PAPER 15 – BUSINESS STRATEGY AND STRATEGIC COST MANAGEMENT

The following table lists the learning objectives and the verbs that appear in the syllabus learning aims and examination questions:

	Learning objectives	Verbs used	Definition
LEVEL C	KNOWLEDGE What you are expected to know	List	Make a list of
		State	Express, fully or clearly, the details/facts
		Define	Give the exact meaning of
	COMPREHENSION What you are expected to understand	Describe	Communicate the key features of
		Distinguish	Highlight the differences between
		Explain	Make clear or intelligible/ state the meaning or purpose of
		Identity	Recognize, establish or select after consideration
		Illustrate	Use an example to describe or explain something
	APPLICATION How you are expected to apply your knowledge	Apply	Put to practical use
		Calculate	Ascertain or reckon mathematically
		Demonstrate	Prove with certainty or exhibit by practical means
		Prepare	Make or get ready for use
		Reconcile	Make or prove consistent/ compatible
		Solve	Find an answer to
		Tabulate	Arrange in a table
	ANALYSIS How you are expected to analyse the detail of what you have learned	Analyse	Examine in detail the structure of
		Categorise	Place into a defined class or division
		Compare and contrast	Show the similarities and/or differences between
		Construct	Build up or compile
		Prioritise	Place in order of priority or sequence for action
		Produce	Create or bring into existence
	SYNTHESIS How you are expected to utilize the information gathered to reach an optimum conclusion by a process of reasoning	Discuss	Examine in detail by argument
		Interpret	Translate into intelligible or familiar terms
		Decide	To solve or conclude
	EVALUATION How you are expected to use your learning to evaluate, make decisions or recommendations	Advise	Counsel, inform or notify
		Evaluate	Appraise or asses the value of
		Recommend	Propose a course of action

Paper 15 - Business Strategy and Strategic Cost Management

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

This paper contains 4 questions, representing two separate sections as prescribed under syllabus 2012. All questions are compulsory, subject to the specific guidance/ instructions stated against each question. All workings, wherever necessary, must form a part of your answer. Assumptions, if any, should be clearly stated.

Question No. 1. (Read the Case and Answer the following Questions)

1. **Chawama Enterprises was established twenty-five years ago. The organization was formed to provide mining tools to the mines of M/s. Coal India Ltd. The organization has faced mixed fortunes in its business over the period of its existence. This is directly attributable to external forces faced over its life cycle both at macro and competitive environment levels. There are times when macro environment has been favourable and times when factors relating to political and economical environment had almost threatened the survival of the organization. During the world credit crunch, fall in copper prices and ever increasing importation prices of tools due to weaker Kwacha has once again created acute challenges for the organization. In wake of the above background:**
   (a) Evaluate how environmental analysis can help Chawama Enterprises deal with the business environment.
   (b) Explain how Chawama Enterprises can use the Five Forces Model to evaluate how competitive the firm is. [10+10]

Answer:

(a) An environmental analysis in strategic management plays a crucial role in businesses by pinpointing current and potential opportunities or threats outside the company in its external environment. The external environment includes political, environmental, technological and sociological events or trends that can affect the business directly or indirectly. An environmental analysis is generally conducted as part of an analysis of strengths, weaknesses, opportunities, and threats (SWOT) when a strategic plan is being developed. Managers practicing strategic management must conduct an environmental analysis quarterly, semi -annually, or annualty, depending on the nature of the business's industry. Being able to identify events or conditions in the external environments helps businesses achieve a competitive advantage and decrease its risk of not being prepared when faced with oncoming threats.

The purpose of an environmental analysis is to help in strategy development by keeping decision-makers within an organization informed on the external environment. This may include changing of political parties, increasing regulations to reduce pollution, technological developments, and shifting demographics. If a new technology is developed and is being used in a different industry, a strategic manager would see how this technology could also be used to improve processes within his business. An analysis allows businesses to gain an overview of their environment to find opportunities or threats.

Chawama must actively and consistently conduct environmental analysis by analyzing the political, legal, economical, social, environmental and technological environments. This analysis will be invaluable as follows:

- Chawama will be become knowledgeable about the macro environmental forces that are affecting the organization.

