PAPER 15 - Business Strategy and Strategic Cost Management

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

This paper contains 4 questions. All questions are compulsory, subject to instruction provided against each question. All working must form part of your answer. Assumptions, if any, must be clearly indicated.

1. Read the Case and Answer the following Questions [20 marks]

DD is the India's premier public service broadcaster with more than 1,000 transmitters covering 90% of the country's population across an estimated 70 million homes. It has more than 20,000 employees managing its metro and regional channels. Recent years have seen growing competition from many private channels numbering more than 65, and the cable and satellite operators (C & S). The C & S network reaches nearly 30 million homes and is growing at a very fast rate.

DD's business model is based on selling half-hour slots of commercial time to the programme producers and charging them a minimum guarantee. For instance, the present tariff for the first 20 episodes of a programme is ₹30 lakhs plus the cost of production of the programme. In exchange the producers get 780 seconds of commercial time that he can sell to advertisers and can generate revenue. Break-even point for producers, at the present rates, thus is ₹ 75,000 for a 10 second advertising spot. Beyond 20 episodes, the minimum guarantee is ₹65 lakhs for which the producer has to charge ₹1,15,000 for a 10 second spot in order to break-even. It is at this point the advertisers face a problem - the competitive rates for a 10 second spot is ₹50,000. Producers are possessive about buying commercial time on DD. As a result the DD's projected growth of revenue is only 6-10% as against 50-60% for the private sector channels. Software suppliers, advertisers and audiences are deserting DD owing to its unrealistic pricing policy. DD has three options before it. First, it should privatize, second, it should remain purely public service broadcaster and third, a middle path. The challenge seems to be to exploit DD's immense potential and emerge as a formidable player in the mass media.

Required:

(i) Discuss the best option, in your view, for DD.

(ii) Analyze the SWOT factors the DD has.

(iii) Explain the proposed alternatives which you suggested.

(iv) State the basic objectives for conducting SWOT analysis. [6+6+4+4]

Answer

(i) For several years Doordarshan was the only broadcaster of television programmes in India. After the opening of the sector to the private entrepreneur (cable and satellite channels), the market has witnessed major changes. The number of channels has increased and also the quality of programmes, backed by technology, has improved. In terms of quality of programmers, opportunity to advertise, outreach activities, the broadcasting has become a popular business. Broadcasters too have realized the great business potential in the market. But for this, policies need to be rationalized and be opened to the scope of innovativeness not only in term of quality of programmes. This would not come by simply going to more areas or by allowing bureaucratic set up to continue in the organization.

Strategically the DD needs to undergo a policy overhaul. DD, out of three options, namely privatization, public service broadcaster or a middle path, can choose the third one, i.e. a combination of both. The whole privatization is not possible under the diversified political scenario. Nor it would be desirable to hand over the broadcasting emotively in the private hand as it proves to be a great means of communication of many socially oriented public

programmers. The government could also think in term of creating a corporation (as it did by creating Prasar Bharti) and provide reasonable autonomy to DD. So far as its advertisement tariff is concerned that can be made fairly competitive. However, at the same time cost of advertising is to be compared with the reach enjoyed by the doordarshan. The number of viewers may be far more to justify higher tariffs.

(ii) The SWOT analyses involve study of strengths, weaknesses, opportunities and threats of an organization. SWOT factors that are evidently available to the Doordarshan are as follows:

S - Strength

More than 1000 transmitters. Covering 90% of population across 70 million homes against only 30 million homes by C & S More than 20,000 employees.

W-Weakness

Rigid pricing strategy. Low credibility with certain sections of society, Quality of program's is not as good as compared to C & S network

O - Opportunities

Infrastructure can be leased out to cable and satellite channel. Digital terrestrial transmission, Regional focused channels, Allotment of time, slots to other broadcasters.

T- Threats

Desertion of advertisers and producers may result in loss of revenues. Due to quality of program the reach of C & S network is continuously expanding. As the C & S network need the trained staffs, some employees of DD may switchover and take new jobs, Best of the market-technology is being used by the private channels.

