \dfrac{dc}{dq} = 0.1q + 2$

At equilibrium, $MR = MC \Rightarrow 50 - q = 0.1q + 2$

$\Rightarrow q = 43.6 \,\&\, p = 50 - \dfrac{1}{2}(43.6) = 28.2.$

**Q 16 (a) Target customers, Cost of the product, Market position of the firm, Distribution channel policy, Price elasticity of Demand – all are factors influencing the price of a product. Discuss each of the above factors.**

   **(b) Describe the limitations of Value Chain Analysis.**

**Answer to 16 (a):**

**Factors Influencing Price of a Product:**
Generally, marketers consider the factors in setting price i.e. Target Customers, Cost of the Product, Competition, The law, Social Responsibility, Market Position of the Firm, Distribution Channel Policy, Price elasticity of Demand, Economic Environment etc. As required by the question we are discussing the following factors:

**(i) Target customers:** Price of product is depend on the capacity of buyers to buy at various prices, in other words, influence of price elasticity of demand will be examined.

**(ii) Cost of the Product:** Pricing is primarily based on, how much it costs to produce and market the product, i.e., both the production and distribution cost.

**(iii) Market Position of the Firm:** The position of the market may also influence the pricing decision of the firm. It is only why the different producers of identical products sell their products at different prices.

**(iv) Distribution Channel Policy:** The prices of products will also depend up the policy regarding distribution channel The longer the channel, the higher would be the distribution costs and consequently higher the prices.

**(v) Price elasticity of Demand:** Price elasticity refers to consequential change in demand due to change in price of the commodity. It is the relative responsiveness to the changes in price. As there an inverse relationship between price and demand for product, the demand will increase with fall in price.

**Answer to 16 (b):**

A value chain is the sequence of business functions in which utility is added to the products or services of the firm. Through proper analysis of each segment of the value chain, customer value is enhanced. No-value creating activities are eliminated.

In value chain analysis, each of the business functions is treated as an essential and value contributor and is constantly analyzed to enhanced value relative to the cost incurred. Like business functions, in value chain approach also, it is important that the efforts of all functions are integrated and co-ordinate to increase the value of the products or services to the customers.

**Limitations of Value Chain Analysis are given below:**

| (i) Non availability of Data | Internal data on costs, revenues and assets used for Value Chain Analysis are derived |
|---|---|

| | from financial of a single period. For long term strategic decision- making, changes in cost structures, market prices and capital investments etc. May not readily available. |
|---|---|
| **(ii) Identification of stages** | Identifying stages in an industry's value chain is limited by the ability to locate at least one firm that participates in a specific stage. Breaking a value stage into two or more stages when an outside firm does not compete in these stages is strictly judgment. |
| **(iii) Ascertainment of costs of Revenues and Assets** | Finding the Costs, Revenues and Assets for each value chain activity poses/gives rise to serious difficulties. There is no specific approach and much depends upon trial and error and experiments methods. |
| **(iv) Identification of cost Drivers** | Isolating Cost Drivers for each value creating activity, identifying Value chain Linkages across activities and computing supplier and customer profit margins present serious challenges. |
| **(v) Resistance from employees** | Value chain Analysis is not easily understandable to all employees and hence may face resistance from employees as well as managers. |

**Q 17 (a)** "Competitive intelligence is a process of gathering data, creating information and making decisions. Management accountants are trained to gather data, assimilate data into information and make decisions based upon information, frequently with their management counterparts." – Justify the statements.

**(b)** What is Process Analysis? Describe the objectives of Process Analysis.

**Answer 17 (a):**

The above statement is related to the Role of Management Accountant in Competitive Intelligence.
Competitive intelligence may also be viewed as a competitiveness audit, a concept that management accountants are familiar with. Management accountants' training and experience make them well-suited to the requirements of the competitive intelligence process.
Management accountants may be actively involved in introducing a competitive intelligence process in several ways:

(i)   Identifying the need for a new or improved competitive intelligence process;
(ii)  Educating top management and other senior managers about that need;
(iii) Developing a plan along with cross-functional team members for designing, developing and implementing the new, improved competitive intelligence practice, including its underlying architectures;
(iv)  Identifying the appropriate tools and techniques for conducting competitor analysis;
(v)   Providing financial input, analysis and expertise to the competitive intelligence effort;
(vi)  Contributing to and using competitive intelligence in target costing;
(vii) Ensuring that the competitive intelligence efforts are tied to the firm's goals, strategies, objectives and internal processes, as appropriate; and,
(viii) Continually assessing the new, improved competitive intelligence process and its implications for the organization and continually improving the process.

**Answer 17(b):**

Process analysis is an approach that helps managers improves the performance of     their business activities. It can be a milestone in continuous improvement.   Process analysis approach consists of the following steps:
(i)   Definition of the scope and the objectives of the study,
(ii)  Documentation of the status quo and definition of performance measures,
(iii) Assessment and performance evaluation, and
(iv) Development of recommendations.

**Objectives of Process Analysis**

For many organizations their goals and objectives are fulfilled once they complete the review process and the Process Capture project stops at that point. For others it is important to move beyond the basic process documents and analyze the data collected and documents. In working with many organizations over 20 years, a good strategy with analysis is to look at the process through three angles to analyze and identify areas for change.

These are **Understanding**, **Quality** and **Efficiency**. By systematically reviewing the process through each of these steps, a much improved and comprehensive analysis will result.



**The objectives of analyzing the process include:**
**(i)**   Identify what makes maps difficult to understand and use
**(ii)**  Evaluate completeness
**(iii)** Isolate bottlenecks
**(iv)** Find redundancies
**(v)**  Examine resources allocation
**(vi)** Measure process times

**Q 18 (a) Explain the 'Contractual Terms' in the context of interaction of Transfer pricing and Taxation – Post evaluation of strategic business arrangement. "Whether the conduct of the associated enterprises conforms to the contractual allocation of risks" – Illustrate.**

**(b) "As a company reduces these wastes and strives for single piece flow, many other benefits will follow." – Describe it in the perspective of Lean Management.**

**Answer 18 (a):**

**Contractual Terms:**
Contractual arrangements are the starting point for determining which party to a transaction bears the risk associated with it. Accordingly, it would be a good practice for associated enterprises to document in writing their decisions to allocate or transfer significant risks before the transactions with respect to which the risks will be borne or transferred occur, and to document the evaluation of the consequences on profit potential of significant risk reallocations. Where no written terms exist, the contractual relationships of the parties must be deduced from their conduct and the economic principles that generally govern relationships between independent enterprises.

A tax administration is entitled to challenge the purported contractual allocation of risk between associated enterprises if it is not consistent with the economic substance of the transaction. Therefore, in examining the risk allocation between associated enterprises and its transfer pricing consequences, it is important to review not only the contractual terms but also the following additional questions:

- Whether the conduct of the associated enterprises conforms to the contractual allocation of risks,
- Whether the allocation of risks in the controlled transaction is arm's length, and
- What the consequences of the risk allocation are.

In transactions between independent enterprises, the divergence of interests between the parties ensures that they will ordinarily seek to hold each other to the terms of the contract, and that contractual term will be ignored or modified after the fact generally only if it is in the interests of both parties. The same divergence of interests may not exist in the case of associated enterprises, and it is therefore important to examine whether the conduct of the parties conforms to the terms of the contract or whether the parties' conduct indicates that the contractual terms have not been followed or are a sham. In such cases, further analysis is required to determine the true terms of the transaction.

The parties' conduct should generally be taken as the best evidence concerning the true allocation of risk.

**Example:**
Assume a business in which a manufacturer sells property to an associated distributor in another country and the distributor is claimed to assume all exchange rate risks, but the transfer price appears in fact to be adjusted so as to insulate the distributor from the effects of exchange rate movements. In such a case, the tax administrations may wish to challenge the purported allocation of exchange rate risk

**Answer 18 (b):**

The benefits of the Lean Management are:

**(i) Improved quality and fewer defects:** When batching and lot production are eliminated, there is less opportunity to manufacture defects. Since the batch size will be just 1, there will not be mountains of inventory to count, move, store and pick.
Furthermore, single piece flow ensures that if there is a quality problem, we know that the defect has affected only that single part. We do not need to dedicate hours isolating and testing other material in the same production run to determine if it meets quality standards.

**(ii) Reduced Inventory:** Implementing single piece flow will require each operation to only produce what is needed by the next operation (in Lean jargon, we call this individual the

*surgeon*). When followed properly, the process will eliminate any opportunity to build ahead. Consequently, inventories will not be allowed to build up.

**(iii) Requires less space:** As inventory levels are reduced, less space and manpower will be required to manage (receive, count, stock, store, pick and deliver) it. In addition, single piece flow usually results in manufacturing cells which squeeze machines close together so that a single operator can oversee many pieces of equipment with the least amount of walking motion.

**(iv) Enhances overall manufacturing flexibility:** We know from our value steam maps that the less inventory in a value steam, the shorter the lead-time will be from customer order to product delivery. In a single piece flow environment, since we operate with fewer inventories, lead-times will also drop, thereby giving us more time to react to customer orders.

**(v) Makes identifying future Kaizen simpler:** We have already discussed that in a single piece flow environment, defects and WIP inventories fall. As this happens, the shop floor will open up and it will become easier to see production problems. For example, if a particular process cannot keep up with take time and WIP is not allowed to be incurred, it will quickly become apparent to even the casual observer that something is wrong. In this case, it will be easy to decide where to focus the next improvement activity.

**(vi) Ensures a safer work environment:** Fewer inventories means less clutter, more light in the darkest corners of the factory and the opportunity to better lay out equipment and tools. Also, since manufacturing cells are occupied by a set number of employees who each know their repeating tasks (as defined by standard work), there is less opportunity for unexpected movements, which increase the chances of accidents.

