

Short notes

1. Responsibility Accounting : It refers to a control system of management accounting are reporting. The basis of responsibility accounting is the creation/recognition of various responsibility/decision centres in an organisation. The individual Managers of these centres are made responsible for the incurrence and control of costs relating to their responsibility centres. It aims at control of cost and not its determination. It will examine the responsibility for cost under review. The performance of the Managers of the various responsibility centres is judged by assessing how far they have been able to monitor these costs. This is done through performance reports.

The method can be tailored according to the needs of an organisation. Thus responsibility accounting is a primary management tool which provides complete suggestions for corrective action. The preparation of an organisation chart, individual interest, probability of resistance and feeling of dissatisfaction are the limitation of responsibility accounting. The names of various responsibility centres are (i) Cost Centre, (ii) Profit Centre, (iii) Investment Centre, (iv) Contribution Centre, (v) Revenue Centre and (vi) Service Cost Centre.

2. Treatment of the research and development costs in connection with
 - i. job undertaken on behalf of a customer; and
 - ii. improvement in existing products ?

Answer:

i. Cost of R & D project undertaken on behalf of a specific customer should not be treated as manufacturing overhead. It should be as a separate profit centre. All expenses to meet such costs should be debited to "Outside R & D Project Account". Receipts against such requests are to be credited against this account.

ii. Where research and development of products are undertaken on continuous basis the expenditure is treated as product costs. The cost of incomplete research project should be carried out continuously in order to retain company's place in the industry, the expenditure should be treated as general overhead. Some companies prefer to charge such costs of continuous research, to the Profit and Loss A/c.

3. Benchmarking

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

The process involves establishment of benchmarks (targets or comparators) through whose use the levels of performance of the company is sought to be improved. Benchmarking is a tool for continuous improvement because after identifying a best practice performance, it becomes a target to beat.

There may be two types of benchmarking :

- a. intra-group and
- b. inter-industry.

In the former case, groups of companies in the same industry agree that similar units within the co-operating companies will pool data on their processes. The processes are benchmarked against each other. Improvement task forces are established to identify and report "best practice" to all members of the group so that each participating company can achieve it and beat it.

In inter-industry benchmarking, non-competing firms with similar processes are identified and asked to participate in benchmarking exercise. The objective is to benefit from the experience of the other, and establish best practice in their common business processes.

Benchmarking can be applied in any business process or activity for continuous improvement—e.g. quality, cost, productivity, process, customer service, and so on. The steps in benchmarking are as follows.

1. Gather relevant data of participating departments or units, establish the benchmarks based on the best practices and communicate them to the relevant departments or participating units.
2. Measure actual performance to compare with the benchmarks.
3. Analyse the reasons for variations and report them to management for taking preventive and corrective actions.
4. Review the existing benchmarks to set new targets for continuous improvement.

A benchmark is a target fixed based on the best practice. It may be two types

- a. financial or
- b. a non-financial measure or both.

Examples of financial benchmarks are

1. standard cost,
2. target profit,
3. sales revenue,
4. desired cash flow, etc.

Examples of non-financial benchmarks are

1. Targets in terms of market share,
2. customer satisfaction,
3. reduction in machine down-time,
4. target rate of return

Again, financial benchmark may be a part of the accounting system, e.g.

- a. standard costing,
- c. budgetary control and
- d. variance analysis

When target profit margin based on competitor's performance is accepted as the benchmark, it is obviously not a part of the accounting system.

4. Strategic Cost Management

What is a strategy?

A strategy is a set of policies, procedures, and approaches to business to produce long-term success under continues change in horizon. For this, one must have a clear idea about the goals or mission of the company. A mission is developed into specific performance objectives which are then implemented by specific corporate strategies, that is, an integrated set of actions to achieve the objectives that will fulfil the mission.

What is strategic cost management?

One of the major themes in strategic cost management concerns the focus of cost management efforts. The key question is: How does a firm organise its thinking about cost management? Strategic cost management is an approach to management accounting that explicitly highlights strategic issues and concerns. It sets cost analysis in a broader context in which cost information is used to develop superior strategies. A sophisticated understanding of the firm's cost structure can go a long way in the search for sustainable competitive advantage. This is what is referred to as strategic cost analysis. Understanding how cost management facilitates the development of a successful business strategy requires a knowledge of the principle and practices of strategic management—the process of developing a competitive strategy.

Developing a sustainable competitive advantage

Through systematic analysis of critical success factors a firm can identify and develop its competitive advantage over its competitors. The traditional approach may be SWOT analysis. SWOT analysis is a systematic procedure for identifying a firm's critical success factors—its internal strengths and weaknesses, and its external opportunities and threats. The more scientific approach is the value chain analysis. The value chain is defined as the linked set of value-creating activities of the firm. The focus is external to the firm.

5. Business process re-engineering

Business process re-engineering involves examining business processes and making substantial changes to how the organisation currently operates. It involves the redesign of how work is done through activities.

A business process consists of a collection of activities that are linked together in a co-ordinated manner to achieve a specific objective. For example, material handling might be classed as

- a. scheduling production,
- b. storing materials,
- c. processing purchase orders,
- d. inspecting materials and
- e. paying suppliers.