(iii) It is suggested that the DD should adopt a middle path. It should have a mix of both the options. It should economize on its operational aspects and ensure more productivity in term of revenue generation and optimization of use of its infrastructure. Wherever, the capacities are underutilized, these may be lease)d out to the private operations. At the same time quality and viewership of programmes should be improved. Bureaucracy may reduce new strategic initiatives or make the organization less transparent. Complete privatization can fetch a good sum and may solve many of the managerial and operational problems. However, complete public monopoly is not advisable because that denies the government to fully exploit the avenue for social and public use. The government will also lose out as it will not be able to take advantage of rising potential of the market.

(iv) The basic objectives of conducting 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.

2. Answer any two questions from a, b and c. [2×15=30 marks]

(a)

(i) Distinguish between 'Strategy' and 'Policy'. [3]
(ii) Explain the significance of Strategy Evaluation. [3]
(iii) Discuss the problems of strategy evaluation. [4]
(iv) "Discuss how a firm can create and sustain 'Competitive Advantage'. [5]

Answer:

(i) Strategy: Strategy refers to the determination of the purpose or mission and the basic long-term objectives of an enterprise, and the adoption of courses of action and allocation of

resources necessary to achieve these aims. Therefore, objectives are a part of strategy formulation.

Policy: Policies are general statements or understandings that guide managers thinking in decision making. They ensure that decisions fall within certain boundaries. They usually do not require action but are intended to guide managers in their commitment to the decision they ultimately make. The essence of policy is discretion. Strategy, on the other hand, concerns the direction in which human and material resources will be applied in order to increase the chance of achieving selected objectives.

Certain major policies and strategies may be essentially the same. A policy of developing only through retailers may be an essential element of a company's strategy for new product development or marketing. One company may have a policy of growth through the acquisition of other companies, while another may have a policy of growing only by expanding present markets and products. While these are policies, they are also essential elements of major strategies. Perhaps one way to draw a meaningful distinction is to say that policies will guide a manager's thinking in decision - making if a decision is to be made while a strategy implies the commitment of resources in a give direction.

(ii) Evaluation of strategy of an enterprise is as important as strategy formulation because it provides an insight into the efficacy and effectiveness of the overall plan as well as sub-plans in attaining the desired results. It also enables the management to judge the suitability of the on-going strategy in changing socio-economic, political and technological developments and corporate conditions and points out to the need for modification in strategy in order to seize emerging opportunities and minimize new threats.

On the basis of periodic strategy evaluation, the central management can determine precisely whether programmes are being carried out in such a way that corporate objectives will be attained satisfactorily.

Strategy evaluation also influences the behaviour of events and ensures that they conform to plans. It serves the 'steering function' - to steer the organisation and the various sub-systems within it on the right track and to negotiate their way through a turbulent environment. It aims at promoting integration between short-range and long-range plans and between the enterprise and the environment.

Strategy evaluation serves as a valuable instrument for the purpose of achieving stability and continuity on the one hand and adaptation and adjustment on the other. Organisational stability is sought through appraisal of operational policies and procedures. This ensures the steady state of the organisation to establish itself, to derive and consolidate the gains from resources already committed, to preserve the system's vitality and viability. Periodic appraisal of strategy provides an opportunity to the management to make requisite adjustments in objectives, strategies and policies in tune with the dynamics of the external environment.

Finally, strategy evaluation can help the management in making effective use of scarce and valuable resources of the enterprise. It strives for minimising the variability in the deployment of resources so that the intended goals are achieved with the least cost and few untoward consequences.

(iii) Task of strategy evaluation suffers from the problems arising out of misinterpretation of environmental forces and corporate resources. The evaluator may not always be correct when he questions the validity of the on-going strategy. This is because of the fact that determination of opportunities and threats is often of a function the perception and the attitude of the person making such exercise as it is of the factor itself. For instance, a dynamic and enterprising planner may perceive abundant opportunities emerging due to

economic and technological developments and formulate expansion strategy. This approach may not be appreciated by an evaluator with a conservative attitude and closed cognitive style that holds the view that the enterprise should continue to maintain its present product-market posture owing to disquieting political developments.