**(vii)Improves employee morale:** Since single piece flow results in production problems being identified and (hopefully) solved right away, team members will receive immediate feedback on their work. This in turn will give everybody more ownership in their production area. Also, provided they lead problem solving efforts by focusing on processes and not individuals, more trust will be gained in managers.

# Section – B

**Q 19 The Dabbawalas- Feeding Mumbai***

Hungry kya? What would you like: pizza from the local Domino's (30 minute delivery) or a fresh, hot meal from home? Most managers don't have a choice. It's either a packed lunch or junk food from a fast food outlet.

Unless you live in Mumbai, that is, where a small army of 'Dabbawalas' picks up 1,75,000 lunches from homes and delivers them to harried students, managers and workers on every working day. At your desk, 12.30 p.m. on the dot. Served hot, of course. And now you can order even through the Internet.

The Mumbai Tiffin Box Suppliers Association (MTBSA) is a streamlined 120 year old organization with 4,500 semi literate members providing a quality door-to-door service to a large and loyal customer base.

How has MTBSA managed to survive through these tumultuous years? The answer lies in twin process that combines competitive collaboration between team members with a high level of technical efficiency in logistics management. It works like this.

After the customer leaves for work, her lunch is packed into Tiffin provided by the *Dabbawala*. A color-coded notation on the handle identifies its owner and destination. Once the *Dabbawala* has picked up the Tiffin, he moves fast using a combination of bicycles, trains and his two feet.

A BBC crew filming *dabbawalas* in action was amazed at their speed. "Following our *Dabbawala* wasn't easy; our film crew quickly lost him in the congestion of the train station. At Victoria Terminus we found other fast moving *dabbawalas*, but not our subject. and at Mr Bhapat's Ayurvedic Pharmacy, the lunch had arrived long before the film crew," the documentary noted wryly. So, how do they work so efficiently?

 TEAM WORK AND TIMING

The entire system depends on team work and meticulous timing. Tiffins are collected from homes between 7.00 am and 9.00 am, and taken to the nearest railway station. At various intermediary stations, they are hauled onto platforms and sorted out for area wise distribution, so that a single Tiffin could change hands three to four times in the course of its daily journey. At Mumbai's downtown stations, the last link in the chain, a final relay of *Dabbawalas* fan out to the Tiffin's destined bellies. Lunch hour over, the whole process moves into reverse and the Tiffins return to suburban homes by 6.00 p.m.

To better understand the complex sorting process let's take an example. At Vile Parle Station, there are four groups of *Dabbawalas*, each has 20 members and each member services 40 customers. That makes 3,200 Tiffins in all. These 3,200 Tiffins have to be collected by 9.00 am, reached the station and sorted according to their destinations by 10.00 am when the '*Dabbawala* Special' train arrives.

The railway provides sorting areas on platforms as well as special compartments on trains travelling south between 10.00 a.m. and 11.30 a.m.

During the journey, these 80 *dabbawalas* regroup according to the number of Tiffins to be delivered in a particular area, and not according to the groups they actually belong to. If 150 Tiffins are to be delivered in the Grant Road Station area, then four people are assigned to that station, keeping in mind one person can carry no more than 35-40 Tiffins.

During the earlier sorting process, each *Dabbawala* would have concentrated on locating only those 40 Tiffins under his charge, wherever they come from, and this specialization makes the entire system efficient and error-free.

Typically it takes about ten to fifteen minutes to search, assemble and arrange 40 Tiffins onto a crate, and by 12.30 p.m. they are delivered to offices.

In a way, MTBSA's system is like the Internet. The Internet relies on a concept called packet switching. In packet switched networks, voice or data files are sliced into tiny sachets, each with its own coded address which directs its routing.

These packets are then ferried in bursts, independent of other packets and possibly taking different routes, across the country or the world, and re-assembled at their destination.

Packet switching maximizes network density, but there is a downside: your packets intermingle with other packets and if the network is overburdened, packets can collide with others, even get misdirected or lost in cyberspace, and almost certainly not arrive on time.

## ELEGANT LOGISTICS

In the *dabbawalas*' elegant logistics system, using 25 kms of public transport, 10 km of footwork and involving multiple transfer points, mistakes rarely happen. According to a Forbes 1998 article, one mistake for every eight million deliveries is the norm. How do they achieve at virtual six sigma quality with zero documentation? For one, the system limits the routing and sorting to a few central points. Secondly, a simple color code determines not only packet routing but packet prioritizing as lunches transfer from train to bicycle to foot.

## COMPETITIVE COLLABORATION

MTBSA is a remarkably flat organization with just three tiers: the governing council (president, vice president, general secretary, treasurer and nine directors), the Mukadams and the Dabbawalas. Its first office was at Grant Road. Today it has offices near most railway stations.
Nobody is an employer and none are employees. Each *Dabbawala* considers himself a shareholder and entrepreneur.
Surprisingly, MTBSA is a fairly recent entity: the service is believed to have started in the 1880s but officially registered itself only in 1968. Growth in membership is organic and dependent on market conditions. This decentralized organization assumed its current form in 1970, the most recent date of restructuring. *Dabbawalas* are divided into sub-groups of 15 to 25, each supervised by four Mukadams. Experienced old timers, the Mukadams, are familiar with the colors and codlings used in the complex logistics process. Their key responsibility is sorting Tiffins but they play a critical role in resolving disputes; maintaining records of receipts and payments; acquiring new customers; and training junior *dabbawalas* on handling new Customers on their first day.

Each group is financially independent but coordinates with others for deliveries: the service could not exist otherwise. The process is competitive at the customers' end and united at the delivery end. The Mukadams are also responsible for day-to-day functioning. And, more important, there is no organizational structure, managerial layers or explicit control mechanisms. The rationale behind the business model is to push internal competitiveness, which means that the four Vile Parle groups vie with each other to acquire new customers?

## EARNINGS

Logistics is the new mantra for building competitive advantage, the world over. Mumbai's *dabbawalas* developed their home grown version long before the term was coined.

Their attitude of competitive collaboration is equally unusual, particularly in India. The operation process is competitive at the customers' end but united at the delivery end, ensuring their survival since a century and more. Is their business model worth replicating in the digital age is the big question.

**Required:**
  **(a)** Explain the objectives of the Six Sigma.
  **(b)** Discuss the strategies used by the organization to achieve the goals of the organization.
  **(c)** What is Competitive Collaboration?

**Answer 19:**

**(a) Objectives of Six Sigma:**

**(i) Overall Business Improvement**
Six Sigma methodology focuses on business improvement. Beyond reducing the number of defects present in any given number of products, a business employing Six Sigma methods must seek improvement through any means available. That means identifying and remedying problems wherever they occur. Six Sigma calls anything that damages business functionality in a way that increases defects, raises costs, slows productivity or reduces customer satisfaction a source of pain. The elimination or remediation of these sources of pain leads to overall business improvement.

**(ii) Remedy Defects/Variability**
Any business seeking improved numbers must reduce the number of defective products or services it produces. Defective products can irrevocably harm customer satisfaction levels, as each customer ending up with a defective product becomes a potential lost costumer- and because the displeased customer will tend to pass the word about this defective product along. Then you've got to fix the defects, which can increase research and production costs dramatically.

**(iii) Reduce Costs**
Reduced costs equal increased profits. A company implementing Six Sigma principles has to look to reduce costs wherever it possibly can-without reducing quality. Cost reduction potential exists throughout a company. Acquire cheaper raw materials of equal or comparable value; reduce transportation costs via alternate shipping methods; streamline production and quality control processes with automation or improved equipment technology; cut personnel costs with outsourcing, downsizing or other methods; or reduce rent payments by moving production or sales facilities to different locations. Even the adoption of greener business practices can lead to reduced costs, as powered-down electronics, recycled paper and reduced wastage can have significant impact. No change is too small to consider.

**(iv) Improve Cycle Time**
Any reduction in the amount of time it takes to produce a product or perform service means money saved, both in maintenance costs and personnel wages. Additionally, customer satisfaction improves when both retailers and end users receive products sooner than expected. The company that can get a product to its customer faster may win her business, regardless of questions of quality or cost. There's a reason fast food was the definitive concept in food service during the 20th century.

**(v) Increase Customer Satisfaction**
The sources of pain that Six Sigma methodologies seek to remedy interrelate. Customer satisfaction depends upon successful resolution of all Six Sigma's other objectives. But customer satisfaction is an objective all its own. Every aspect of a business' self-

representation, from marketing strategies to sales personnel performance, can have a positive or negative effect on customer satisfaction. Seek positive customer response to these self-representations, and customer satisfaction will improve.

**(b)** Organization's successful strategy depends on good systems. Again, the entire system depends on team work and meticulous timing. Tiffins are collected from homes between 7.00 am and 9.00 am, and taken to the nearest railway station. At various intermediary stations, they are hauled onto platforms and sorted out for area wise distribution, so that single Tiffin could change hands three to four times in the course of its daily journey.

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**(c)** Collaboration is a strategic alliance typically between two firms with the goal of providing mutual benefit for each firm. Collaborating with your competitors is like a double-edged sword. Sharing between firms is a smart strategy as long as the relationship is give-and-take and is one that will benefit both parties without compromising each of the firm's competitive position in the industry. Firms must be careful in what information is shared across this delicate communication trail.
To borrow a line from the Godfather, "keep your friends close, but your enemies closer". Discussion of competitive collaboration lends itself to the idea that learning and studying your enemy pays. Although are infinite possibilities arising from collaborations, be wary of the risk of sharing knowledge with the enemy when it is core to your firm's competitive competencies.