The aim of business process re-engineering is to improve the key business process in an organisation by focusing on

- a. simplification,
- b. cost reduction,
- c. improved quality and
- d. enhanced customer satisfaction.

Consider the materials handling process outlined in the above paragraph. The process might be re-engineered by sending the production schedule direct to nominated suppliers and entering into contractual agreements to deliver the materials in accordance with the production schedule and also guaranteeing their quality by inspecting them prior to delivery.

The end result might be the elimination, or a permanent reduction, of the storing, purchasing and inspection activities. These activities are non-value added activities since they represent an opportunity for cost reduction without reducing the products' service potentials to customers.

A distinguishing feature of business process re-engineering is that it involves radical and dramatic changes in processes by abandoning current practices and reinventing completely new methods of performing business processes. The focus is a major changes rather than marginal improvements.

A further example of business process re-engineering is moving from a traditional functional plant layout to a just-in-time cellular product layout and adopting a just-in-time philosophy. Adopting a just-in-time (JIT) system and philosophy, has important implications for cost management and performance reporting. It is therefore, important that you understand the nature of such systems had how they differ from traditional systems, but rather than deviating at this point from our discussion of cost management the description of a JIT system will be deferred until the end of he chapter.

6. Tear-Down analysis

Tear down analysis (also known as reverse engineering) involves examining a competitor's product in order to identify opportunities for product improvement and/or cost reduction. The competitor's product is dismantled to identify its functionality and design and to provide insights about the processes that are used and the cost to make the product. The aim is to benchmark provisional product designs with the designs of competitors and to incorporate any observed relative advantages of the competitor's approach to product design.

7. The need for Accurate Cost Management Systems

It is important that target costing is supported by an accurate cost system. In particular, cost drivers should be established that are the significant determinants of the costs of the activities so that cause-and-effect allocations are used. Arbitrary cost allocations should be avoided. IF arbitrary cost allocations are used the allocation base will not be a significant determinant of cost. Let us assume that an arbitrary allocation base, say direct labour hours, is used to allocate support costs to products. To reduce the projected cost towards the target cost the target costing team will be motivated to focus on reducing direct labour hours. Why? Because this will result in a smaller proportion of the support costs being assigned to the product.

However, the support costs incurred by the organisation will not be reduced because there is no cause-and-effect relationship between direct labour hours and the resulting costs.

Therefore the target costing exercise will merely result in a reduction in the costs that are allocated to the product but organisational costs will not be reduced. In contrast, if cause-and-effect allocation bases (i.e. cost drivers) are established, reductions in cost driver usage should be followed by a reduction in organisational support costs.

Therefore, it is very important that cost systems use cost drivers that are the determinants of costs so that they will motivate designers to take actions that will reduce organisational costs. Decisions taken at the design stage lead to the committed usage of cost drivers which can be difficult to change in the future.

8. Cost Leadership

By pursuing an overall cost leadership strategy, a firm can earn above-average returns in its industry despite the presence of strong competitive forces. Cost leadership attained by consistent emphasis on efficient production of a good or service, which makes the firm as a low-cost producer in the industry.

For cost leadership the commonly required skills and resources are:

1. Sustained capital investment and access to capital,

2. Process engineering skills,
3. Intense supervision of labour,
4. Products designed for ease in manufacture,
5. Low-cost distribution system.

the common organisational requirements are:-

1. Tight cost control,
2. Frequent detailed control reports,
3. Structure organisation and responsibilities,
4. Incentives based on meeting strict quantitative targets,

9. Kaizen Costing & Target Costing

Kaizen Costing is widely used by Japanese organisation as a mechanism for reducing and managing costs.

Kaizen is the Japanese terms for making improvements to a process through small incremental amounts, rather than through large innovations.

The major difference between target and Kaizen costing is

- a. Target costing is applied during the design stage whereas Kaizen costing is applied during the manufacturing stage of the product life cycle.
- b. With target costing the focus is on the product, and cost reductions are achieved primarily through product design. In contrast, Kaizen costing focuses on the production process and cost reduction are derived primarily through the increased efficiency of the production process.

Therefore the potential cost reductions are smaller with Kaizen costing because the products are already in the manufacturing stage of their life cycles and a significant proportion of the costs will have become locked-in.

The aim of Kaizen costing is to reduce the cost of components and products by a pre-specified amount. Monden and Hamada (1991) describe the application of Kaizen costing in a Japanese automobile plant. Each plant is assigned a target cost reduction ratio and this is applied to the previous year's actual costs to determine the target cost reduction.

Kaizen costing relies heavily on employee empowerment. They are assumed to have superior knowledge about how to improve processes because they are close to the manufacturing processes and customers and are likely to have greater insights into how costs can be reduced.

Thus, a major feature of Kaizen costing is that workers are given the responsibility to improve processes and reduce costs. Unlike target costing it is not accompanied by a set of techniques or procedures that are automatically applied to achieve the cost reductions.

10. The Balanced Scorecard

Prior to the 1980s management accounting control systems tended to focus mainly on financial measures of performance. The inclusion of only those items that could be expressed in monetary terms motivated managers to focus excessively on cost reduction and ignore other important variables which were necessary to compete in the global competitive environment that emerged during the 1980s. Product quality, delivery, reliability, after-sales service and customer satisfaction became key

competitive variables, but not of these were measured by the traditional management accounting performance measurement system.