Inaccurate assessment of financial, marketing, managerial and other resources of the enterprise and existence of synergistic benefits poses another obstacle to the appraisal of strategy. Thus, for instance, a corporate planner chooses a diversification strategy because in his view the firm has adequate financial and managerial resources to support this plan. But the evaluator questions the utility of such a strategy because he doubts the skill and competence of the senior executives of the firm.

Another obstacle that is inherent in strategy appraisal is identification, evaluation and choice of strategic alternatives. In the real world, it has been noted that some organisations without making independent appraisal of opportunities choose a course of action because others in the same line of business have done so. This type of approach renders the product-market strategy weak.

Another source of difficulty involved in appraisal of strategy is misinterpretation of current results. Generally, the central chief executive, without digger deep into the problem, regards the current strategy as unsound if the performance has not been satisfactory and directs the corporate planner to re-examine it. In the same vein, he labels the strategy as sound because of the excellent operating results. But such type of hurried judgment may, at times, be erroneous. Poor results may have been due to improper execution of strategy or outstanding profits were due to certain other factors such as war and product rationing. The management swayed by good results may not take serious note of implications of impending environmental changes and accordingly remain indifferent to any modification in the current plan for the future.

(iv) Competitive advantage is creating better value for the customers of an organisation for the same or lower cost than that of its competitors or creating equivalent Value for it customers for the lower cost than that of its competitors. The difference between what a customer receives (customer's realization) and what the customer gives up (customer's sacrifice) is the customer's value what a customer receives is called 'total product'. The total product is the complete range of tangible and intangible benefits that a customer receives from a purchased product.

According to Porter, there are two generic strategies capable of producing a sustainable competitive advantage, viz., (i) a low-cost strategy (cost leadership), and (ii) a differentiation strategy.

A low-cost strategy aims at providing the same or better value to the customers of an organisation at a low cost than its competitors. If one defines customer value as the difference between realization and sacrifice, a low-cost-strategy tries to increase customers' value by minimizing the sacrifice of the customers. On the other hand, a differentiation strategy strives to increase the customers' value by increasing what the customers receive. Providing something to the customers that is not provided by the competitors creates competitive advantage. The product characteristic(s) must be such that it/they set the product different from that of the organisation's competitors. To be of value, the customers should appreciate that same variation has been made in the product/service. Furthermore, the value added to the customers by differentiation must exceed the organisation's costs of providing the difference (variation). If the customers appreciate the variation made and if the value added to the customers exceed the cost of providing the difference, then a competitive advantage has been accomplished.

(b)

(i) Describe about "Corporate Restructuring". Discuss different Corporate Level Restructuring Strategies. [5]
(ii) "Differentiation Strategy is not without pitfalls". — Identify the common pitfalls. [5]
(iii) Explain about the 'synergy'. Discuss its significance in strategy making [5]

Answer:

(i) **Corporate restructuring** refers to the process by means of which a firm makes an assessment and evaluation of itself at a point of time and refocuses itself to specific tasks of performance for improvements. It looks upon every activity as a green field project and question the firm's basic premise in order to engineer radical change rather than aim for just incremental gains. The concept is sometimes referred to as business process re-engineering as it involves consideration of at least: business portfolio revaluation; financial engineering; and organisational redesign.

Corporate level restructuring strategies can be thought of from two aspects: hardware and software.

Hardware restructuring involves redefining and/or modifying the structure of the organisation so as to make it more efficient in decision-making, responsiveness and intra-organisational communication etc. Some suggested strategies are:

- Identification of core competency and portfolio pruning
- Flattening of organisational layer
- Downsizing
- Creation of self directed teams
- Benchmarking.

Software restructuring involves cultural and process changes required creating collaborative environment for a firm's growth. Suggested steps are:

- Business strategy communication
- Co-ordination
- Trust
- Stretch
- Empowering people
- Industry foresight
- Training.