**Types of competitive collaboration**
       (i)   Joint Ventures

(ii)  Outsourcing agreements
(iii)  Product Licensing
(iv)  Cooperative research

In that case, the competitive collaboration is
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**Q20** **"It may be useful for development organizations to consider the many issues involved before embarking on an e-commerce initiative, in relation to the organization's mandate, development goals, and organizational structure. The primary issues involved would include: (i) Resource Expansion, (ii) Capital Costs, (iii) Marketing, (iv) Staff/ Training,(v) Types of products offered for sale online, (vi)Purchasing patterns of online customers etc" – Discuss the points.**

**Answer 20 (a):**

It may be useful for development organizations to consider the many issues involved before embarking on an e-commerce initiative, in relation to the organization's mandate, development goals, and organizational structure. The primary issues involved would include:

**(i)  Resource Expansion** – Is the main goal of selling goods and services online the generation of revenue to offset operational costs? If so, how much revenue does the organization expect/wish to generate? These strategic questions will allow the organization to assess how much funding will go toward e-commerce activities. If the organization is approaching e-commerce as a means of covering not only the costs of producing the goods and services and disseminating development-focused products, but wishes to expand its revenue base to support other project costs, then it may want to develop an e-commerce platform and strategy that can attract customers. The organization may have to approach e-commerce as a resource expansion activity that uses business strategies and a full marketing approach. This leads to the question of whether this fits in with the development mandate of the organization and its charitable organization status. Will e-commerce activities distort the tax-free status of the development organization? Is the organization liable in the case of legal conflicts? Most development organizations

have already faced these questions if they sell publications and other products by "traditional" means.

**(ii) Capital Costs** – How much funding is the organization willing to put into e-commerce activities? E-commerce platforms can be high priced, depending on the level of sophistication. A development organization undertaking e-commerce activities should consider whether it wants to incur higher costs, with the possibility of cost recovery from an expected higher level of sales. What are the possibilities of receiving financial assistance from donor agencies or partner organizations for this activity? Development organizations pursuing e-commerce activities may have to decide between varieties of options for their online selling activities, depending on their financial capacities. These options can be divided into 1) technical hardware and 2) site design and maintenance. The organization will have to decide whether it wants to invest in setting up its own in-house server, depending on the organization's size and computing requirements, or find a third party that is willing to host the site on its server. Is the third party another development-focused organization, or is it a private company/ISP? Regarding design and maintenance of the e-commerce site, is the organization able to hire in-house technical personnel to handle design, development, and maintenance, or is it more cost effective to hire an outside party to handle these tasks? Developing an e-commerce site that generates high levels of revenue will have to respond to the changes in e-commerce platforms in the commercial sector. The development organization may want to consider using security encryption software for credit card payment, increasing costs to an extent yet benefiting from increasing customer confidence in the transaction process. Will the site be eye-catching, with the hope of attracting customers, possibly increasing site development costs for higher level graphics and design? Pan Partners currently do not have to bear all of the above-mentioned capital costs, but may one day have to consider them when they initiate an e-commerce site on their own.

**(iii) Marketing** – As evident from the discussion above, a good marketing strategy forms the basis of the operational strategy, in order to attract customers to the e-commerce site and ensure a steady pattern of sales. Development organizations often need not employ capital-intensive marketing programs in order to have a successful marketing campaign. The marketing strategy can be divided into two main categories: 1) online markets and 2) offline markets.

- **Online markets** include those customers that have already used, or are able to use, e-commerce for purchasing products. The Internet can be used as a tool in itself in order to capture online markets. Techniques include identifying other sites that would be willing to link to the organization's e-commerce site, or cross selling on these sites. These sites include organization partners and sites that offer links to development information and online resources. Another technique includes identifying target markets that would be interested in purchasing the specific development-focused products that the organization is selling online. Once the target markets are identified, potential customers can be identified and a personalized e-mail sent, providing a description of the products being offered and why they might be of interest to the potential customer. As well, individuals and organizations that have already been in contact with the organization can be contacted by e-mail with a similar message. In this way, the development organization is targeting markets that it knows will be interested in the products it offers.

- **Offline markets** include those individuals and organizations that have access to the Internet, but have never used e-commerce or are unlikely to do so. In these cases, "traditional" means of marketing can be employed to attract the potential customer to the e-commerce site. This includes advertisements in publications, newsletters, announcements at conferences and events, mailings to members, and supporters. Other innovative means of marketing can be employed, such as advertising promotional offers (e.g., "buy one, get one free," or announcements of

discounted items) on the home page of the development organization's website.

**(iv) Staffing/Training** -- Along with the capital costs comes the assessment of whether the organization has trained staff that can maintain an e-commerce site, including both the technical staff mentioned above, and the administrative staff that can process and fulfill the orders. Is the current staff able and willing to take on these activities? Will capacities be taken away from other projects and activities? Will the organization have to employ new staff to concentrate on e-commerce? Would it be cheaper/more effective to hire an outside company to do this? Can the organization afford these costs? Will the staff have to receive training? All of the above questions are important, not only for the success of the e-commerce initiative, but also to ensure that capacities are not taken away from other development activities. Once the above-mentioned issues are addressed, it is possible to move on to the operational strategy. The operational strategy addresses the issues highlighted in the examples above. These issues are important to address because of their impact on the overall expected sales patterns of development organizations.

**(v) Types of Products Offered for Sale Online** -- As previously noted, the products that are produced by development organizations primarily serve the purpose of disseminating information on a specific development topic or issue. These are products that are not often produced for mass markets, but for particular groups with an interest in the development sector. Should development organizations wish to broaden their market sector, they can develop products that have a wider appeal, while still maintaining a focus on the dissemination of information on development issues. These products could include general information and educational publications on a particular development theme (e.g., a survey of regional environmental issues). Such products could draw in new markets, such as schools and libraries. Development organizations could also look at innovative ways of using the Internet to create Web-based products for sale. For example, electronic versions of books and journals can provide a low-cost means of both producing these products and distributing them. Text can be digitized and offered for sale online. The product can then be sent to the customer electronically, cutting down on the cost of printing the text and sending the item by post. Other products could include digitized audio and video materials and electronic greeting cards. One such initiative is E-cards, an online greeting card company that supports the World Wildlife Fund (WWF). The virtual cards contain photographs of endangered animals and habitats. The site is sponsored by advertisers and for every greeting card sent, E-cards donates a significant portion of the revenue to the WWF. It also assists by sending Web traffic to the WWF website and, as an extension, drawing attention to the cause of endangered species and the environment. Another possibility that development organizations could pursue is allowing charitable donations and contributions to be made online. This would allow individuals that would like to support the efforts of a particular organization to submit their contribution in the form of an online transaction. This may increase overall contributions, as it provides a convenient way for individuals with access to the Internet to donate.

**(vi) Purchasing Patterns of Online Customers** -- The frequency of updating new products can impact the number of items purchased by customers and the number of returning customers. In order to encourage customers to purchase more than one item at a time, it is important to offer a (wide) variety of products. Returning to the marketing strategies, development organizations can offer sales promotions mentioned above. This can increase the per-customer volume of sales, increasing overall revenue. Development organizations can consider organizing a schedule for updating their e-commerce site, adding new products and promotional offers on a regular basis. This way, previous customers will see that new products are available for sale and may be attracted to purchasing a second or third time. It may be useful to form a general profile of who the organization's likely customers might be, and what their purchasing patterns could be. Are they individuals, companies, research institutes, universities, donors, libraries, or

governments? Further research on e-commerce customers could provide a useful tool for assessing online purchasing patterns. Developing an e-commerce strategy can allow development organizations to approach this initiative with an understanding of what they want to achieve and how to achieve it. This can encourage strategic thinking of how to attract potential customers to the site and how to keep them returning. In order for e-commerce initiatives to be successful, whether generating revenue to offset production costs or increasing overall revenue to offset operational costs, development organizations can often use business strategies to more effectively achieve their overall goals.

**Q21 (a) Explain about the Data Quality Measurement and Metrics. And mention aspects of this practice.**
  **(b) Describe about the Elman and Jordon Neural Networks.**

**Answer 21 (a):**

**Data Quality Measurement and Metrics**

Having used an assessment to identify areas for data quality improvement, the next step is to synthesize the results of the assessment to narrow the scope by concentrating on the data elements that are deemed critical based on the business users' needs. Defining performance metrics for reporting using a data quality scorecard requires processes for the determination of dimensions and corresponding units of measure and acceptability thresholds, and the presentation of quantifiable metrics that are relevant to the business data consumers.

To continue our example, once we have determined using the data quality assessment process that problems with addresses impacts the ability to optimally deliver shipped items, we can narrow the focus for data quality measurements to specific metrics associated with the critical data elements that contribute to the delivery failures. Some items might not be delivered due to missing street information, while others might have incorrect zip codes. The first problem is one of completeness, while the second of consistency with defined reference data. Measurements associated with the data quality dimensions of completeness and consistency can be defined using data quality validation rules for each address, and the resulting measures can be presented as metrics to the business users in the fulfillment department to estimate how invalid addresses are related to increased costs.

**Aspects of this Practice Include:**
▪ **Select dimensions of data quality –** A dimension of data quality describes a context and a frame of reference for measurement along with suggested units of measurement. Commonly measured dimensions of data quality include completeness, consistency, timeliness, and uniqueness, although the range of possible dimensions is only limited by the ability to provide a method for measurement. During this process, the data quality analysts select the dimensions that are to be measured and consider the tools, techniques, and skills needed to capture the measurements. The result of this process is a collection of specific measures that can be combined to contribute to qualitative data quality metrics.

▪ **Define data quality metrics –** Having identified the dimensions of data quality that are relevant to the business data consumers as well as the dimensions and the specific measures, the analyst can create specific reportable metrics that can be presented to the business data stewards. These may be basic metrics composed of directly measured rules, or may be more complex metrics that are composed as weighted averages of collected scores. Other aspects include reporting schemas and methods for drilling into flawed data for root cause analysis.