During the 1980s much greater emphasis was given to incorporating into the management reporting system those non-financial performance measures that provided feedback on the key variables that are required to compete successfully in a global economic environment.

However, a proliferation of performance measures emerged. This resulted in confusion when some of the measures conflicted with each other and it was possible to enhance one measure at the expense of another. It was also not clear to managers how the non-financial measures on which they were evaluated contributed to the whole picture of achieving success in financial terms.

The need to link financial and non-financial measures of performance and identify key performance measures led to the emergence of the balanced scorecard – a set of measures that gives top management a fast but comprehensive view of the organisational unit (i.e. a division / strategic business unit). The balanced scorecard was devised by Kaplan and Norton (1992) and refined in later publications (Kaplan and Norton, 1993,)

It allows managers to look at the business from four different perspectives by seeking to provide answers to the following four basic questions:

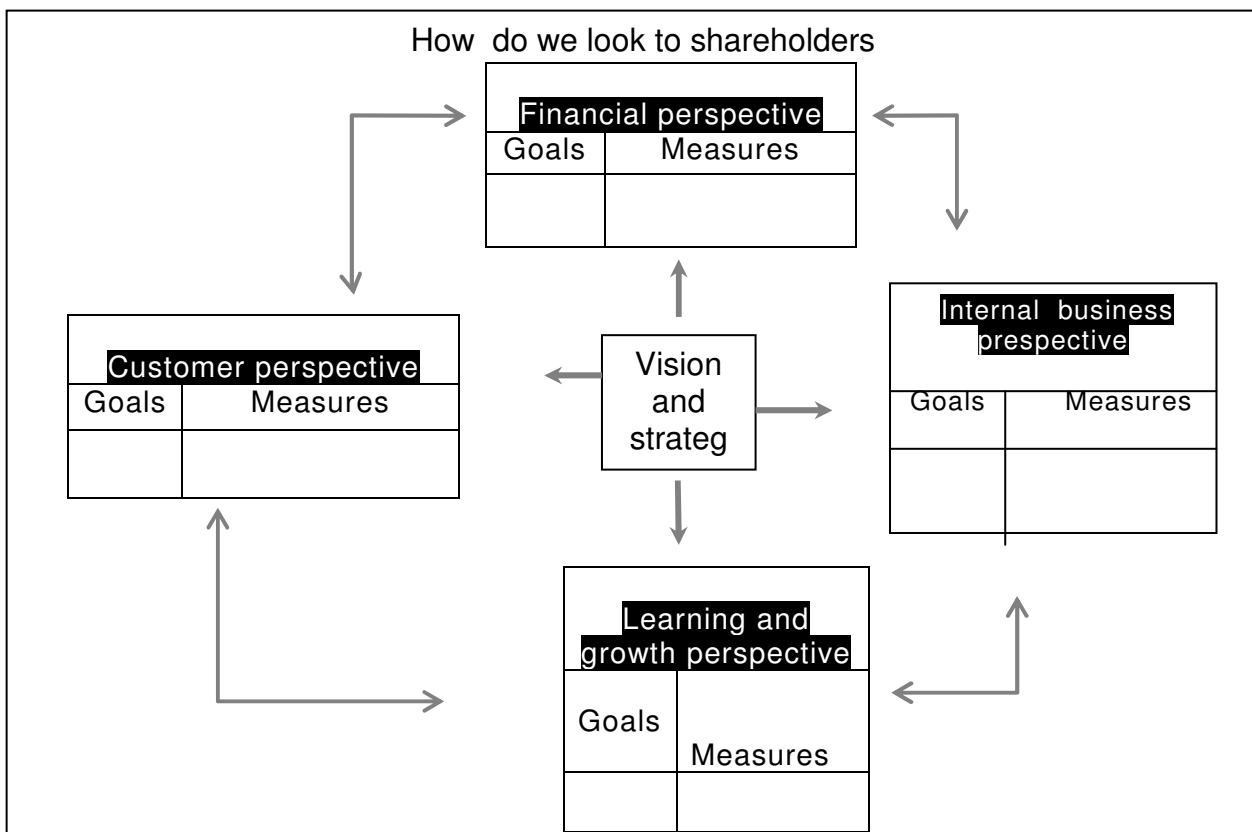
1. How do customers see us? (customer perspective)
2. What must we excel at ? (internal business process perspective)
3. Can we continue to improve and create value? (learning and growth perspective)
4. How do we look to shareholders? (financial perspective)

The aim of the scorecard is to provide a comprehensive framework for translating a company's strategic objectives into a coherent set of performance measures.

Kaplan and Norton recommend that organisations should articulate the major goals for each of the four perspectives and then translate these goals into specific performance measures. The choices will vary over time and should be linked to the strategy that the organization is following.

They observed that most companies were trying to improve the performance of existing processes (through lower cost, improved quality and shorter customer response times) but they were not identifying the processes that were truly strategic (i.e. those that require exceptional performance) for an organisation's strategy to succeed.