(ii) The essence of diversification is to be unique with features that are of value to the customers. It is concerned with a company's positioning within a market or a segment in relation to the various product characteristics that influence customer choice. However, the common pitfalls are:-

- Over differentiating, so that price is too high relative to competitors or product quality or service levels exceed buyer's need.
- Attempting to charge too high a premium price.
- Ignoring the need to signal value and depending only on intrinsic product attributes to achieve differentiation.
- Not understanding or identifying what buyers consider as value.
- Trying to differentiate on the basis of something that does not lower a buyer's cost, as perceived by a buyer.

(iii) 'Synergy' is a measure of the firm's ability to make good on a new product - market entry. Usually it is explained by the term "two plus two equals five". Synergistic advantages emerge because of operating economies which can be achieved through the elimination of duplicate facilities and consolidation of marketing, purchasing and other operations.

Synergy is the powerful ally of international strategic planning and must receive special attention of top management before making any decision regarding new product market

entry or acquisition of a new firm in host country. The whole concept of synergy is based on the promise that the compatibility of the existing product - market with the new product market will help an organisation to achieve its objective much more profitably than that achieved by firms independently.

Synergies invariably result in more exports, with the transnational source, finished products and components from its Indian operation. Analysis of synergistic effects of alternatives is very useful because of their far - reaching consequences. The major thrust of the analysis is on the measurement of synergistic effects upon the operations of the organisation. This effect can be measured in terms of cost economies to the organisation from a joint operation or in terms of increase in net revenue for a given level of investment or in terms of decreased investment requirements for a given level of earnings. According to Ansoff, synergistic effects should be measured in terms of start-up economies and operating economies. Structure must follow synergy. This calls for willingness and dynamism on the part of the management of the acquiring firm to adjust themselves in consonance with the changing situations. However, in the real world this is not usually found because of apathy of most of the managers particularly those brought up in internally oriented skills and those who are conservative and believe in maintaining the status quo to go for any change from the present product market complexion.

(c) Hassan is one of the India's leading detergent manufacturing companies. The firm has more than twenty-five product types. These have been developed over a period of its ten year existence. Some products are very successful while others have not performed well. The challenge for the board has been the formulation of strategy policy in the way the company manages the portfolio of products.

As a newly recruited qualified Cost Accountant, your advice is being sought to address the following questions the Product manager has prepared as input into his paper to the Board.

(i) Describe the Boston Consulting Group (BCG) growth vector matrix.

(ii) Explain what strategic options are available to Hassan in accordance to the BCG Matrix. Outline

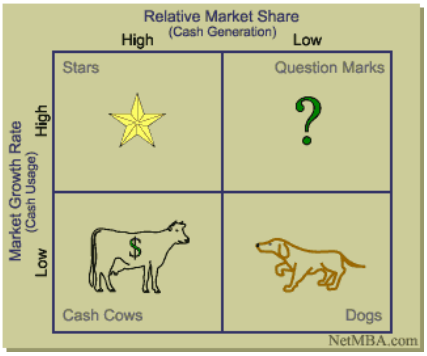
(iii) Outline what limitations the model poses to the Product Manager as he prepares his paper to the Board. [10+2+3]

Answer:

(i) The BCG Matrix is a model used to analyze the portfolio of strategic business units, investments and products according to their cash generating capabilities whose function is relative market share and market growth rate. These results into 4 categories being: question marks (future potential earners), stars (increasing good positive cash flow), cash cows (cash rich) and dogs (declining cash flows).

The BCG Growth-Share Matrix is a portfolio planning model developed by Bruce Henderson of the Boston Consulting Group in the early 1970's. It is based on the observation that a company's business units can be classified into four categories based on combinations of market growth and market share relative to the largest competitor, hence the name "growth-share". Market growth serves as a proxy for industry attractiveness, and relative market share serves as a proxy for competitive advantage. The growth-share matrix thus maps the business unit positions within these two important determinants of profitability.