- Chawama will be able to establish a trend analysis of these forces in terms of how the forces have affected the firm over its life cycle. Are we faced with opportunities or threats, is the question to answer?
- Chawama will know at any given point which force has high, medium or low impact. Currently most firms must deal with the economic environment. During 1991, the firm had to deal with the political environment.
- Chawama can then construct scenarios representing possible future occurrences. This is applicable in times of acute uncertainty.
- Chawama will then develop strategies of dealing with each scenario should it occur in future.
- The above will result in Chawama overcoming the negative implications of not taking the environment seriously.
- Eventually environment analysis ensures long term survival as the organization is able to gain strategic foresight. Strategic management must address the environment in knowing what opportunities and threats are being posed by the environment

(b) The five forces model helps organizations to analyze and evaluate their competitive position by looking at the impact of these forces. These forces include:

Threat of rivalry amongst current competitors- Chawama will have to look at the number of competing firms, are these firms supplying a homogenous product, are firms competing on price or quality and what are the exit barriers. For example, too many competitors increase competition. High exit barriers can also increase competition, while differentiation can reduce competition.

Threat of new entrants - the extent to which new entrants can establish similar business will result in Chawama finding its position undermined. Factors relating to entry barriers will have to be analyzed. Ease with which new entrants can get business from mines, ease of raising capital and ease of having access to sources of these tools can make it easy for new firms to set up the business in which Chawama is.

Threat of substitute products- this relates to whether mines can find alternative tools or methods of extracting minerals. In times where Chawama tools are getting expensive, the mines may be forced to get innovative or look at alternative tools

Threat of bargaining power of suppliers- Chawama will have to ask themselves the extent to which the firm can force suppliers to reduce prices. This will depend on the quantities bought,t he number of customers buying from the same supplier and the extent to which Chawama can easily switch to other sources of tools.

Threat of bargaining power of customers- this relates to mines. Can they drive the prices down? Under current economic problems, mines are finding strength in the crisis by citing

economic vows as reducing their ability to pay and in the process forcing suppliers to reduce prices or be threatened with loss of business. The extent to which Chawama can deal with these forces will affect the level of profits, value and long term survival of the firm.

Question No. 2. (Answer **any two** questions. Each question carries **15 marks**)

2. (a)

(i) Discuss the Simultaneous and Sequential games

(ii) List any eight advantages and any four disadvantages of the Global Strategic Alliance.

(iii) Difference between Policy and Strategy. [5+6+4]

Answer:

(i) A game can either be one in which moves (or choices) take place sequentially (as in chess) or one in which choices are made simultaneously, as in the children's game rock-paper-scissors. As we shall see, the distinction between simultaneous and sequential games is not so much about the timing of the moves (whether moves are made at the same time or at different times) but rather about the information available to players when a move is made. In a sequential game, a player knows which particular choice her opponent has made from all those available to her, whereas simultaneous games involve players making choices prior to information becoming available about the choice made by the other.

Business games are rarely, if ever, ones in which decisions are made exactly at the same point in time by all relevant firms. However, because it is often the case that companies must select from options before knowing what options rivals have selected, many business choices are best analyzed as taking place within the framework of simultaneous games. In other words, we think of matters as if all players must select a strategy at the same time.

Most actual games probably combine elements of both simultaneous and sequential move games.

There are several other concepts that will be necessary for an understanding of game theory, but we shall introduce these as we go along.

(ii) Advantages of the Global Strategic Alliance

There are many specific advantages of a global strategic alliance. You can:

- Get instant market access, or at least speed your entry into a new market.
- Exploit new opportunities to strengthen your position in a market where you already have a foothold.
- Increase sales.
- Gain new skills and technology.
- Develop new products at a profit.
- Share fixed costs and resources.
- Enlarge your distribution channels.
- Broaden your business and political contact base.
- Gain greater knowledge of international customs and culture.
- Enhance your image in the world marketplace.

[Answer any 8 points]

Disadvantages of the Global Strategic Alliance

There are also some inevitable trade-offs to consider:

- Weaker management involvement or less equity stake.
- Fear of market insulation due to local partner's presence.
- Less efficient communication.
- Poor resource allocation.
- Difficult to keep objectives on target over time.
- Loss of control over such important issues as product quality, operating costs, employees, etc.

[Answer any 4 points]

(iii) Difference between strategy and policy

Policy	Strategy
Policy is a statement of an organization's intention to act in certain ways in specific situation. It represents a general decision establishing a normal pattern of conduct.	Strategy is the determination of the basic long-term goals and objectives of an enterprise and the adoption of the courses of action and the allocation of resources necessary for carrying out these goals.
It is a guideline to the thinking of final decision.	It concerns with the direction in which resources are applied.
It is contingent decision.	It is a rule for taking decision.
Since the policy is prescribed for the people so it can be delegated downward in the organization.	Since strategy requires last minute executive decisions so it cannot be delegated downward

2.(b)

(i) State the industry characteristics which influence the intensity of rivalry among the firms.