The Balance Scorecard



11. What are the features of a Just –in –time (JIT) manufacturing system ?
What are its benefits ?

Answer: Just in Time Manufacturing (JIT –Manufacturing) :

Just in time manufacturing system developed in Japan (Toyota), normally for use with respect to manufacture. Which aims at a much tightened control over inventory. It has been defined as the production of the necessary items, in the necessary quantities, at the necessary time. The term implies prompt movement of materials to an operation or customer as and when they are required.

The concepts involved in JIT are little more than common sense. Rather than pushing large quantities of inventory through a process, JIT encourages a smaller, more consistent flow of parts to be pulled when needed as illustrated in Figure 1. The result is a smooth flow of piece parts and work in process. Quoting Henry Ford : 'Simplify and the goods will flow like water'.

Features :

- a) Low or Zero inventories; emphasis on operation from source to customer .
- b) Emphasis on customer service and timing.
- c) Short of operations.
- d) Flexibility of operations.
- e) Efficient flow
- f) Use of kanban and Visibility.

Benefits :

- a. Reduce inventories and WIP
- b. Reduce space requirements, set up time
- c. Shorter throughput times
- d. Greater employees involvement, participation and motivation
- e. Smooth work force
- f. Greater productivity
- g. Improved product /service quality
- h. Improved customer service and smaller batch size.
- i. More uniform loading of facilities.

Pre –requisites of JIT:

- (i) Low variety
- (ii) Demand stability
- (iii) Vendor reliability
- (iv) Defect free materials.
- (v) Good communication
- (vi) Preventive maintenance
- (vii) Total quantity control.

Desirable factor of JIT :

- (i) Management commitment
- (ii) Employee investment.
- (iii) Employee flexibility.

Effect of using JIT (Just in Time) in Inventory Control.

- i. saves cost due to lead time
- ii. saves cost due to holding inventory like insurance, spoilage, obsolescence etc.
- iii. does away with locking up of funds in inventory
- iv. helps very much in working capital management

12. Target Costing vs. Kaizen Costing

It has been mentioned earlier that Kaizen costing can be used to achieve target cost. We thus make a brief comparison between the two as follows:

1. Target costing is effective in managing costs in design and development stage of value chain while Kaizen is effective in the rest of the value chain areas, i.e. production, marketing, customer service etc.
2. Target costing is essentially a long term strategy aimed at bringing in excellence in the organisation. Kaizen stands for continuous improvement which is generated to short-term repetitive actions for cost reduction.
3. Kaizen is complimentary to target costing to achieve the desired results. Used with target costing, Kaizen helps reduce costs through the entire value chain of the firm.

13. Kaizen Costing vs. Standard Costing

A standard costing system has essentially a financial accounting focus, i.e. standards are set in financial terms and variance analysis follows similarly. Kaizen operates outside a company's standard costs system and takes into account both financial and non-financial measures for cost reduction. In that sense, it functions in a similar fashion as a budgetary control system. Kaizen has a close link with a firm's profit planning costing, the aim is to meet the cost standard effectively. Standard costing assumes current manufacturing conditions. Kaizen assumes

continuous improvement in manufacturing and takes care of many other business functions (in the value chain) beyond manufacturing.

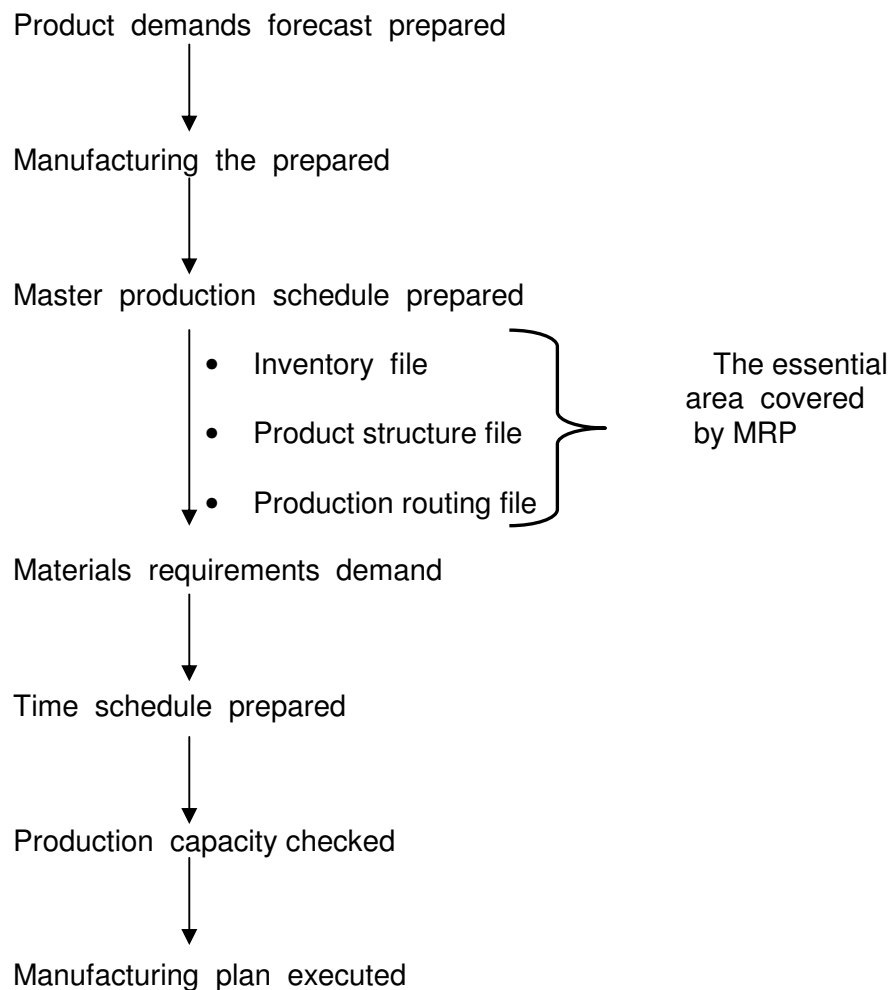
14. State the requirements for operation of a **Materials Requirement Planning (MRP) system**