BCG Growth-Share Matrix



This framework assumes that an increase in relative market share will result in an increase in the generation of cash. This assumption often is true because of the experience curve; increased relative market share implies that the firm is moving forward on the experience curve relative to its competitors, thus developing a cost advantage. A second assumption is that a growing market requires investment in assets to increase capacity and therefore results in the consumption of cash. Thus the position of a business on the growth-share matrix provides an indication of its cash generation and its cash consumption.

Henderson reasoned that the cash required by rapidly growing business units could be obtained from the firm's other business units that were at a more mature stage and generating significant cash. By investing to become the market share leader in a rapidly growing market, the business unit could move along the experience curve and develop a cost advantage. From this reasoning, the BCG Growth-Share Matrix was born.

The four categories are:

- Dogs - Dogs have low market share and a low growth rate and thus neither generate nor consume a large amount of cash. However, dogs are cash traps because of the money tied up in a business that has little potential. Such businesses are candidates for divestiture.
- Question marks - Question marks are growing rapidly and thus consume large amounts of cash, but because they have low market shares they do not generate much cash. The result is a large net cash consumption. A question mark (also known as a "problem child") has the potential to gain market share and become a star, and eventually a cash cow when the market growth slows. If the question mark does not succeed in becoming the market leader, then after perhaps years of cash consumption it will degenerate into a dog when the market growth declines. Question marks must be analyzed carefully in order to determine whether they are worth the investment required to grow market share.
- Stars - Stars generate large amounts of cash because of their strong relative market share, but also consume large amounts of cash because of their high growth rate; therefore the cash in each direction approximately nets out. If a star can maintain its large market share, it will become a cash cow when the market growth rate declines. The portfolio of a diversified company always should have stars that will become the next cash cows and ensure future cash generation.
- Cash cows - As leaders in a mature market, cash cows exhibit a return on assets that is greater than the market growth rate, and thus generate more cash than they consume. Such business units should be "milked", extracting the profits and investing as little cash as possible. Cash cows provide the cash required to turn question marks into market leaders, to cover the administrative costs of the company, to fund research and development, to service the corporate debt, and to pay dividends to shareholders. Because the cash cow generates a relatively stable cash flow, its value can be

determined with reasonable accuracy by calculating the present value of its cash stream using a discounted cash flow analysis.

Under the growth-share matrix model, as an industry matures and its growth rate declines, a business unit will become either a cash cow or a dog, determined soley by whether it had become the market leader during the period of high growth.

While originally developed as a model for resource allocation among the various business units in a corporation, the growth-share matrix also can be used for resource allocation among products within a single business unit. Its simplicity is its strength - the relative positions of the firm's entire business portfolio can be displayed in a single diagram.

(ii) Hassan has four strategic choices when we look at the BCG Matrix. They include:
Build - this is where Hassan uses funds from other products to invest in question marks or stars. These funds are usually harvested from cash cows. This is about moving excess cash around various product lines especially those with potential for growth but lacking own funds for reinvestments.

Hold - this is where funds are ploughed back or profits reinvested. This is applicable to question marks and stars.
Harvest - this is where funds are milked out of cash cows and used to build question marks and stars.
Divest - this is applicable in cases where Hassan discontinues operations of product lines that are no longer profitable.

(iii) The limitations include:

- Market information regarding aggregate demand and market shares held by competing firms may not be readily available or too expensive to obtain.
- Too simplistic by assuming that cash flow is affected by only market growth rate and relative market share.
- Assumes that only longer staying firms in the market can build competitive edge. In modern business environments, this is not possible. We have seen new entrants easily overtaking long established firms.