▪ **Define data validity rules –** The assessment process will expose potential anomalies, which are reviewed with the business users to identify data quality measures and, ultimately, data quality metrics. Yet in order to transition away from a reactive approach that seeks to remediate data quality issues once they are manifested at the end-user interface, the organization must engineer data controls into the application development

process so that data errors can be identified and addressed as they occur. This process has the data quality analysts developing data validity rules; these rules can be integrated into the business applications as controls to verify that data meet expectations throughout the information flow.
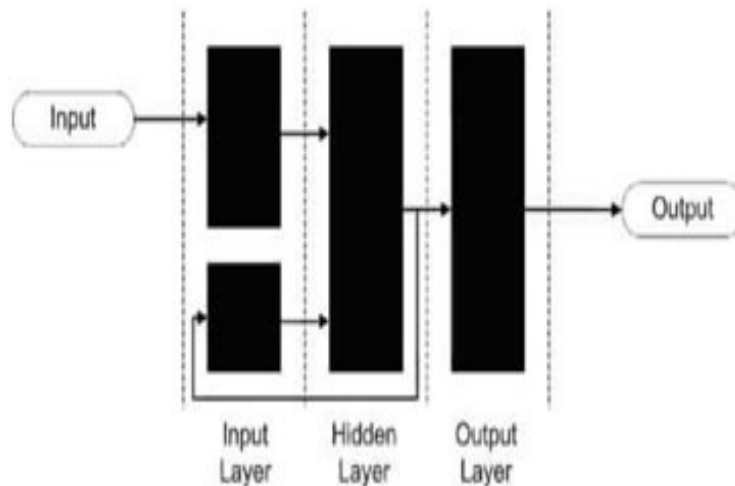
- **Set acceptability thresholds –** Once the data quality dimensions and metrics have been validated, the business users are consulted to express their acceptability thresholds. When a metric score is below the acceptability threshold, it means that the data does not meet business expectations. Integrating these thresholds with the methods for measurement completes the construction of the data quality metric.

- **Devise data quality scorecard –** A data quality scorecard presents metric scores to the data stewards observing the business data sets. Metrics scores can be captured within a repository over a long time period to enable trending and demonstrate continuous improvement or (conversely) show that progress is not being made. The process of devising the scorecard include managing the metrics definitions, measurement processes, weightings, how the scores are captured and stored, as well as composing the tools and technologies for delivery and presentation.
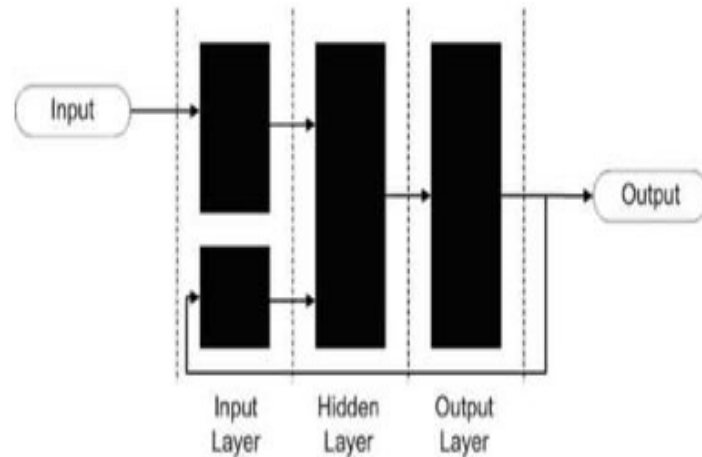
**Answer 21 (b):**

**Elman and Jordan Artificial Neural Networks**

Elman network also referred as Simple Recurrent Network is special case of recurrent artificial neural networks. It differs from conventional two-layer networks in that the first layer has a recurrent connection. It is a simple three-layer artificial neural network that has back-loop from hidden layer to input layer trough so called context unit. This type of artificial neural network has memory that allowing it to both detect and generate time-varying patterns.

The Elman artificial neural network has typically sigmoid artificial neurons in its hidden layer, and linear artificial neurons in its output layer. This combination of artificial neurons transfer functions can approximate any function with arbitrary accuracy if only there is enough artificial neurons in hidden layer. Being able to store information Elman artificial neural network is capable of generating temporal patterns as well as spatial patterns and responding on them. Jordan network is similar to Elman network. The only difference is that context units are fed from the output layer instead of the hidden layer.

Input Layer    Hidden Layer    Output Layer

**Q22 (a) Explain the Six Sigma process in Quality Management.**
**(b) Describe the Data Warehousing.**

**Answer 22 (a):**

Six Sigma is a business management strategy, originally developed by Motorola in 1986. Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes. It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization. A six sigma process is one in which 99.99966% of the products manufactured are statistically expected to be free of defects (3.4 defects per million). Motorola set a goal of "six sigma" for all of its manufacturing operations, and this goal became a byword for the management and engineering practices used to achieve it.

The fundamental objective of the Six Sigma methodology is the implementation of a measurement- based strategy that focuses on process improvement and variation reduction through the application of Six Sigma improvement projects. This is accomplished through the use of two Six Sigma sub- methodologies: DMAIC and DMADV. The Six Sigma DMAIC process (define, measure, analyze, improve, control) is an improvement system for existing processes falling below specification and looking for incremental improvement. The Six Sigma DMADV process (define, measure, analyze, design, verify) is an improvement system used to develop new processes or products at Six Sigma quality levels. It can also be employed if a current process requires more than just incremental improvement. Both Six Sigma processes are executed by Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

Six Sigma projects follow two project methodologies. These methodologies, composed of five phases each, bear the acronyms DMAIC and DMADV.

1. DMAIC is used for projects aimed at improving an existing business process.
2. DMADV is used for projects aimed at creating new product or process designs. DMAIC

The DMAIC project methodology has five phases:
(i)   Define the problem, the voice of the customer, and the project goals, specifically.
(ii)  Measure key aspects of the current process and collect relevant data.
(iii) Analyze the data to investigate and verify cause-and-effect relationships. Determine what the relationships are, and attempt to ensure that all factors have been considered. Seek out root cause of the defect under investigation.
(iv)  Improve or optimize the current process based upon data analysis using techniques such as design of experiments, poka yoke or mistake proofing, and standard work to create a new, future state process. Set up pilot runs to establish process capability.
(v)   Control the future state process to ensure that any deviations from target are corrected before they result in defects. Implement control systems such as statistical process

control, production boards, visual workplaces, and continuously monitor the process.

The DMADV project methodology, also known as DFSS ("Design For Six Sigma"), features five phases:
(i)    Define design goals that are consistent with customer demands and the enterprise strategy.
(ii)   Measure and identify CTQs (characteristics that are Critical to Quality), product capabilities, production process capability, and risks.
(iii)  Analyze to develop and design alternatives, create a high-level design and evaluate design capability to select the best design.
(iv)   Design details, optimize the design, and plan for design verification. This phase may require simulations.
(v)    Verify the design, set up pilot runs, implement the production process and hand it over to the process owner(s).

**Answer 22 (b):**

**Data Warehousing**

Data warehousing is the science of storing data for the purpose of meaningful future analysis.
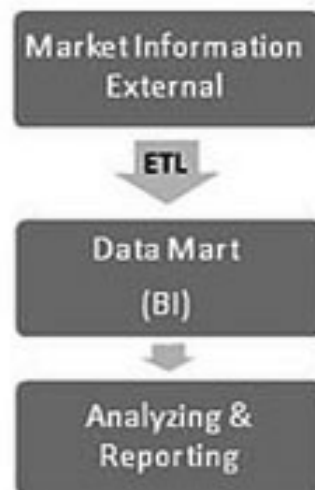
Yes, it is a science (not much art involved!) and it deals with the mechanism of electronically storing and retrieving data so that some analysis can be performed on that data to corroborate support a business decision or to predict a business outcome.

DW technologies provide historical, current and predictive views of business operations by analyzing the present and historical business data. Data analysis is often done using visualization techniques that turn complex data into images that tells compelling story. Raw data by this process of analysis help management take right decisions.

To further demonstrate the need of data warehousing, consider this.

Let's imagine a company called "Fair Shop" that has 1000 retail outlets across USA. The company has built one data warehouse to store the data collected from all the shop outlets so that they can analyze the data to gather business intelligence.

The company collects raw sales data from all of their outlet shops (through a process called ETL) and then loads them into a place called data warehouse or data mart.



Once the data is there in data warehouse (or data mart) business intelligence techniques are applied to that data for analysis and reporting. Since the company now has the sales and purchase information from all their shops in a centralized place, it can easily use this data to answer some rudimentary questions about their business e.g. what shop makes highest sales, which product is most popular across the shop, what is the stock balance etc.

**Q23 Define the following terms in the context of Supply Chain Management –**
**(a)Activity Based Costing, (b) Business 2 Business Commerce, (c) Capacity Requirements Planning, (d) Demand Management, (e) Forecast Sharing, (f) Inventory, (g) Joint Venture, (h) Logistic Information Sharing, (i) Sourcing Strategy, (j) Supplier Development Training.**

**Answer 23:**

**(a) Activity-Based Cost Accounting (ABC)**
A cost accounting system that accumulates costs based on activities performed and then uses cost drivers to allocate these costs to products or other bases, such as customers, markets, or projects. It is an attempt to allocate overhead costs on a more realistic basis than direct labor or machine hours.

**(b) Business-to-Business Commerce (B2B)**
Business being conducted over the Internet between businesses. The implication is that this connectivity will cause businesses to transform themselves via supply chain management to become virtual organizations, reducing costs, improving quality, reducing delivery lead time, and improving due-date performance.