Answer :Materials Requirement Planning (MRP) originated in the early 1960s as a computerised approach for co-coordinating the planning, acquisition and production of materials. Important requirements for the operation of a MRP system are as follows :-

- (i) **Master production schedule** : It specifies the quantity of each finished unit of products to be produced along with the time at which each unit will be required.
- (ii) **Bill of materials file** : This file specifies the sub-assemblies, components and materials requirement for each item of finished goods.
- (iii) **Inventory file** : It maintains details of items in hand for each sub-assemblies, components and materials required.
- (iv) **Routing file** : This file specifies the sequence of operations required to manufacture components sub-materials required.
- (v) **Master parts file** : It contains information about the production time of sub-assemblies and components produced internally and lead time for externally procured items.

15. Write short notes on **MRP- II**

MRPII (also written MRP-2) adds the MRP schedule into a capacity planning system and then builds the information into a production schedule. It is also seen as a link between strategic planning and manufacturing control. The sequence of events is as follows :



From that document, a manufacturing, plan is developed based upon inputs from purchasing and production. Adjustments may be necessary to allow for production rates. Possible inventory levels in seasonal trades and the size of the workforce. The manufacturing plan leads into a

detailed master production schedule which is akin to the original philosophy of MRP already outlined.

If correctly applied, MRPII provides a common data base for the different function units such as manufacturing, purchasing and finance within a firm.

16. Synchronous management / manufacturing

The profitability of the modern organization is dependent on a number of factors, not least of which is the rate at which are made. Other factors include the reduction of costs and maximization of efficiency.

Management must identify what is referred to as 'the bottleneck factor' This is the factor of production which limits the organization's ability to increase the rate at which sales are achieved. You should recall that this is similar in principle to the limiting factor used in contribution analysis as part of short-term decision making.

The combination of management policies and practices to improve efficiency and identify and alleviate the bottleneck factor are collectively referred to as synchronous management and manufacturing practices.

17. Backflush accounting

Backflush accounting is a cost accounting system which focuses on the output of an organization and then works backwards to attributed costs to stock and cost of sales.

This system records the transaction only at the termination of the production and sales cycle. The emphasis is to measure cost at the beginning and at the end with greater emphasis on the end or outputs. Since back flushing is usually employed in parallel with JIT, there is no work-in-progress to considered nor, does work-in-progress materially fluctuate.

Essential for Backflush accounting

1. accurate bill materials,
2. good measures of yield and
3. accurate engineering change notice when yields do change.

The variants of Backflush accounting

There are a number variants of the Backflush system, each differing as to the 'trigger points' at which costs are recognized within the cost accounts and thus associated with products. All variants, however, have the following common features :

- the focus is on output – costs are first associated with output (measured as either sales or completed production) and then allocated between stocks and costs of goods sold by working back.
- Conversion costs (labour and overheads) are never attached to products until they are complete (or even sold). Materials are recognized at different points according to the variant used, but only to the extent of being either stock of raw materials or part of the cost of stock of finished goods. Again, materials are not attached to WIP.

18. The theory of constraints (TOC)

The idea behind TOC is that raw materials should be turned into products that are immediately shipped to customers at the greatest possible speed, in a similar way to the JIT system.

The important concept behind TOC is that the production rate of the entire factory is set at the pace of the bottleneck – the constraining resource. Hence, in order to achieve the best result TOC emphasises the importance of removing bottlenecks or limiting factor. If they cannot be removed they must be coupled with in the best to be drawn to identify the bottlenecks or binding constraints.

TOC identifies three types of cost.

- Throughput contribution = Sales revenue -- direct material cost.

Direct material cost includes purchased components and materials handling costs.)

- Conversion costs : These are all operating costs, excluding completely variable costs, which are incurred in order to produce the product i.e. labour and overhead, including rent, utilities and relevant depreciation.
- Investments which include all stock, raw material, work in progress, finished goods, research and development costs, cost of equipment and buildings, etc.

The aim is to increase throughput contribution while decreasing conversion costs and investment costs.

19. Throughput accounting

Throughput Accounting (TA) is a method of performance measurement which relates production and other costs to throughput. Throughput accounting product costs relate to usage of key resources by various products.

It assumes that a manager has a given set of resources available. These comprise the existing buildings, capital equipment and labour force. Using these resources, purchased materials and components must be processed to generated sales revenue. To achieve this, maximum amount of throughput is required with the financial definition.

$$\text{Sales revenue} - \text{Direct materials cost}$$

The cost of all other is deemed at least time related rather than fixed.