3. Read the case and answer the following questions. [20 marks]

Rizwan, the general manager of Infosys, is to decide when to release the new version of Infosys's spreadsheet package, Easyspread 2.0. Development of Easyspread 2.0 is complete. However, the diskettes, compact discs, and user manuals have not yet been produced. The product can be shipped starting 2014.
The key problem is that Infosys has overstocked the previous version of its spreadsheet package, Easyspread 1.0. Rizwan knows that once Easyspread 2.0 is introduced, Infosys will not be able to sell any more units of Easyspread 1.0. Rather than just throwing away the inventory of Easyspread 1.0, Rizwan is wondering if it might be better to continue to sell Easyspread 1.0 for next three months and introduce Easyspread 2.0 on April 1,2014, when the inventory of Easyspread 1.0 will be sold out.
The following information is available:

	Easyspread 1.0	Easyspread 2.0
Selling price	**₹1,500**	**₹1,850**
Variable cost per unit of diskettes, compact discs, user manuals	**200**	**250**

Development cost per unit	**650**	**950**
Marketing and administrative cost per unit	**350**	**400**
Total cost per unit Operating income per unit	**1,200**	**1,600**
Operating income per unit	**300**	**250**

Development cost per unit for each product equals the total costs of developing the software product divided by the anticipated unit sales over the life of the product. Marketing and administrative costs are fixed costs in 2014, incurred to support all marketing and administrative activities of Infosys. Marketing and administrative costs are allocated to products on the basis of the budgeted revenues of each product. The preceding unit costs assume Easyspread 2.0 will be introduced on April, 2014.

Required

(i) On the basis of financial considerations alone, should Rizwan introduce Easyspread 2.0 on 2014, or wait until April 1, 2014? Show your calculations, clearly identifying relevant and irrelevant revenues and costs. [5]

(ii) What other factors might Rizwan consider in making a decision? [6]

(iii) Fixed Costs are irrelevant in decision making. List out the exceptions. [5]

(iv) State the term Opportunity Cost. [4]

Answer:

(i) Easyspread 2.0 has a higher relevant operating income than Easyspread 1.0. Based on this analysis, Easyspread 2.0 should be introduced immediately.

	Easyspread 1.0	**Easyspread 2.0**
Relevant revenues	₹ 1,500	₹ 1,850
Relevant costs:		
Manuals, diskettes, compact discs	₹0	₹250
Total relevant costs	0	250
Relevant operating income	₹1,500	₹1,600

Reasons for other cost items being irrelevant are:

Easyspread 1.0

- Manuals, diskettes-already incurred
- Development costs-already incurred
- Marketing and administrative-fixed costs of period

Easyspread 2.0

- Development costs-already incurred
- Marketing and administration-fixed costs of period

Note that total marketing and administration costs will not change whether Easyspread 2.0 is introduced on January 1,2014, or on April 1,20124

(ii) Other factors to be considered:

- **Customer satisfaction**. If 2.0 is significantly better than 1.0 for its customers, a customer driven organization would immediately introduce it unless other factors offset this bias towards "do what is best for the customer."

- **Quality level of Easyspread 2.0**. It is critical for new software products to be fully debugged. Easyspread 2.0 must be error-free. Consider an immediate release only if 2.0 passes all quality tests and can be fully supported by the sales force.

- **Importance of being perceived to be a market leader**. Being first in the market with a new product can give Infosys a "first-mover advantage," e.g., capturing an initial large share of the market that, in itself, causes future potential customers to lean towards purchasing Easyspread 2.0. Moreover, by introducing 2.0 earlier, Infosys can get quick feedback from users about ways to further refine the software while its competitors are still working on their own first versions. Moreover, by locking in early customers, Infosys may increase the likelihood of these customers also buying future upgrades of Easyspread 2.0.

- **Morale of developers**. These are key people at Infosys. Delaying introduction of a new product can hurt their morale, especially if a competitor then preempts Infosys from being viewed as a market leader.

(iii) In the following circumstances, Fixed Costs become relevant in decision making:
- Fixed Costs are specifically incurred for any Contract;
- When Fixed costs are incremental in nature;
- When fixed portion of semi variable costs increases due to change in level of activity consequent to acceptance of a contract;
- When Fixed Costs are avoidable or discretionary;
- When Fixed cost are such that one cost is incurred in lieu of the another.