**(c) Capacity Requirements Planning**
This is defined as the function of establishing, measuring, and adjusting limits or levels of capacity. The term capacity requirements planning in this context refers to the process of determining in detail the amount of labor and machine resources required to accomplish the tasks of production. Open shop orders and planned orders in the MRP system are input to CRP, which through the use of parts routings and time standards translates these orders into hours of work by work center by time period. Even though rough-cut capacity planning may indicate that sufficient capacity exists to execute the MPS, CRP may show that capacity is insufficient during specific time periods.

**(d) Demand Management**
The function of recognizing all demands for goods and services to support the market place. It involves prioritizing demand when supply is lacking. Proper demand management facilitates the planning and use of resources for profitable business results.

**(e) Forecast Sharing**
A supply partnership between a buyer and supplier is based on mutual interdependency and respect and calls for information sharing between the involved parties. By sharing its demand forecast with the supplier, the buyer benefits in two ways:

1) The partner becomes familiar with the buyer's needs, and

2) The buyer develops a dependable supply source. Forecast sharing allows the supplier to plan for and schedule production efficiently.

**(f) Inventory**

(1) Those stocks or items used to support production (raw materials and work-in-process items), supporting activities (maintenance, repair, and operating supplies), and customer service (finished goods and spare parts). Demand for inventory may be dependent or independent. Inventory functions are anticipation, hedge, cycle (lot size), fluctuation (safety, buffer, or reserve), and transportation (pipeline), and service parts.

(2) In the theory of constraints, inventory is defined as those items purchased for resale and includes finished goods, work in process, and raw materials. Inventory is always valued at purchase price and includes no value-added costs, as opposed to the traditional cost accounting practice of adding direct labor and allocating overhead as work in process progresses through the production process.

**(g) Joint Venture**

An agreement between two or more firms to risk equity capital to attempt a specific business objective.

**(h) Logistic Information System**

Converting data to information, portraying it in a manner useful for decision making, and interfacing the information with decision-assisting methods are considered to be at the heart of an information system. Logistics information systems are a subset of the firm's total information system, and it is directed to the particular problems of logistics decision making. There are three distinct elements that make up this system: the input, the database and its associated manipulations, and the output. The inputs are data items needed for planning and operating logistics system obtained from sources like customers, company records, and published data and company personnel. Management of the database involves selection of the data to be stored and retrieved, choice of the methods of analysis and choice of the basic data-processing procedures.

**(i) Sourcing Strategy**

A successful sourcing strategy requires a thorough understanding of a company's business strategy, the resources required to deliver that strategy, the market forces and the unique risks within the company associated with implementing specific approaches. A periodic review of the sourcing strategy ensures achievement of desired results and continued alignment with business objectives. Some of the sourcing strategies that are used in supply chain management today include:

**Single sourcing:** A method whereby a purchased part is supplied by only one supplier. A JIT manufacturer will frequently have only one supplier for a purchased part so that close relationships can be established with a smaller number of suppliers. These close relationships (and mutual interdependence) foster high quality, reliability, short lead times, and cooperative action.

**Multisourcing:** Procurement of a good or service from more than one independent supplier. Companies may use it sometimes to induce healthy competition between the suppliers in order to achieve higher quality and lower price.

**Outsourcing:** The process of having suppliers provides goods and services that were previously provided internally. Outsourcing involves substitution—the replacement of internal capacity and production by that of the supplier.

**Insourcing:** The goods or services are developed internally.

**(j) Supplier Development Training**

Education and training is the most common approach to supplier development and improvement. A purchaser may provide training in statistical process control, quality improvement techniques, just-in-time delivery or any other crucial performance area. In order for purchasing to adequately assess and aid suppliers in improving quality, purchasers need to become familiar with the important components of quality management. In many organizations, purchasing may request the assistance of quality and engineering departments in assisting with the supplier quality training. Purchasing companies emphasize four areas of quality training with their suppliers: 1) Total quality management and quality improvement training, 2) statistical quality control techniques training, 3) training focusing on integrating quality into the design of products and processes to reduce variability, and 4) training in problem solving techniques.

**Q24 (a) What are the key roles required for successful implementation of Six Sigma?**
   **(b) Explain about the Dashboard and comparison with the Scorecard**

### Answer 24 (a) :

Six Sigma identifies several key roles for its successful implementation:

**(i)  Executive Leadership** includes CEO and other key top management team members. They are responsible for setting up a vision for Six Sigma implementation. They also empower the other role holders with the freedom and resources to explore new ideas for breakthrough improvements.

**(ii) Champions** are responsible for the Six Sigma implementation across the organization in an integrated manner. The Executive Leadership draws them from the upper management. Champions also act as mentors to Black Belts. At GE this level of certification is now called "Quality Leader".

**(iii) Master Black Belts**, identified by champions, act as in-house expert coaches for the organization on Six Sigma. They devote 100% of their time to Six Sigma. They assist champions and guide Black Belts and Green Belts. Apart from the usual rigour of statistics, their time is spent on ensuring integrated deployment of Six Sigma across various functions and departments.

**(iv) Experts** this level of skill is used primarily within Aerospace and Defense Business Sectors. Experts work across company boundaries, improving services, processes, and products for their suppliers, their entire campuses, and for their customers. Raytheon Incorporated was one of the first companies to introduce Experts to their organizations. At Raytheon, Experts work not only across multiple sites, but across business divisions, incorporating lessons learned throughout the company.

**(v) Black Belts** operate under Master Black Belts to apply Six Sigma methodology to specific projects. They devote 100% of their time to Six Sigma. They primarily focus on Six Sigma project execution, whereas Champions and Master Black Belts focus on identifying projects/functions for Six Sigma.

**(vi) Green Belts** are the employees who take up Six Sigma implementation along with their other job responsibilities. They operate under the guidance of Black Belts and support them in achieving the overall results.

**(vii) Yellow Belts** are employees who have been trained in Six Sigma techniques as part of a corporate-wide initiative, but have not completed a Six Sigma project and are not expected to actively engage in quality improvement activities.

### Answer 24 (b) :

**Dashboard**

In information technology, a dashboard is a user interface that, somewhat resembling an automobile's dashboard, organizes and presents information in a way that is easy to read. However, a computer dashboard is more likely to be interactive than an automobile dashboard (unless it is also computer- based). To some extent, most graphical user interfaces (GUIs) resemble a dashboard. However, some product developers consciously employ this metaphor (and sometimes the term) so that the user instantly recognizes the similarity.

Some products that aim to integrate information from multiple components into a unified display refer to themselves as dashboards. For example, a product might obtain information from the local operating system in a computer, from one or more applications that may be running, and from one or more remote sites on the Web and present it as though it all came from the same source. Hewlett Packard developed the first such product, which began as a tool for customizing Windows desktops. Called Dashboard, the HP product was subsequently acquired by Borland and then a company called Starfish. Microsoft's Digital Dashboard tool incorporates Web-based elements (such as news, stock quotes, and so on) and corporate elements (such as e-mail, applications, and so on) into Outlook. Dashboards may be customized in a multitude of ways and named accordingly, generally, for example as a general corporate or enterprise dashboard, or more specifically, as a CIO or CEO dashboard.

### Comparison between Scorecard and Dashboard

The two terms – scorecards and dashboards – have a tendency to confuse, or rather get used interchangeably, but each brings a different set of capabilities. The sources of the confusion are:

- Both represent a way to track results.
- Both use traffic lights, dials, sliders and other visual aids.
- Both have targets, thresholds and alert messages.
- Both provide linkage or drill down to other metrics and reports.

The difference comes from the context in how they are applied. To provide some history, as busy executives and managers struggled to keep up with the amount of information being thrust at them, the concept of traffic lighting were applied to virtually any and all types of reporting. As technology has improved, more bells and whistles were added – the ability to link to other reports and to drill down to finer levels of detail. The common denominator was the speed of being able to focus on something that required action or further investigation. The terminology evolved to reflect how technology vendors described the widgets that provided this capability – dashboards. As a consequence, both dashboard and scorecard terms are being used interchangeably.

Some refer to dashboards as "dumb" reporting and scorecards as "intelligent" reporting. The reason is dashboards are primarily for data visualization; they display what is happening during a time period. Most organizations begin with identifying what they are already measuring and construct a dashboard dial from there. However, dashboards do not communicate why something matters, why someone should care about the reported measure or what the impact may be if an undesirable declining measure continues. In short, dashboards report what you can measure.

# Section – C

**Q25 (a) Q In today's environment, financial firms operate in increasingly complex, competitive and global challenging market. In the light of Basel II, can you briefly describe the various risks prevalent in the financial services.**

**(b) Describe about the Business Risk and Exchange Risk.**

**Answer 25 (a):**

In the light of Basel II Guidelines, the following risks are identified in banking and financial sectors:

(i) **Credit Risk:** Risk resulting from uncertainty in counterparty's ability or willingness to meet its contractual obligations, e.g., a bank gives a house-building loan to a customer and his default triggers a total or partial financial loss to the bank.

(ii) **Operational Risk:** Risks associated with their back office operations - what came to be called operational risks (i.e., risks other than credit or market risks). A bank office staff fails to catch a discrepancy between a reported trade and a confirmation from the counterparty. Ultimately, the trade could be disputed running into litigation and causing a loss.

(iii) **Market Risk:** Such a risk arises due to uncertainty in the future market value of a portfolio of assets and/or liabilities and possible decline in value. Market risk exists in many forms some of which are as follows:

**Liquidity risk:** It is a financial risk from a possible loss of liquidity. There are two types of liquidity risks:

i. **Specific Liquidity Risk -** it is the risk that particular firms will loss liquidity. This might happen if the firm's credit rating fell or something else happened which might cause counterparties to avoided trading with or lending to the firm, and

ii. **System Liquidity Risk -** which affects all participants in the market. It is the risk that entire markets will loss liquidity. Financial markets tend to loss liquidity during the periods of crisis or high volatility.