(ii) Explain the objectives of SWOT Analysis and its Advantages. [10+5]

Answer:

(i) The intensity of rivalry is influenced by the following industry characteristics:

- A larger number of firms increase rivalry because more firms must compete for the same customers and resources. The rivalry intensifies if the firms have similar market share, leading to a struggle for market leadership.
- Slow market growth causes firms to fight for market share. In a growing market, firms are able to improve revenues simply because of the expanding market.
- High fixed costs result in an economy of scale effect that increases rivalry. When total costs are mostly fixed costs, the firm must produce near capacity to attain the lowest unit costs.
- High storage costs or highly perishable products cause a producer to sell goods as soon as possible. If other producers are attempting to unload at the same time, competition for customers intensifies.
- Low switching costs increases rivalry. When a customer can freely switch from one product to another there is a greater struggle to capture customers.
- Low level of product differentiation is associated with higher levels of rivalry. Brand identification, on the other hand, tends to constrain rivalry.
- Strategic stakes are high when a firm is losing market position or has potential for great gains. This intensifies rivalry.

- High exit barriers place a high cost on abandoning the product. The firm must compete. High exit barriers cause a firm to remain in an industry, even when the venture is not profitable.
- A diversity of rivals with different cultures, histories, and philosophies make an industry unstable. There is greater possibility for mavericks and for misjudging rival's moves. Rivalry is volatile and can be intense.
- Industry Shakeout: A growing market and the potential for high profits induce new firms to enter a market and incumbent firms to increase production. A point is reached where the industry becomes crowded with competitors, and demand cannot support the new entrants and the resulting increased supply. The industry may become crowded if its growth rate slows and the market becomes saturated, creating a situation of excess capacity with too many goods chasing too few buyers. A shakeout ensues, with intense competition, price wars, and company failures

(ii) The objectives of SWOT Analysis are:

- To identify the shortcomings in the company's present skills and resources.
- To exploit the strengths of the company to achieve its objectives.
- To focus on profit-making opportunities in the business environment and for identifying threats.
- To highlight areas within the company, which are strong and which might be exploited more fully and weaknesses, where some defensive planning might be required to prevent the company from downfall

Advantages:

- It provides a logical framework to be used for systematic discussion of various issues bearing on the business situation, alternative strategies and finally the choice of strategy.
- Another application of SWOT analysis is the structured approach whereby key external threats and opportunities may be systematically compared with internal strengths and weakness.
- A business may have several opportunities but also face some serious threats in the environment. It may have likewise several weaknesses along with one or two major strength. In such situations, the SWOT analysis guides the strategist to visualize the overall position of the firm, and helps to identify the major purpose of the grand strategy being considered.

2.(c)

(i) The process of Strategy formulation basically involves six main steps." –Explain these six steps. [6]

(ii) State loss leaders. Mention its four specific uses. [1+4]

(iii) List out the four levels of the residual uncertainty facing most strategic-decision makers. [4]

Answer:

(i) The process of strategy formulation basically involves six main steps. Though these steps do not follow a rigid chronological order, however they are very rational and can be easily followed in this order.

- **Setting Organization's objectives** -The key component of any strategy statement is to set the long-term objectives of the organization. It is known that strategy is generally a

medium for realization of organizational objectives. Objectives stress the state of being there whereas Strategy stresses upon the process of reaching there. Strategy includes both the fixation of objectives as well the medium to be used to realize those objectives. Thus, strategy is a wider term which believes in the manner of deployment of resources so as to achieve the objectives. While fixing the organizational objectives, it is essential that the factors which influence the selection of objectives must be analyzed before the selection of objectives. Once the objectives and the factors influencing strategic decisions have been determined, it is easy to take strategic decisions.