(iv) 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. Answer any two questions from a, b and c. [2×15=30 marks]

(a)

(i) The monthly budgets for manufacturing overhead of a concern for two levels of activity were as follows :

Capacity	**60%**	**100%**
Budgeted production (units)	**600**	**1,000**
Wages	**₹ 1,200**	**₹ 2,000**
Consumable stores	**900**	**1,500**
Maintenance	**1,100**	**1,500**
Power and fuel	**1,600**	**2,000**
Depreciation	**4,000**	**4,000**
Insurance	**1,000**	**1,000**
	9,800	**12,000**

You are required to:

I. Indicate which of the items are fixed, variable and semi variable

II. Prepare a budget for 80% capacity; and

III. Find the total cost, both fixed and variable, per unit of output at 60%, 80% and 100% capacity. [3+4+3]

Answer:

I. Fixed :

Depreciation	-Since it remains constant at both the given levels.
Insurance	- Same as above.

Variable :

Wages	-Because it is ₹ 2 per unit at both the given levels.
Consumable stores	-Because it is ₹ 1.50 per unit at both the given levels.

Semi-variable:

Maintenance	- Since it is neither fixed nor the quantum of increase is Proportionate to the increase in volume.
Power and fuel	- Same as above.

II. First of all, find out the variable portion of semi-variable overhead.

Working notes:

Maintenance:

Variable portion = Change in overhead = ₹ 400 ÷ 400 = Re. 1 per unit.

Fixed portion = ₹ 1,100 – (600 units x Re. 1) = ₹ 500

At 80% capacity level = (800 units x Re. 1) + ₹ 500 = ₹ 1,300

Power and fuel:

Variable portion = ₹ 400 ÷ 400 = Re. 1 per unit.

Fixed portion = ₹ 1,600 – (600 units x Re. 1) = ₹ 1,000

At 80% capacity level = (800 units x Re. 1) + ₹ 1,000 = ₹ 1,800

Budget for 80% capacity level

Budgeted production (80% capacity)	800 units
Wages @ ₹ 2 per unit	1,600
Consumables stores @ ₹ 1.5 per unit	1,200
Maintenance – as per above working	1,300
Power and fuel - do -	1,800
Depreciation	4,000
Insurance	1,000
Total	10,900

To sum up, the variable cost per unit works out to ₹ 5.50. It consists of wages – ₹ 2, consumable stores – ₹ 1.50, maintenance – ₹ 1 and power and fuel – ₹ 1. The total fixed cost comes to ₹ 6,500 i.e. maintenance ₹ 500 + power and fuel ₹ 1,000 + depreciation ₹ 4,000 + insurance ₹ 1,000.

III. Total cost per unit

	Capacity		
	60%	80%	100%
Production (units)	600	800	1,000
			₹ Per unit

Variable cost	5.50	5.50	5.50
Fixed cost (₹ 6,500 ÷ production)	10.83	8.13	6.50
Total	16.33	13.63	12.00

It should be noted that total cost (both fixed and variable) per unit is required and nor total cost at different capacity levels.

(ii) Explain the concept of learning curve and state how relevant is the same in managing costing? [1+4]

Answer:

The first time when any operation is carried out it takes little bit of extra time and the time taken goes on decreasing during the subsequent operations as the workmen become more and more familiar to the operations. This process of decline in time taken will continue for some time and the labour cost per unit comes down. This is the concept of working out the learning curve.

The learning curve is relevant in managing cost due to the following reasons:-

- It is useful in analysis of cost-volume-profit relationship.
- It is useful in preparing budgeting, price fixation and profit planning.
- It is useful in negotiating price with a customer based on volume of offtake .
- It is useful in performance evaluation.

(b) 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. [7]

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. [8]

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.

(c)

(i) Difference in operating speeds of machines may lead to higher WIP inventory. How does a JIT system resolve this issue? [5]

Answer:

At times, there may be huge differences between the operating speeds of different machines, e.g. process I Machinery may produce 180 components per hour whereas process II Machinery may finish only 135 units per hour. This difference in operating speeds affects cost in the following manner:-

- **Piling up of WIP Inventory:** Work-in-process inventory builds up in front of the slowest machines. In the above case, after four hours of work, there will be a WIP of 180 components. This is because, process I would have produced 180x4=720 components whereas process II would have finished only 135 x 4=540 units in the four-hour period.
- **Delayed Tracing of Defectives:** Defective components or parts produced by an upstream machine (e.g. Process I) may not be discovered until the next downstream machine operator (e.g. Process II) finds them later. By that time, the upstream machine may have created more defective parts, all of which must now be destroyed or reworked.