Throughput is influenced by :

- Selling price
- Direct purchase price
- Usage of direct materials
- Volume of throughput.

Constraints on throughput might include :

- the existence of an uncompetitive selling price
- the need to deliver on time to particular customers
- the lack of product quality and reliability
- the lack of reliable materials suppliers
- the existence of shortage of production resources.

It becomes management's task to eliminate these constraints. Shortage of resources are usually termed bottlenecks, and their elimination often only moves a problem from one location to another. Thus the careful planning to minimize and eliminate all bottlenecks becomes very important.

20. Kanban Materials Acquisition System

Kanban is a Japanese word. It is a tool for implementing JIT production. In its most common form a kanban is simply a card that contains production information. This card identifies

- a. the part number,
- b. delivery and work cell locations,
- c. part descriptions,
- d. quantity,
- e. company name and the
- f. card number within a series.

Often kanban cards are bar-coded to facilitate ease of use.

The implementation of Kanban drastically changed the buyers' activities. Under the new system the buyers

- Placed blanked orders with suppliers. Instead of suppliers receiving five to six large orders per year, smaller kanban quantities were requested often, on a daily basis.
- Made quality the primary factor. It is of no use to receive five or 500 parts if they are not usable.
- Provided the support to supply economical amounts of inventory. Buyers no longer controlled or were responsible for inventory levels and their delivery dates. Once the Kanban was formed, the buyer acted as a facilitator, providing the necessary administration to support parts movement.

Once the Kanban was in place, buyers found their relationships with the vendors had changed from adversarial and tenuous to a partnership. The vendors were thrilled with Kanban. The radical schedule and production fluctuation they had been experiencing were gone. They now had visibility of what their customer actually needed. They were able to respond immediately to demand.

Re-vision: tough Problems for those students who likes to do some hard sums

1. A company extracts exhaust gases from process ovens as part of the manufacturing process. The exhaust gas extraction is implemented by machinery which cost £100,000 when bought five years ago. The machinery is being depreciated at 10% per annum. The extraction of the exhaust gases enhances production output by 10,000 units per annum. This production can be sold at £8 per unit and has variable cost of £3 per unit. The exhaust gas extraction machinery has directly attributable fixed operating costs of £16,000 per annum.

The company is considering the use of the exhaust gases for space heating. The existing space heating is provided by deducted hot air which is heated by equipment with running costs of £10,000 per annum. This equipment could be sold now for £20,000 but would incur dismantling costs of £3000. If retained for one year the equipment could be sold for £18,000 with dismantling cost of £3,500.

The conversion to the of the exhaust gases for space heating would involve the following :

- (i) The removal of the existing gas extraction machinery. This could be implemented now at a dismantling cost of £5,000 with sale of the machinery for £40,000. Alternatively it could be sold in one year's time for £30,000 with dismantling costs of £5,500.
- (ii) The leasing of alternative gas extraction equipment at a cost of £4,000 per annum with annual fixed running cost of £12,000.
- (iii) The conversion would mean the loss of 30% of the production enhancement which the exhaust gas extraction provides for a period of one year only, until the new system is 'running'.
- (iv) The company has a spare electric motor in store which could be sold to company X for £3,500 in one year's time. It could be fitted to the proposed leased gas extraction of the production losses during the running-in period. This course of action would reduce its sales value to company X in one year's time to £2,000 and would incur £2,500 of fitting and dismantling costs.

It would, however, reduce the production enhancement loss from 30% to 10% during the coming year (year1). This would not be relevant in year 2 because of an anticipated fall in the demand for the product. The electric motor originally cost £5,000. If replaced today it would cost £8,000. It was purchased for another process which has now been discontinued.

It could also be used in a cooling process for one year if modified at a cost of £1,000. instead of the company hiring cooling equipment at a cost of £3,000 per annum. Because of its modification, the electric motor would have to be disposed of in one year's time at a cost of £250.

Ignore the time value of money.

Required :

- (a) Prepare an analysis indicating all the options available for the use of the spare electric motor and the financial implications of each. State which option should be chosen on financial grounds.
- (b) Prepare an analysis on an incremental opportunity cost basis in order to decide of financial grounds whether to convert immediately to the use of exhaust gases for space heating or delay the conversion for one year.

2. Ben runs an industrial moulding company whose bread and butter product-line standard, preformed windows for housing estates. A worker, who is paid £9 per hour, can produce two windows an hour. Each window uses material and glass costing £10 and incurs a variable overhead of £7. Each window sells for £30. At present, owing to economic conditions, work is rather slack and three of Ben's employees are occupied in carrying out extensive repairs to his own house. Ben also owns a warehouse next to the factory, which has been used as a factory store in the past. Today it is let out on a renewable annual lease of £6,000 for storage to Shifty Depositories.