- **Evaluating the Organizational Environment** -The next step is to evaluate the general economic and industrial environment in which the organization operates. This includes a review of the organizations competitive position. It is essential to conduct a qualitative and quantitative review of an organizations existing product line. The purpose of such a review is to make sure that the factors important for competitive success in the market can be discovered so that the management can identify their own strengths and weaknesses as well as their competitors' strengths and weaknesses. After identifying its strengths and weaknesses, an organization must keep a track of competitors' moves and actions so as to discover probable opportunities of threats to its market or supply sources.
- **Setting Quantitative Targets** -In this step, an organization must practically fix the quantitative target values for some of the organizational objectives. The idea behind this is to compare with long term customers, so as to evaluate the contribution that might be made by various product zones or operating departments.
- **Aiming in context with the divisional plans** -In this step, the contributions made by each department or division or product category within the organization is identified and accordingly strategic planning is done for each sub-unit. This requires a careful analysis of macroeconomic trends.
- **Performance Analysis** -Performance analysis includes discovering and analyzing the gap between the planned or desired performance. A critical evaluation of the organizations past performance, present condition and the desired future conditions must be done by the organization. This critical evaluation identifies the degree of gap that persists between the actual reality and the long-term aspirations of the organization. An attempt is made by the organization to estimate its probable future condition if the current trends persist.
- **Choice of Strategy** -This is the ultimate step in Strategy Formulation. The best course of action is actually chosen after considering organizational goals, organizational strengths, potential and limitations as well as the external opportunities.

(ii) Loss leaders are product priced below cost price in order to attract consumers into a shop or online store to buy some of the more profitable products being sold.

The following are some uses:

- To prevent or restrict competition.
- Existing customers become loyal.
- To enhance bulk sales and achieve advantages of volume.
- To realize as much value as possible in case of perishable products

(iii) Four levels of the residual uncertainty:

- Level one: A clear enough future -The residual uncertainty is irrelevant to making strategic decisions at level one, so managers can develop a single forecast that is a

sufficiently precise basis for their strategies. To help generate this useful precise prediction of the future, managers can use the standard strategy toolkit: market research, analyses of competitors" costs and capacity, value chain analysis, Poter's five-force framework, and so on. A DCF model that incorporates those predictions can then be used to determine the value of alternative strategies.

- Level two: Alternative futures -The future can be described as one of a few discrete scenarios at level two. Analysis cannot identify which outcome will actually come to pass, though it may help establish probabilities. Most important. some, if not all, elements of the strategy would change if the outcome were predictable.
- Level three: A range of future -Arange of potential futures can be identified at level three. A limited number of key variables define that range, but the actual outcome may lie anywhere within it. There are no natural discrete scenarios
- Level four:True ambiguity –A number of dimensions of uncertainty interact to create an environment that is virtually impossible to predict at level four. In contrast to level three situations, it is impossible to identify a range of potential outcomes, let alone scenarios within a range. It might not even be possible to identify, much less predict, at all the relevant variables that will define the future. Level four situations are quite rare, and they tend to migrate toward one of the others over time. Situational analysis at level four is highly qualitative

Question No. 3. (Read the Case and Answer the following Questions)

3. Hero Cycles has two divisions, A and B, which manufacture expensive bicycles. Division A produces the bicycle frame, and Division B assembles the rest of the bicycle onto the frame. There is a market for both the subassembly and the final product. Each division has been designated as a profit center. The transfer price for the subassembly has been set at the long-run average market price.

The following data are available for each division:

	₹
Selling price for final product	**3,000**
Long-run average selling price for intermediate product	**2,000**
Incremental costs for completion in Division B	**1,500**
Incremental costs in Division A	**1,200**

The manager of Division B has made the following calculation:

	₹	₹
Selling price for final product		**3,000**
Transferred-in costs (market)"	**2,000**	
Incremental costs for completion	**1,500**	**3,500**
Contribution (loss) on product		**(500)**

Required:

(I) Should transfers be made to Division B if there is no unused capacity in Division A? Is the market price the correct transfer price? Show your computations.

(II) Assume that Division A's maximum capacity for this product is 1,000 units per month, and sales to the intermediate market are now 800 units. Should 200 units be transferred to Division B? At what transfer price? Assume that for a variety of reasons, Division A will maintain the ₹ 2,000 selling price indefinitely. That is, Division A is not considering lowering the price to outsiders even if idle capacity exists.

(III) Suppose Division A quoted a transfer price of ₹ 1,500 for up to 200 units. What would be the contribution to the company as a whole if a transfer were made? As manager of Division B, would you be inclined to buy at ₹1,500? Explain. [8+5+7]

Answer:

(I) No, transfers should not be made to Division B if there is no excess capacity in Division A. An incremental (outlay) cost approach shows a positive contribution for the company as a whole.