**Answer 25 (b):**

**Business Risk:**
A company's business risk is determined by how it invest its funds i.e., the type of projects which it undertakes, while financial risk is determined by how it finances these investments. A company's competitive position, the industries in which it operates, the company's market share, the rate of growth of the market and the stage of maturity all influence business risk. Business risk relates to volatility of revenues and profits of a particular company due to its market conditions, product mix, input availability, competitive market condition, labour supply etc. The business risk may be due to external factors or internal conditions of a particular business firm. External business risk arises due to change in operating conditions caused by conditions thrust upon the firm which are beyond its control - such as business cycles, Governmental controls etc. Internal business risk is associated with the efficiency with which a firm conducts its operations within the broader environment imposed upon it.

**Exchange Risk:**
Since the liability of the borrower of the foreign currency financing remains in the currency in which the borrower obtains loan, so at the time of repayment the rupee liability is determined on the basis of the exchange rate prevailing on the date of repayment. The exchange rate fluctuates widely with the passage of time, so the borrower is subject to exposure to exchange rate fluctuations on the outstanding principal of the foreign currency financing. Further if the borrowing is made at a floating rate of interest, there can be substantial variations in the rate of interest with the passage of time, depends on the variations in the LIBOR.

**Q 26 (a) Explain about the Risk Pooling.**
**(b) Describe about the Value at Risk.**

**Answer 26 (a):**

**Risk Pooling:**
One of the forms of risk management mostly practiced by insurance companies is Risk Pool. Under this system, insurance companies come together to form a pool, which can provide protection to insurance companies against catastrophic risks such as floods, earthquakes etc. The term is also used to describe the pooling of similar risks that underlies the concept of insurance. While risk pooling is necessary for insurance to work, not all risks can be effectively pooled. In particular, it is difficult to pool dissimilar risks in a voluntary insurance market, unless there is a subsidy available to encourage participation.

Risk pooling is an important concept in supply chain management. Risk pooling suggests that demand variability is reduced if one aggregates demand across locations because as demand is aggregated across different locations, it becomes more likely that high demand from one customer will be offset by low demand from another. This reduction in variability allows a decrease in safety stock and therefore reduces average inventory.

The three critical points to risk pooling are:

a. Centralized inventory saves safety stock and average inventory in the system.

b. When demands from markets are negatively correlated, the higher the coefficient of variation, the greater the benefit obtained from centralized systems i.e., the greater the benefit from risk pooling.

c. The benefits from risk pooling depend directly on the relative market behaviour. If we compare two markets and when demand from both markets is more or less than the average demand, we say that the demands from the market are positively correlated.

Thus the benefits derived from risk pooling decreases as the correlation between demands from the two markets becomes more positive.

The basis for the concept of risk pooling is to share or reduce risks that no single member could absorb on their own. Hence, risk pooling reduces a person or fim's exposure to financial loss by spreading the risk among many members or companies. Actuarial concepts used in risk pooling include:

i. Statistical variation.

ii. The law of averages.

iii. The law of large numbers.

iv. The laws of probability.

**Answer 26 (b):**

**Value at Risk**
Value at Risk (VaR) is one of the popular methods of measuring financial risks. There are different types of VaR—long-term VaR, marginal VaR, factor VaR etc . VaR is also defined as the threshold value such that the probability of a portfolio making a market to a market loss over a specific time horizon exceeds this value. For example, if a portfolio stock has a one day 3 per cent VaR of ₹10 million, there is 0.03 probability that the portfolio may face a reduction in value by more than ₹10 million over a specific time period. This is on assuming that normal market operations and there is no trading. A loss which exceeds VaR threshold is known as 'VaR break'. VaR has applications in financial risk management, risk measurement, control and reporting. It can also be used in calculating regulatory capital.

VaR essentially identifies the boundary between normal days and extreme occurrences. The probability level is specified as 1 minus probability of a VaR Break. Normally VaR parameters are 1 per cent and 5 per cent probabilities and 1 day and 2 week horizons. While VaR represents loss, a negative VaR would indicate that a portfolio has a high probability for making profits.

There are two types of VaR—one is applied primarily in risk management and the other in risk measurement. For a manager who is managing financial risk, VaR is essentially a system and not just a number as it runs periodically and is compared with the movement of computed prices in opening positions over the particular time horizon. An interesting application of VaR is the governance of endowments, trusts and pension plans. VaR utilized for this purpose is to monitor risk.

VaR has the advantage of a structured methodology for critically analyzing a risk that is available as part of management function. Daily publication of a number on time and with particular statistical data enables an organization to maintain a high objective standard. However, robust backup systems and assumptions regarding default need to be established. A quotation runs thus, 'risk taking institution that does not compute VaR might escape disaster but an institution that cannot compute VaR will not' according to Aaaron Brown.

Another advantage of VaR is that it differentiates risks into two regimes, that is, normal days and extreme occurrences. Inside the VaR limit, application of the conventional statistical methods is reliable. Out VaR limit risk should be analyzed with stress testing on the basis of data available on the long-term and in the broad market. Distribution losses beyond VaR point are both impossible and useless. As such the finance manager should concentrate on developing plans to limit the loss if possible or to survive the loss.

VaR as a risk measurement is usually reported with other risk measurements such as standard deviation, expected shortfall, partial derivatives of portfolio value, etc.

Application of VaR is to segregate extreme occurrences in a systematic way. They can be studied over the long-term in a qualitative manner on the basis of day-to-day movement of prices, both quantitatively and qualitatively. As VaR can at best be utilized to define risk as a market to market loss on a fixed portfolio over a fixed time horizon in normal markets, it is not useful in abnormal situations.

There has been criticism against VaR. It is said that this concept has led to excessive risk taking and leveraging by financial institutions. Again VaR is not sub-additive which means that VaR of a combined portfolio can be larger than the sum of the VaRs of its components.

**Q 27 (a) "To be effective, any Enterprise Risk Management (ERM) implementations should be integrated with strategy-setting". Do you agree? Give your views bringing out the basic elements of ERM and the reasons why ERM is implemented.**

**(b) Describe 'Asset Liability Model' and its utility for managing liquidity risk and exchange rate risk.**

**(c) Explain about the Project Risk Management.**

**Answer 27 (a):**

"To be effective, any Enterprise Risk Management (ERM) implementations should be integrated with strategy-setting". To my mind, this statement is true.

In today's challenging business environment, opportunities and risks are constantly changing, giving rise to the need for identifying, assessing, managing and monitoring the organization's business opportunities and risks.

This, in turn, necessitates establishing the linkage between the opportunities and risk while managing the business. This requirement is addressed by ERM, which redefines the value proposition of risk management by elevating its focus from the 'tactical' to the strategic."

ERM is about designing and implementing capabilities for managing the risks that matter. In the light of this, the statement is correct and therefore acceptable.

**Basic Elements of ERM:**
The following are the basic element of ERM:
(i) A process, ongoing and flowing through an entity.
(ii) Effected by people at every level of an organization.
(iii) Applied in strategy setting.
(iv) Applied across the enterprise, at every level and unit and includes taking an entry-level view of risk.
(v) Designed to identify potential events affecting the entity and manage risk within the risk appetite.
(vi) Able to provide reasonable assurance to an entity's management.
(vii) Geared to the achievement of objectives in one or more separate but overlapping categories. It is 'a means to an end, not an end in itself.

**Need for Implementation of ERM**
ERM needs to be implemented for the following reasons:
(i) Reduce unacceptable performance variability.
(ii) Align and integrate varying views of risk management.

(iii) Build confidence of investment community and stakeholders.

(iv) Enhance corporate governance.

(v) Successfully respond to a changing business environment.

(vi) Align strategy and corporate culture.

Traditional risk management approaches are focused on protecting the tangible assets reported on a company's Balance Sheet and the related contractual rights and obligations. The emphasis of ERM, however, is on enhancing business strategy. The scope and application of ERM is much broader than protecting physical and financial assets. With an ERM approach, the scope of risk management is enterprise-wide and the application of risk management is targeted to enhancing as well as protecting the unique combination of tangible and intangible assets comprising the organization's business model.

**Answer 27 (b):**

**Asset Liability Management Model**

Risks encountered in portfolio management need to be addressed more emphatically. In passive portfolio management, normally the mean variance and mean absolute deviation are employed to arrive at an optimal fixed mix strategy. However, this method does not recognize the high volatility in financial markets and as such the volatility risk is not addressed. However, active portfolio management is more aggressive, and involves reviewing the initial investment strategy every time rebalancing of the portfolio is required. Carino and Turner (1998) present the superiority of dynamic asset allocation framework using stochastic programming applications. Any financial planning strategy should be such that the mix of asset classes in a portfolio is able to grow and satisfy future goals with the best possible returns. This is the crux of asset liability management.

Asset liability management applications with the aid of stochastic programming conceptualize the problem of creating a portfolio by allocating a set of assets. The investor needs to decide the three factors, namely:

• Amount of assets to buy

• Amount of assets to sell

• Amount of assets to hold

The indices are defined and the problem parameters and decision variables are set out so that the stochastic programming model can develop a solution.

In this deterministic model, uncertainty is introduced to take care of risk. A refinement to the deterministic model is to apply a more sophisticated technique for estimation of asset prices that takes into consideration any unusual occurrence in the market as well as volatility. Sub-models based on randomness are introduced into the programming to take care of the risk as well. The randomness introduced is able to generate a set of scenarios which can be incorporated into the optimization model.

This model can be further improved using a two-stage stochastic program because an investor tries to use this model for making a contingent decision involving future risk. The first stage involves fixing a time period for stage two observation followed by finally taking a decision. The observation part of it can be likened to a 'wait and see' period of observation.