A new building company which specialises in producing prefabricated houses has asked Ben if he would be interested in accepting a contract for £300,000 which will be for a year initially, to

produce moulded internal building sections. Ben estimates that it would take 13,200 hours work, or the work of five men for a year, and the variable overhead would be £100,000. The work could be carried out in the factory, but because of the large amount of space needed it would have to replace 9,600 hours of existing work. He calculates that the materials required for the contract would cost £60,000,

Alternative the work could be carried out in the warehouse; the lease is due to be renewed next month, anyway. Ben thinks this would involve the company in an extra cost of £3,000 for heating and the cost of power would increase by £5,000. He would hire two new workers and pay them £22,000 each per annum. If the contract was carried out in the warehouse, the other three men would be those at present repairing Ben's house. The three workers are paid £77,000 per annum in total and it would cost £25,000 to get an outside contractor to finish the house repairs.

Requirements

- (a) What would you advise Ben to do ?
- (b) Consider the longer-term implications to Ben's business that this decision might have. Explain in detail your reasoning and all figures in your calculations.

3. Lucy & Co. manufactures a particular type of lawn mower which sells for Rs. 150. Head office is in C uptown and its factories are in three widely separated town Cee, Uwe and Tee factories. The company is facing not only increasing competition, but also a falling market for its product. The sales director forecasts that this year's sales will be $16\frac{2}{3}\%$ less than those for the year ended 30th April and that there is no possibility of an increase in selling price. It can be assumed that cost prices will not change during the year. You are required :

- a. to evaluate for management the possibility of closing one of the factories and of changing the output of one or both of the remaining two to maximise profit ;
- b. to list the behavioral implications if such a decision were taken. The summarised profit and loss statements for the year ended 30th April are as follows:

	Factories (Rs.000)		
	Cee	Uwe	Tee
Direct materials	1,200	4,800	2,400
Direct wages	600	3,000	1,440
Prime cost	1,800	7,800	3,840
Variable production overhead	150	840	360
Fixed production overhead	750	2,640	1,200
Production cost	2,700	11,280	5,400
Administration overhead	300	1,800	840
Variable selling overhead	300	1,440	480
Fixed selling overhead	450	1,560	1,080
Head office costs	300	1,200	600
Total cost	4,050	17,280	8,400
Profit	450	720	600
Sales	4,500	18,000	9,000

Additional data :

- (i) Costs of closing down each factory can be ignored;
- (ii) In general, there is sufficient capacity available at each factory to undertake additional production, if required. Each factory could increase its output upto twice the past year's level without the need for major investment, but additional costs would be incurred in respect of supervision, storage, maintenance. etc. These additional facilities are readily available in each locality and their costs are forecast as follows:

If output compared with that of past year rises by	Cee	Uwe	Tee
	(Rs.000)		
1% -- 25%	300	500	300

26% -- 50%	350	600	400
51% -- 75%	400	800	600
76% -- 100%	500	1,000	700

(iii) Transport costs would be affected if one of the factories were closed because the remaining factories would be required to supply customers in the particular area concerned. It is expected that sales in each area will be reduced in line with the sales director's forecast. Extra costs of transport per unit are forecasted as :

To factory Cee area	Rs. 35
To factory Uwe area	Rs. 25
To factory Tee area	Rs. 10

4. Pepcola Ltd. selling a washing machine, has estimated the market capacity as 30,000 units a year, divided evenly three sales area -East, North and Centre. The Managing Director has set a sales objective of between 50% and 80% of this potential. The sales force is divided into three equal areas and the objective is expected to be achieved by using salesmen in the following manner :

Number of Salesmen used	Market Share expected (%)
5	60
6	68
7	74
8	78

All the products are manufactured at one location at ex-factory cost of Rs. 8,400 each and are sold at a standardised price of Rs 10,000 each. The transportation and installation cost varies in relation to the distance from the factory as follows:

Sales Area	Variable transportation installation cost per Unit (Rs.)
East	800
North	750
Centre	700

20 salesmen will be employed at an average cost of Rs. 3,25,000 The marketing Director indicated that even with additional salesmen increase beyond 6500 units per area would be difficult unless additional expenditure are incurred in advertising and sales incentives as below.

Sales per Area	Additional Expenditure
6501-7000	Rs.20,000 for every 100 units or part there of sold beyond 6500.
7001-7500	Rs.1,00,000 plus Rs. 25,000 for every 100 units or part there of sold beyond 7000.
7501-8000	Rs.2,25,000 + Rs. 40,000 for every 100 units or part thereof sold beyond 7500 units.

Given that there must be at least five salesman in each areas, you are required to do the following:

- Calculate the highest total contribution possible using 20 salesmen.
- Advise whether increasing the sales force would improve the total contribution.

5. SV Ltd. has setup a treatment plan at Kaval Town. The Company purchases the basis raw material namely raw KAB and arranges for the sales of the finished product KAB after in its plant.

The treatment plan has a capacity of 60,000 tonnes per annum of raw KAB. The variable costs of treatment of raw KAB are Rs. 4/- per tonne and the fixed costs amount to Rs. 6,00,000 per annum. There is no loss in process.

The Company owns a fleet of vehicles having a capacity to handle 260 lakhs tonne kilometre of raw KAB. The fixed costs of the transport net work of the company is Rs. 10,50,000 per annum and the variable costs amount to 8 paise per tonne-kilometre. The Company can also provide

another transport service to its customers at 16 paise per tonne-kilometre variable and Rs. 45,000 per annum fixed. Facilities for hiring transport of incoming and outgoing goods are also available outside at a cost of 18 paise per tonne-kilometre.