	₹	₹
Selling price for final product		3,000
Incremental costs in Division A	1,200	
Incremental costs in Division B	1,500	2,700
		300

However, if there is no excess capacity in Division A, any transfer will result in diverting products from the market for the intermediate product. Sales in this market results in a greater contribution for the company as a whole. Division B should not assemble the bicycle since the incremental revenue Hero Cycles can earn, ₹1,000 per unit (₹3,000 from selling the final product – ₹2,000 from selling the intermediate product) is less than the incremental costs of ₹1,500 to assemble the bicycle in Division B. Alternatively put, Hero Cycles's contribution margin from selling the intermediate product exceeds Hero Cycles's contribution margin from selling the final product.

	₹
Selling price of intermediate product	2,000
Incremental (outlay) costs in Division A	1,200
Contribution	800

Minimum transfer price

$$= \begin{pmatrix} \text{Additional incremental costs per unit} \\ \text{incurred up to the point of transfer} \end{pmatrix} + \begin{pmatrix} \text{Opportunity costs per unit to the} \\ \text{supplying division} \end{pmatrix}$$

= ₹1,200 + (₹2,000 – ₹1,200)

= ₹2,000, which is the market price

The market price is the transfer price that leads to the correct decision, that is, do not transfer to Division B unless there are extenuating circumstances for continuing to market the final product. Therefore, B must either drop the product or reduce the incremental costs of assembly from ₹1,500 per bicycle to less than ₹1,000.

(II) If (a) A has excess capacity, (b) there is intermediate external demand for only 800 units at ₹2,000, and (c) the ₹2,000 price is to be maintained, then the opportunity costs per unit to the supplying division are ₹0. The general guideline indicates a minimum transfer price of: ₹1,200 + ₹ 0 = ₹1,200, which is the incremental or outlay costs for the first 200 units. B would buy 200 units from A at a transfer price of ₹1,200 because B can earn a contribution of ₹300 per unit [₹3,000 - (₹1,200 + ₹1,500)]. In fact, B would be willing to buy units from A at any price up to ₹1,500 per unit because any transfers at a price of up to ₹1,500 will still yield B a positive contribution margin.

Note, however, that if B wants more than 200 units, the minimum transfer price will be ₹2,000 as computed in requirement 1 because A will incur an opportunity cost in the form of lost contribution of ₹800 (market price, ₹2,000 - outlay costs of ₹ 1,200) for every unit above 200 units that are transferred to B.

The following schedule summarizes the transfer prices for units transferred from A to B:

Units	Transfer Price
0 - 200	₹1,200 - ₹1,500
200 -1,000	₹2,000

(III) Division B would show zero contribution, but the company as a whole would generate a contribution of ₹300 per unit on the 200 units transferred. Any price between ₹1,200 and ₹1,500 would induce the transfer that would be desirable for the company as a whole. A motivational problem may arise regarding how to split the ₹300 contribution between Division A and B. Unless the price is below ₹1,500, B would have little incentive to buy.

Note. The transfer price that may appear optimal in an economic analysis may, in fact, be totally unacceptable from the viewpoints of (1) preserving autonomy of the managers, and (2) evaluating the performance of the divisions as economic units. For instance, consider the simplest case discussed previously, where there is idle capacity and the ₹2,000 intermediate price is to be maintained. To direct that A should sell to B at A's variable cost of ₹1,200 maybe desirable from the viewpoint of B and the company as a whole. However, the autonomy (independence) of the manager of A is eroded. Division A will earn nothing, although it could argue that it is contributing to the earning of income on the final product.

If the manager of A wants a portion of the total company contribution of ₹300 per unit, the question is: How is an appropriate amount determined? This is a difficult question in practice. The price can be negotiated upward to somewhere between ₹1,200 and ₹1,500 so that some "equitable" split is achieved. A dual transfer-pricing scheme has also been suggested, whereby the supplier gets credit for the full intermediate market price and the buyer is charged with only variable or incremental costs. In any event, when there is heavy interdependence between divisions, such as in this case, some system of subsidies may be needed to deal with the three problems of goal congruence, management effort, and subunit autonomy. Of course, where heavy subsidies are needed, a question can be raised as to whether the existing degree of decentralization is optimal.