In JIT philosophy, there are two ways to resolve the above problems:-

- **Kanban Card:** It is a notification card that a downstream machine sends to each upstream machine that feeds it with parts, authorizing the production of just enough components to fulfill the production requirements. This is also known as a "pull" system, since these cards are initiated at the end of the production process, pulling work authorizations through the production system. WIP cannot pile up since it can be created only with kanban Authorization.
- **Working Cells:** A Working Cell is a small cluster of machines, which can be run by a single machine operator. The establishment of Working Cell has the following advantages:-
  - The individual machine takes each output part from machine to machine within the cell, and thus there is no way for WIP to build up between machines.
  - The operator can immediately identify defective output (Which otherwise is difficult) for each machine of the cell. The smaller machines used in a machine cell are generally much simpler than the large, automated machinery they replace. Hence, Maintenance costs are reduced.
  - It is much easier to reconfigure the production facility when it is necessary to produce different products, avoiding the large expense of carefully repositioning and aligning the equipments.

(ii) State how the PRAISE process can be smoothly implemented. [3]

Answer:

A three-point plan for implementation of the process is:-

- **Small to Big Issue:** Big improvement opportunities are generally complex and require extensive inter-departmental co-operation. The choice of a relatively small problem in the first instance provides greater chance of success. Therefore, the TQM team has to proceed from small to big issues gradually.
- **Solvable problem:** The problem selected should not be trivial, but it should be one with a potential impact and a clear improvement opportunity. Measurable progress towards implementation should be accomplished within a reasonable time in order to maintain the motivation of participants and advertise the success of the improvement itself.
- **Recognition of participations:** The successful projects and team members should receive appropriate recognition. Prominent individuals should be rewarded for their efforts through monetary/ non-monetary prizes as a measure of personal recognition and as encouragement to others.

(iii) A Company using a detailed system of standard costing finds that the cost of investigation of variances is ₹ 20,000. If after investigation an out of control situation is discovered, the cost of correction is ₹ 30,000. If no investigation is made, the present value of extra cost involved is ₹ 1,50,000. The probability of the process being in control is 0.82 and the probability of the processes being out of control is 0.18. You are required to advice:

I. Whether investigation of the variances should be undertaken or not;

II. The probability at which it is desirable to institute investigation into variances. [3+4]

Answer:

I. Whether investigation should be undertaken or not:

Situation	Cost (a)	Probability (b)	Effective Cost (a) × (b)
Process under control	20,000	.82	16,400
Process out of control (20,000+30,000)	50,000	.18	9,000
Total cost to investigate:			25,400

Cost of not to investigate:

Extra cost of correction × Probability of processing being out of control

= 1,50,000 × .18
= 27,000
Since cost when investigation is undertaken is less than the cost of no investigation it should be done.

II. Probability at which Investigation into Variance should be instituted

Finding out the probability at which both costs are equal.
Let x be the probability of process being in control.
Therefore,
(1-x) is probability of process being out of control.

Process	Cost of Investigation		Effective Cost (1) × (2)	Cost of No Investigation
	Cost (1)	Probability (2)		
In Control	20,000	x	20,000x	1,50,000 × (1-x)
Out of Control	50,000	1-x	50,000 – 50,000x	
Net Cost			50,000-30,000x	1,50,000-1,50,000x

Equating two cost:
50,000 – 30,000x = 1,50,000 – 1,50,000x
⇨ 1,20,000x = 1,00,000
or, x = 0.833.
At the probability level of 0.83 (Process-in-control), both costs are equal. As this probability level decline, the cost of not investigating will be greater than cost of investigating. If probability level is anywhere below 0.83, investigation should be instituted.