The Company has three sources of purchase of Raw KAB as per details given below :--

- (i) The data relating to outputs, costs and distances of the three sources are :

Sources:	Bee town	Cee town	Dee town
Capacity of raw KAB (tonnes per annum)	9,000	27,000	45,000
Distance of the towns from Kaval Town in kms.	250	250	500
Costs of extraction of raw KAB :			
Variable costs (Rs./tonne)	90	120	68
Fixed Cost (Rs. per annum)	24,000	80,000	96,000

- (ii) The sources at Bee town being the subsidiary of the Company has an offer from outside party for the purchase of its entire output of raw KAB at Rs. 108/- per tonnes from source.

- (iii) Ceetown its own arrangement for the sales of its output of Raw KAB but is prepared to offer the left over quantity of 8,000 tonnes per annum to the Company at a cost of Rs. 120/- per tonne.

- (ii) The Deetown sources can supply its entire quantity of raw KAB to the Company.

Customer	Quantity of sales Tonnes/ annum	Price/tonnes Rs.	Delivery terms	Distance from the Company's treatment Plant Kaval Km.
NA	6,000	200	At customer's site	8
NB	6,000	188	Ex-factory Kaval	--
NC	15,000	168	Ex-factory Kaval	---
ND	9,000	150	Ex-factory Kaval	--
NE	10,000	192	At customer's site	22
NF	9,000	220	At customer's site	15
NG	9,000	200	At customer's site	26

You are required to :--

- Evaluate the alternative proposal for purchase of raw KAB, sales of the treated product KAB and transportation plans for incoming and outgoing goods with a view to maximising the profitability.
- Prepare a statement showing the profitability of the proposal recommended by you.

6. Plant Manager has proposed a scheme of modification to remove imbalance in plant which would cost Rs. 200 lakhs. The plant is operated for 8,000 hours round the clock in continuous operation and is taken off for shutdown of one month. Hooking up of the scheme would required 50 days.

Following improvements are envisaged :

- Raw materials consumption would improve to 1.04 from 1.05 as at present.
- Production capacity would go up by 10% from existing one of 10,000 tonnes per annum
- Hourly steam consumption of 10 tonnes would be improved by 10%

Operational cost of the scheme is indicated as under :

- (1) Five additional operators would be required in each shift. Average employment are Rs. 2000 per month ;
- (2) Repairs and maintenance cost is estimated @ 3% of the total cost of the scheme :
- (3) Power consumption would be Rs. 100 per hour ; and
- (4) Additional overheads would be Rs. 25,000 per month.

Further information to examine viability of the scheme are as under :

- (1) Product is sold at Rs. 20,000 per tonne ;
- (2) Variable cost is Rs. 12,000 while raw material is purchased at Rs. 6,000 per ton ; and
- (3) Steam costs Rs. 300 per tonne which includes fuel cost of Rs. 240 and chemicals of Rs. 10.

Since own funds are limited, term loan to the extent of 50% would be procured carrying interest @ 15% payable at year end along with 10% of principle amount.

Depreciation on WDV basis is provided @ 30%

Tax is payable @ 50% on net income after aforesaid depreciation.

It is the corporate policy to expect a post tax return of 14% on total investment of own funds and considering three years spectrum for any major modifications. It is generally assumed that all cost elements and selling price will remain unchanged and to ignore all cash inflows, if any , while evaluating viability of such schemes.

There is some hesitation in approving the scheme. You are ,therefore, consulted to examine various aspects of the scheme and its financing.

You are required to tender your advice on desirability and viability in executing the scheme having regard to the corporate policy.

7. A Company manufacturing agricultural Tractors has a capacity to produce 6,000 tractors annually. The capital employed in the project as on date is Rs. 20 cores. With increasing cost of production and reducing margins the company is fast narrowing its margin of safety. The return on capital employed fell from 10% in the previous year to 6% in the current year, i.e., the current year profit is Rs. 1.20 cores. The company wants to maintain the original cut off rate of 12% and various possibilities have been examined for this propose.

The company is at present manufacturing and marketing 6,000 tractors annually though there is imbalance in the plant. The company has the following major production departments with percentage capacity utilisation for the present production :

Production Dept.	Capacity utilized
Machine Shop	75%
Assembly Shop	100%
Heat treatment Shop	75%
Induction hardening	50%

The Company operates a single shift of 8 hours per day on an average for 300 days in a year. For technical reason the plant will have to operate on single shift basis only.

The two alternatives which have emerged after a detailed study are :

(a) To hire out the surplus capacity in the productions shops for which constant demand exists. The following income and expenditure projections are drawn out :

	Hire charges per hour Rs.	Incremental cost per hour Rs.
Machine Shop	10,000	2,000
Heat-treatment Shop	7,500	1,500
Induction-hardening	5,000	1,000

(b) To increase the installed capacity to 8,000 tractors by spending Rs. 2 cores on additional machinery for the assembly for the assembly shop. The incremental revenue from the additional sale will be Rs. 5,000 per tractor. The cost of additional finance will be 12% being the cost of existing capital employed. In addition tax benefits on an average will work out to 1% of additional investment.

Decide.