Question No. 4. (Answer **any two** questions. Each question carries **15 marks**)

4.(a)

(i) State the differences in Programme Evaluation and Review Technique (PERT) and Critical Path Method (CPM) [5]

Answer:

Although these techniques i.e. PERT and CPM use the same principles and are based on network analysis yet they differ from each other in the following respect:

- Programme Evaluation and Review Technique (PERT) is appropriate where time estimates are uncertain in the duration of activities as measured by optimistic time, most likely time, and pessimistic time, whereas Critical Path Method (CPM) is good when time estimates are found with certainty. CPM assumes that the duration of every activity is constant and therefore every activity is critical or not.
- PERT is concerned with events which are the begging or ending points of operation while CPM is concerned with activities.
- PERT is suitable for non-repetitive projects while CPM is designed for repetitive projects
- PERT can be analysed statistically whereas CPM not
- PERT is not concerned with the relationship between time and cost, whereas CPM establishes a relationship between time and cost and cost is proportionate to time.

(ii) X uses traditional standard costing system. The inspection and setup costs are actually ₹ 1,760 against a budget of ₹ 2,000.

ABC system is being implemented and accordingly, the number of batches is identified as the cost driver for inspection and setup costs. The budgeted production is 10,000 units in batches of 1,000 units, whereas actually, 8,800 units were produced in 11 batches.

(I) Find the volume and total fixed overhead variance under the traditional standard costing system.

(II) Find total fixed overhead cost variance under the ABC system. [4+6=10]

Answer:

(I) Calculation of volume and total fixed overhead under Traditional Standard Costing System.

Budgeted overhead cost per unit	₹ 2,000/10,000 units	₹ 0.20
Actual overhead cost per unit	₹ 1,760/8,800 units	₹ 0.20
Total fixed over head variance	Absorbed budgeted overhead – Actual overhead = (₹ 0.20 x 8,800 units) – ₹ 1,760	Nil
Fixed overhead expenditure variance	Budgeted overhead – Actual overhead = 2,000 – 1,760	₹ 240 (F)
Standard absorption rate	₹ 2,000 / 10,000 units	₹ 0.20 per unit
Verification:	Standard absorption rate x (Budgeted units – Actual units) = ₹ 0.20 (10,000 units – 8,800 units)	₹ 240 (A)

Total fixed overhead variance	Expenditure variance + Volume variance = 240 (F) + 240 (A)	Nil

(II) Calculation of fixed overhead cost variance under ABC System

Particulars	Budget	Actual	ABC standard
Total cost (₹)	2,000	1,760	1,800
Production (units)	10,000	8,800	8,800
No. of batches	10	11	9
Batch size (units/batch)	1,000	800	1,000
Cost per batch	200	160	200

Under ABC 8,800 units should have been produced in standard batch size of 1,000 units/ batch.

No. of batches = 8,800/1,000 = 9 approx.

Standard cost under ABC =

(Budgeted cost per batch x ABC standard number of batches)

= ₹ 200 x 9 = 1,800

Under ABC, variability is with respect to batches and not units

Absorbed overheads = 9 batches x Standard rate per batch

= 9 x ₹ 200 = ₹ 1,800

Actual overheads = ₹ 1,760

Total overheads cost variance = ₹ 40 (F)

4.(b)

(i) An agriculturist has 480 hectares of land on which he grows Onion, tomatoes, Cabbage and carrots. Out of the total area of land, 340 hectares are suitable for all the four vegetables but the remaining 140 hectares of land are suitable only for growing Cabbage and carrots. Labour for all kinds of farm work is available in plenty.

The market requirement is that all the four types of vegetables must be produced with a minimum of 5,000 boxes of any one variety. The farmer has decided that the area devoted to any crop should be in terms of complete hectares and not in fractions of a hectare. The only other limitation is that not more than 1,13,750 boxes of any one vegetable should be produced.

The relevant data concerning production, market prices and costs are as under:

	Onion	Cabbage	Carrots	Tomatoes
Annual yield:				
Boxes per hectare	**350**	**100**	**70**	**180**
	₹	**₹**	**₹**	**₹**
Costs:				
Direct material per hectare	**952**	**432**	**384**	**624**
Direct Labour:				
Growing per hectare	**1792**	**1216**	**744**	**1056**
Harvesting and packing per box	**7.20**	**6.56**	**8.80**	**10.40**
Transport per box	**10.40**	**10.40**	**8.00**	**19.20**
Market price per box	**30.76**	**31.74**	**36.80**	**44.55**

Fixed expenses per annum:	**₹**
Growing	**1,24,000**

Harvesting	**75,000**
Transport	**75,000**
General administration	**1,50,000**

It is possible to make the land presently suitable for Cabbage and carrots, vegetable for growing Onion and tomatoes if certain land development work is undertaken. This work will involve a capital expenditure of ₹6,000 per hectare which a bank is prepared to finance at the rate of interest of 20% p.a. If such improvement is undertaken, the harvesting cost of the entire crop of tomatoes will decrease on an average by ₹2.60 per box.