Asset liability management model can also be conceptualized as a method to compute the matching of assets and liabilities to generate a cautious investment portfolio. The purpose of this model is to optimize risk-adjusted returns to the shareholders over a long run. Two approaches for matching assets and liabilities are as follows:

**Duration:** This is defined as a measure of price sensitivity in relation to interest rates. It refers to the It refers to the weighted average maturity where the weights are applied in terms of present value. This can be represented by the following formula:

Modified duration =Duration / [1+ (Yield to maturity/Number of coupon payments per year)]

**Convexity:** This is defined as the change in duration corresponding to changes in yield as follows:

Convexity = $(P_+ + P_- - 2P_0) / 2P_0(\Delta i)^2$

$\Delta i$ = Change in Yield (in decimal)

$P_0$ = Initial Price

$P_+$ = Price if yields increase by $\Delta i$

$P_-$ = Price if yields decline by $\Delta i$

Combining convexity and duration is a good approach to examining the influence on change in yield on the market values of assets and liabilities.

**Liquidity Risk Management through Asset-Liability Management:**
It is difficult to measure liquidity risk as it entails expected likely inflow of deposits, loan dispersals, changes in competitive environment, etc. The most commonly used techniques for measurement of liquidity risks is the gap analysis.

The Assets and Liabilities are arranged according to their maturity pattern in time brackets. The gap is the difference between the maturing Assets to the maturing liabilities. A positive gap indicates that maturities of assets are higher than those liabilities. A negative gap indicates that some re-arrangement of funds will have to be done during that time-bracket. It can be from sale of assets or issue of new liabilities or rolling over existing liabilities.

**Exchange Rate Risk Management through Asset-Liability Management:**
At a particular exchange rate, assets and liabilities of financial institution match exactly. As exchange rate fluctuates, the balance gets disturbed. A simple solution to correct this risk is to match assets and liabilities of the same currency. Many financial institutions do not have foreign exchange exposure, as all their assets and liabilities are in rupee currency. The risk of foreign exchange borrowings of these institutions is passed on to the lenders through dollar denominator loans. The uncovered loans are hedged at the time of contacting them through forward covers for the entire amount.

**Answer 27 (c):**

**Project Risk Management:**
Projects are one time processes-unique in nature. Each project will be different and has different gestation periods. By its own nature, a project is based on many assumptions, to be realized at a future and is subjected to environmental changes and changes due to statutory policies. With a gestation period running into a few years, any change or revision in assumptions can transform itself into a big risk. Management of such risks is called as Project Risk Management, which can be difficult and would require special tools and models. Risks in Project Management are basically:

**(i) Market Related Risks** - mainly due to changes in demands.

**(ii) Completion Risks** - due to both administrative & technical risks during implementation.

**(iii) Institutional Risks -** due to unexpected changes in the conditions and norms laid down by the institutions that have funded the projects.

All the three risks can create certain consequences of events, compounded by unforeseen circumstances. This may lead to 'turbulence', when multiple issues arise, initiating moves and counter-moves and often ending in deadlock and the entire project may collapse.

**Q 28 (a)** **"Just as diseases are identified by certain symptoms, industrial sickness can be identified by the following symptoms. These symptoms act as leading indicators of sickness" – Do you agree with the statement.**

**(b) Describe the prevention of corporate failure.**

**Answer 28 (a):**

"Just as diseases are identified by certain symptoms, industrial sickness can be identified by the following symptoms. These symptoms act as leading indicators of sickness". The statement is true.

If immediate remedial actions are not taken, the sickness will grow to the extent that the organization will find its natural death.

There are the following leading indicators of sickness:
- Continuous reduction in turnover.
- Piling up of inventory,
- Continuous reduction of net profit to sales ratio.
- Short term borrowings M high interest rate,
- Continuous cash losses leading to erosion of tangible net worth,
- Default in payment of interest on borrowings and default in repayment of term loan installments.
- The 'sundry debtors' as well as the 'sundry creditors' keep growing and reaching a disproportionately high level.
- Approaching the banker for temporary overdraft at frequent intervals.
- High turnover of personnel, especially at senior levels,
- Change in accounting procedure with to view to window dressing.
- Delay in finalization of accounts

**Answer 28 (b):**

It is a fact that some companies perform well and that some underperform and some fails. In many, if not most cases, these companies are led by executives that are quite experienced. Below are some recommendations that can help to reduce the risk of failures of organizations:

**(i) Appointment of non-executive directors**

The non-executive directors will bring their special expertise and knowledge on strategies, innovative ideas and business planning of the organization. They will monitor the work of the executive management and will help to resolve situations where conflict of interest arises. Overall, the non-executive directors will act as a Cross Check.

**(ii) Audit committees**
Very often, there is occurrence of fraud in management and financial reporting. The presence of the audit committees will help to resolve this problem. Audit committees have the potential to reduce the occurrence of fraud by creating an environment where there is both discipline and control.

**(iii) Development of environment learning mechanism**

Some organizations fail because they lose touch with their environment. Therefore, to counter this problem, there is a need to develop the environmental learning mechanism. Through it, new information can be brought on continuous basis. This is mainly done by carrying customer-feedback surveys. In this way, the organization can realign itself with the new needs and challenges.

**(iv) Focus on research and development**

Organizations can generate new knowledge by investing and focusing more on research and development. Thus, there will be more ideas how to make the products much better than that of their competitors.

It can be deducted that a director has a big responsibility that he has to assume there commendations mentioned above can help directors to reduce corporate failure, provided that the directors abide. Proper planning also is critical to the success of a business.

**Q 29 (a) Explain the L. C. Gupta Model under the Predictions of Corporate Failure.**

**(b) Describe the Neural Network (NN) under the Corporate Bankruptcy Prediction Models.**

**Answer 29 (a):**

**Dr. L.C. Gupta's Sickness Prediction Model**

Dr. L.C. Gupta made an attempt to distinguish between sick and non-sick companies on the basis of financial ratios. He used a simple non-parametric test for measuring the relative predicting power of different financial ratios. A mixed sample of sick and non-sick companies was made and the companies in the sample were arranged in a single ordered sequence from the smallest to the largest, according to the financial ratio that is tested for its predictive power. Let [profit after tax ÷ Net worth] is a financial ratio that is to be tested for its predictive power. The companies in the sample are arranged in increasing order of this particular ratio. Let the sick companies be denoted by the letter 'S' and the non-sick ones by the letter 'N'. Let us assume that 8 sick companies and 8 non-sick companies are taken for building up the sample. When arranged in a sequential order as stated above, the sequence may result in any pattern as shown below:

(A) S -N-S-N-S-S-N-S-N-N-S-N-S-N-S-N

(B) S -S-S-S-S-S-S-S-N-N-N-N-N-N-N-N

(C) S -S-S-S-N-N-N-N-N-N-N-N-S-S-S-S

(D) S -S-S-N-S-S-N-N-S-S-N-N-S-N-N-N

Observing the pattern of occurrence of 'S' and 'N' a cutoff point is chosen to separate the sick group from the non-sick group. Companies that fall to the left of the cutoff point lie in the sick group while companies that fall to the right of the cutoff point lie in the non-sick group. The cutoff point is so chosen that the number of misclassifications is minimized. The ratio that showed the least percentage classification error at the earliest possible time is deemed to have the highest predicative power. Referring to the four patterns shown above, the pattern of sequence shown in (B) is the most accurate one since the cutoff point will be located exactly midway in the sample group and the percentage of classification error will be zero since there are no misclassifications. Pattern shown in (C) is bound to have a higher error since the sick companies are concentrated on both the extreme ends.

Dr. L.C. Gupta used Indian data on a sample of 41 textile companies of which 20 were sick companies and 21 were non-sick companies. He studied the predictive power of 63 financial ratios and observed that the following two ratios have comparatively better predictive power.

(i) (Earnings before Interest and Taxes) ÷ Sales

and

(ii) (Operating cash flow) ÷ Sales

**[Note: Operating cash flow = profit after tax + depreciation]**

**Answer 29 (b):**

**Neural Networks (NN)**

Although capable of outperforming human brain in basic arithmetic calculations, computers are certainly inferior when it comes to tasks involving symbolic recognition like signs of bankruptcy in a firm. Neural networks are enthused by biological works related to brain and

its nervous system to triumph over this lack of computational efficiency in computers. Neural networks perform the classification task, in response to impending signals of financial health of a firm, in the way a brain would do for example in deciding whether the food is salty or sweet by its taste signal.

Human brain is made up of certain types of neurons (nerve cells), which is the base of neuroscience. Neurons, in neural networks, are called 'processing elements' or 'nodes. Like real neurons, these nodes are connected to each other through 'weighted interconnections' (synapses in neuroscience terms). Nodes are organized in layers. Each node takes delivery of, joins, and converts input signals into a single output signal via weighted interconnections. This output signal is accepted as the classifying decision if it satisfies the researcher; otherwise it is transmitted again as an input signal to many other nodes (possibly including itself). Process keeps going until satisfaction is gained from researchers' point of view.

Perhaps the major task of any neural network is to determine appropriate weights to interconnections of different nodes. Neural networks perform this task by a training process in which knowledge about the relationship between input and output signals is learned following certain principle. This knowledge produces a distinct structure of nodes (in one of the network layers called 'hidden layer') and connection weights, which correctly classifies the objects into their respective known groups.

Technically, this process of mapping is termed as 'convergence'. Following a mathematical theorem, the network is always able to converge.

While predicting corporate bankruptcy, NN would take information on explanatory variables at input nodes via input layer. The hidden layer nodes, connected to input nodes through weighted interconnections, collect and process this information to suggest a probability of a firm getting failed or succeeded.