Required:

(I) Calculate, within the given constraint, the area to be cultivated in respect of each crop to achieve the largest total profit and the amount of such total profit before land development work is undertaken.

(II) Assuming that the other constraints continue, advice the grower whether the land development schemes should be undertaken and if so the maximum total profit that would be achieved after the said development schemes is undertaken. [6+6]

Answer:

(I) Calculation showing area to be cultivated in respect of each crop to achieve the largest total profit.

	Hectares
Land available for all four vegetables	340
Land available for Cabbage and carrots	140
Total	480
Minimum requirement of each variety	5,000 boxes
Maximum requirement of each variety	1,13,750 boxes

	Onion	**Cabbage**	**Carrots**	**Tomatoes**
Boxes per hectare	350	100	70	180
Cost per hectare	₹	₹	₹	₹
Direct Materials	952	432	384	624
Direct Labour:				
Growing	1,792	1,216	744	1,056
Harvesting	2,520	656	616	1,872
Transport	3,640	1,040	560	3,456
Total V. Costs	8,904	3,344	2,304	7,008
Selling price per hectare	10,766	3,174	2,576	8,019
Contribution per hectare	1,862	(170)	272	1,011

Cabbage: Minimum 5,000 Boxes=5,000/100=50 hectares

Carrots Balance land of 140-50= 90 hectares

Tomatoes minimum 5,000 boxes= 5,000/180= 28 hectares

Onion Balance land of 340-28=312 hectares

Cultivation plan to achieve largest profit before land development:

	Onion	Cabbage	Carrots	Tomatoes
Hectares	312	50	90	28
	₹	₹	₹	₹
Contribution per hectare	1,862	(170)	272	1,011
Contribution	5,80,944	(8,500)	24,480	28,308
Total Contribution	6,25,232			
Fixed expenses	4,24,000			
Profit	2,01,232			

(II) Carrots yield a low contribution and this crop is grown in excess of the requirement 5000 boxes. The land that could be released from t5his crop is 90-72=18 hectares (5000 boxes need 72 hectares only). This land could be utilized for growing Onion which yield the largest contribution.

Analysis to show whether and development to be undertaken

After land development the contribution per hectare of tomatoes will be as under:

Present contribution per hectare

Saving in harvesting @ 2.60 per box

Revised contribution

Allocation of 18 hectares of land

Crop	Max sale	Present production	Addl. Reqt.	Yield per hectare	Additional Hectares to
Onion	1,13,750	1,09,200	4,550	350	13
Tomatoes	1,03,750	5,000	900	180	5*

*Balance Land

Revised Cultivation Plan

	Onion	Cabbage	Carrots	Tomatoes	Total
Hectares	325	50	72	33	480
	₹	₹	₹	₹	₹
Contribution/hectare	1,862	(170)	272	1,479	
Total Contribution	6,05,150	(8,500)	19,584	48,807	6,65,041
Fixed Expenses					4,40,200
Profit					2,24,841

Capital Expenditure: 18 hectares x 6,000	=₹1,08,000
Interest 1,08,000 x 20/100	=21,600
Existing fixed expenses	=4,24,000
Total	4,45,600

Conclusion

Since the profit after land development is greater, the company should implement the proposal to develop 18 hectare of land.

(ii) Write short note on Opportunity Cost. [3]

Answer:

As per CIMA terminology opportunity cost is defined as 'the value of the benefit sacrificed when one course of action is chosen, in preference to an alternative. The opportunity cost is represented by the forgone potential benefit from the best rejected

course of action'. In opportunity cost we are to identify the value of benefit forgone as the result of choosing a particular course of action in preference to another.

Notional rent foregone by a company by using its own building instead of renting it out and foregoing rent that it could have earned is an example of opportunity cost.

Another example of opportunity cost is considered for even an obsolete material lying in store for long. When it is found to be useful for a new job, the sale value of material even as scrap is taken as the opportunity cost of using that material for the new job.

4.(c)

(i) The data of running costs per year and resale price of equipment A whose purchase price is ₹2,00,000 are as follows:

Year-	1	2	3	4	5	6	7
Running cost (₹ '000)	30	38	46	58	75	90	110
Resale value (₹ '000)	100	50	25	12	8	8	8

(I) What is the optimum period for replacement?

(II) When equipment A's age is two years old, equipment B which is a new model for the same usage is available. The optimum period for replacement is 4 years with an average cost of ₹ 72,000. Should equipment A be changed with equipment B? If so, in which year it will be replaced? [3+1+3]

Answer:

The calculations of average cost per year during the life of the Equipment A:

Year	Running cost (₹)	Cumulative Running cost	Resale price	Cumulative Dep. cost	Cumulative Total Cost	Average cost per year
1	30,000	30,000	1,00,000	1,00,000	1,30,000	1,30,000
2	38,000	68,000	50,000	1,50,000	2,18,000	1,09,000
3	46,000	1,14,000	25,000	1,75,000	2,89,000	96,333
4	58,000	1,72,000	12,000	1,88,000	3,60,000	90,000
5	72,000	2,44,000	8,000	1,92,000	4,36,000	87,200
6	90,000	3,34,000	8,000	1,92.000	5,26,000	87,667
7	1,10,000	4,44,000	8,000	1,92,000	6,36,000	90,857

(I) As average cost per year of ₹87,200 is minimum in 5th year so Equipment A should be replaced at the end of the 5th year.

(II) Given, the optimum period for replacement of Equipment B is 4 years with an average cost of ₹72,000. As minimum average cost of B is lower than minimum average cost of Equipment A. **So A should be replaced by B.**

As, Equipment A is two years old, so total cost per year of A from 3rd year is as follows:

Year of services	Total cost per year (₹)
3	2,89,000 - 2,18,000 = 71,000
4	3,60,000 - 2.89,000 = 71,000
5	4,36,000 - 3,60,000 = 76,000
6	5,26,000 - 4,36,000 = 90,000
7	6,36,000 - 5,26,000 = 1,10,000

As the total cost per year of A is higher in 5th year than the minimum average cost of Equipment B (i.e. ₹72.000) so Equipment A should be replaced at the end of the 4th year.

(ii) Fit straight line by the least square method to the following figures of production of Sugar Factory. Estimate the production for the year 2015.

Year	2008	2009	2010	2011	2012	2013	2014
Production(in Lakh tons)	76	87	95	81	91	96	90

[4]

Answer:

Analysis of Trend by Least square Method

Year	x	Y (production)	xy	x^2
2008	-3	76	-228	9
2009	-2	87	-174	4
2010	-1	95	-95	1
2011	0	81	0	0
2012	1	91	91	1
2013	2	96	192	4
2014	3	90	270	9
Total	0	$\sum y = 616$	$\sum xy = 56$	$\sum x^2 = 28$

The two normal equations are as under:

Equation 1	Equation 2
$\sum y = na + b\sum x$	$\sum xy = a\sum x + b\sum x^2$
So, 616=7a+ b (0)	56=88 (0)+b (28)
So, 7a= 616	56=28b
a=616÷ 7=88	b=56÷28=2

The first degree polynomial trend equation (straight line trend) is Y=a+ bx

So, Y=88+2x (where original year is 2011, x=1 year unit)

Estimated production for the year 2015: Here, x=4 (i.e. from 2011 to 2015)

So, Y=88+2(4); 88+8=96.

Hence, production for the year 2015= 96 lakh tons.

(iii) Why is Lean Accounting Needed? **[4]**

Answer:

There are positive and negative reasons for using Lean Accounting. The positive reasons include the issues addressed in the "Vision for Lean Accounting" shown above. Lean Accounting provides accurate, timely and understandable information that can be used by managers, sales people, operations leaders, accountants, lean improvement teams and others. The information gives clear insight into the company's performance; both operational and financial. The Lean accounting reporting motivates people in the organization to move lean improvement forward. It is often stated that "What you measure is what will be improved." Lean accounting measures the right things for a company that wants to drive forward with lean transformation.

Lean Accounting is also itself lean. The information, reports, and measurements can be provided quickly and easily. It does not require the complex systems and wasteful

transactions that are usually used by manufacturing Companies. The simplicity of lean Accounting frees up the time of the financial people and the operational people so that they can become more actively involved in moving the Company forward towards its strategic goals. The role of the financial professional moves away from bookkeeper and reporter and towards strategic partnering with the Company leaders.

At a deeper level Lean accounting matches the cultural goals of a lean organization. The simple and timely information empowers people at all levels of the organization. The financial and performance measurement information is organized around Value streams and thereby honors the lean principle of Value stream management. The emphasis on Customer Value is also derived from the principles of lean thinking. The way a Company accounts and measures its business is deeply rooted in the culture of organization. Lean Accounting has an important role to play in developing a lean culture within an organization