**Q 30. Read the following Case study and answer the following questions:**

**Immense damage was done to Shell after it confessed to a 23 per cent overstatement of its proven oil and gas reserves. This led to record fines, director resignations and a radical restructuring involving a reduction of Shell's independence.**

**Shell is a long-established FTSE 100 company. It is one of the largest international energy companies, operating in at least 90 countries.**

**At the time of the event it formed part of the Anglo-Dutch giant, Royal Dutch Shell Group.**

**Royal Dutch Petroleum owned a 60 per cent interest in the group and Shell Transport and Trading UK had a 40 per cent interest. The group had an unwieldy dual board structure and was listed on the New York, London and Amsterdam stock exchanges.**

**A major part of the value creation of an oil company is the location of new oil and gas reserves to replace those it extracts. These reserves, still in the ground, represent many billions of dollars, but investors cannot easily verify the amounts of oil and gas they contain.**

**This uncertainty prompted the SEC to implement rules for the calculation and reporting of "proven" and "unproven" reserves.**

**Proven reserves are those where there is a high certainty as to the quantity of oil and gas in the ground, and how much can be extracted. Unproven reserves are those where there is less certainty over volume or how much can be extracted. The latter have significantly less value for investors.**

**For a number of years prior to 2004, Shell used a different basis to calculate reserves than that of the SEC. After the implementation of the rules, the SEC and the Financial Services Authority (FSA), the UK regulator, examined stated reserves more closely.**

**They became uneasy about Shell and in 2001 gave the company indications that they felt the figures were incorrect, followed by stronger warnings in 2002 and 2003. Shell's senior management appeared to have rejected these concerns.**

**On 9th January 2004, Shell announced that its "proven" reserves were 20 per cent less than it had reported; ft revised the figure three more times (on 18 March, 9 April and 24 May) before admitting it had overstated its reserves by around 23 per cent. This amounted to tens of**

billions of dollars (depending on the future price of oil). It had to make a further restatement on 3rd February 2005.

Shell also twice restated its financial results for 2001 and 2002, and once for 2003. Shell's audit committee commissioned an independent review by US law firm Davis, Polk & Wardwell. In April 2004 the review severely censored the chairman who had previously been Shell's head of exploration and responsible for the reserve figures and his successor as head of exploration.

They were obliged to step down, and were followed by the finance director. Particularly damaging was the disclosure of a series of internal emails, including one dated 9 November 2003 in which the head of exploration said he was "sick and tired of lying about the extent of our reserves issues".

The January 2004 revision caused Shell's share price to fall by more than nine per cent. It trailed the FTSE Oil & Gas Producers sector thereafter - as shown in the chart. In July 2004, the SEC fined Shell a record $120m after an inquiry found that the company had violated record-keeping and anti-trust rules in relation to the reporting of proven reserves. The company also had to pay an FSA fine of £17m in relation to the same matter.

Three senior directors resigned. Over the next two years, the chairman fought to clear his name. The FSA (2005) and the SEC (2006) decided not to take action against him. He had maintained from the beginning that he had acted in good faith.

It should be noted that under new SEC rules on oil and gas reporting, Shell reported a significant increase in proven oil and gas reserves for 2009 that may go some way towards supporting the previous chairman's views.

The replacement chairman, Jeroen van der Veer, was brought in to restore the company's credibility. He scrapped bonus schemes linked to oil reserves as he believed they provided an incentive to exaggerate such reserves.

Indeed, The Wall Street Journal reported that internal auditors had mentioned this, together with "systemic problems with the company's reserves reporting procedures", to the external auditors as early as 2002.

In November 2004, the group said it would change its unwieldy dual board structure to a single capital structure, with one board of directors. It achieved this by creating a new parent company, Royal Dutch Shell.

A lawsuit based on the over-reserving resulted in a payment of $352.6m to non-US shareholders in 2007. As part of the settlement, Shell agreed to request that the SEC distribute to shareholders the $120m Shell paid to the SEC in 2004.

A class action for US shareholders was settled for $82.85m in 2008. Van der Veer changed the corporate culture. By 2010, trust was restored to the extent that the company, now known as Royal Dutch Shell, was voted third in Management Today's peer group survey of Britain's Most Admired Companies.

**Required:**

**(a) Mention the symptoms of Corporate Failure.**

**(b) Mention the causes of Corporate Failure and give their examples.**

**(c) Explain the meaning of "Proven Reserve" and "Unproven Reserve" in the context of the above case study.**

**(d) How should a company tackle the corporate failure in the context of the above case study?**

**Answer 30 (a):**

There are three classic symptoms of corporate failure. These are namely:

1. Low profitability
2. High gearing
3. Low liquidity

Each of these three symptoms may be indicated by trends in the company's accounts. Symptoms are interrelated. The classic path to corporate failure starts with the company experiencing low profitability. This may be indicated by trends in the ratios for:

• Profit margin

- Return on Capital Expenditure
- Return on Net Assets

**Answer 30 (b):**
**Causes of Corporate Failure:**
**1. Technological Causes**

Traditional methods of doing work have been turned upside down by the development of new technology. If within an industry, there is failure to exploit information technology and new production technology, the firms can face serious problems and ultimately fail.

By using new technology, cost of production can be reduced and if an organization continues to use the old technology and its competitors start using the new technology; this can be detrimental to that organization. Due to high cost of production, it will have to sell its products at higher prices than its competitors and this will consequently reduced its sales and the organization can serious problems.

This situation was seen in the case of Mittal Steel Company taking over Arcelor Steel Company. Arcelor Steel Company was using its old technology to make steel while Mittal Steel Company was using the new technology and as a result, Mittal Steel Company was able to sell steel at lower price than Arcelor Steel Company due to its low cost of production. Arcelor Steel Company was approaching corporate failure and luckily, Mittal Steel Company merged with Arcelor Steel Company and became Arcelor Mittal Steel Company, thus preventing Arcelor from failure.

**2. Working Capital Problems**

Organizations also face liquidity problems when they are in financial distress. Poor liquidity becomes apparent through the changes in the working capital of the organization as they have insufficient funds to manage their daily expenses.

Businesses, which rely only on one large customer or a few major customers, can face severe problems and this can be detrimental to the businesses. Losing such a customer can cause big problems and have negative impact on the cash flows of the businesses.

Besides, if such a customer becomes bankrupt, the situation can even become worst, as the firms will not be able to recover these debts.

**3. Economic Distress**

A turndown in an economy can lead to corporate failures across a number of businesses. The level of activity will be reduced, thus affecting negatively the performance of firms in several industries. This cannot be avoided by businesses.

The recent economic crisis in the USA led to many cases of corporate failures. One of them is the insurance AIG insurance company. It is facing serious problems and it might close its door in the near future.

**4. Mismanagement**

Inadequate internal management control or lack of managerial skills and experience is the cause of the majority of company failures. Some managers may lack strategic capability that is to recognize strengths, weaknesses, opportunities and threats of a given business environment. These managers tend to take poor decisions, which may have bad consequences afterwards.

Furthermore, managers of different department may not have the ability to work closely together. There are dispersed department objectives, each department will work for their own benefits not towards the goal of the company. This will bring failure in the company. One example can be WorldCom, where the finance and legal functions were scattered over several states and communication between these departments were poor.

**5. Over-expansion and Diversification**

Research has shown that dominant CEO is driven by the ultimate need to succeed for their own personal benefits. They neglect the objective set for the company and work for

their self-interest. They want to achieve rapid growth of the company to increase their status and pay level. They may do so by acquisition and expansion.

The situation of over expansion may arise to the point that little focus is given to the core business and this can be harmful as the business may become fragment and unfocused. In addition, the companies may not understand the new business field. Enron and WorldCom can be an example for this situation where the managers did not understand how growing overcapacity would influence its investment and therefore did not comprehend the risks associated with it.

### 6. Fraud by Management

Management fraud is another factor responsible for corporate collapse. Ambitious managers may be influenced by personal greed. They manipulate financial statements and accounting reports. Managers are only interested in their pay checks and would make large increase in executive pay despite the fact that the company is facing poor financial situation. Dishonest managers will attempt to tamper and falsify business records in order to fool shareholders about the true financial situation of the company. These fraudulent acts or misconduct could indicate a serious lack of control. These frauds can lead to serious consequences: loss of revenue, damage to credibility of the company, increased in operating expenses and decrease in operational efficiency.

### 7. Poorly Structured board

Board of Directors is handpicked by CEO to be docile and they are encouraged by executive pay and generous benefits. These directors often lack the necessary competence and may not control business matters properly. These directors are often intimated by dominant CEO and do not have any say in decision making. Example Enron and WorldCom where poorly structured board was a contributor towards their failure.

### 8. Financial Distress

Firms that become financially distressed are found to be under- performing relative to the other companies in their industry. Corporate failure is a process rooted in the management defects, resulting in poor decisions, leading to financial deterioration and finally corporate collapse. Financial distresses include the following reasons also low and declining profitability, investment Appraisal, Research and Development and technical insolvency amongst others.

**Answer 30 (c):**
A major part of the value creation of an oil company is the location of new oil and gas reserves to replace those it extracts. These reserves, still in the ground, represent many billions of dollars, but investors cannot easily verify the amounts of oil and gas they contain.
This uncertainty prompted the SEC to implement rules for the calculation and reporting of "Proven" and "Unproven" reserves.

"Proven Reserves" are those where there is a high certainty as to the quantity of oil and gas in the ground, and how much can be extracted. "Unproven Reserves" are those where there is less certainty over volume or how much can be extracted. The latter have significantly less value for investors.

**Answer 30 (d):**
• Admit mistakes quickly and gracefully.
• Don't appear to reward failure.
• Incentives must inspire the desired behaviour.
• Ethical best practice can't be adopted selectively.
• Organizations need a fully effective and functioning conscience.
• Directors need to be vigilant at all times.
• Financial irregularities can have an exceptionally high impact.
• Fresh faces may occasionally be needed at the top of the organization
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