REVISIONARY TEST PAPER

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GROUP IV

PAPER - 15 : MANAGEMENT ACCOUNTING – ENTERPRISE PERFORMANCE MANAGEMENT

THE INSTITUTE OF COST AND WORKS ACCOUNTANTS OF INDIA

12, SUDDER STREET, KOLKATA-700 016

FINAL EXAMINATION

(REVISED SYLLABUS - 2008)

GROUP - IV

Paper-15 : MANAGEMENT ACCOUNTING–ENTERPRISE PERFORMANCE MANAGEMENT

Q. 1. (a) State whether the following statement are "True" or "False".

(i) A 'cost of quality report' indicates the total cost to the organization of producing products or services conforming with quality of requirements.

(ii) A balanced score card studies the performance of management by comparing a financial achievement with the amount spent thereon.

(iii) One of the goals JIT seeks to achieve is batch sizes of one.

(iv) Safety stock is that level of stock that is stored in fire-proof insurable storage.

(v) Differential cost decision excludes fixed cost and qualitative factors.

(vi) Back Flash Accounting compares profit with the cost of producing a product.

(vii) EVA encourages short-term performance.

(viii) The useful purpose that budgets seek to serve include coordinating the activities of the various parts of the organization and ensuring that the parts are in harmony with each other.

(ix) To convert the assignment problem into a maximization problem, all elements of the matrix are deducted from the highest element in the matrix.

(x) In a transportation problem VAM stands for Vogel's approximation method.

Q. 1. (b) Choose the most appropriate one from the stated options and write it down.

(i) Back flush costing is most likely to be used when

A. Management desires sequential tracking of costs

B. A Just-in-Time inventory philosophy has been adopted

C. The company carries significant amount of inventory

D. Actual production costs are debited to work-in-progress

(ii) In calculating the life cycle costs of a product, which of the following items would be included?

A. Planning and concept design costs

B. Preliminary and detailed design costs

C. Testing costs

D. Production costs

E. Distribution costs

(A) All of the above **(C) (ii), (iv) and (v)**

(B) (iv) and (v) **(D) (iv)**

(iii) A company's approach to a make-or-buy-decision

A. Depends on whether the company is operating at or below normal volume

B. Involves an analysis of avoidable cost

C. Should use absorption (full) costing

D. Should use activity-based-costing

(iv) When a manager is concerned with monitoring total cost, total revenue, and net profit conditioned upon the level of productivity, an accountant should normally recommended.

	Flexible Budgeting	*Standard Costing*
A	Yes	Yes
B	Yes	No
C	No	Yes
D	No	No

(v) The selling price of product P is set at Rs. 1,500 for each unit and sales for the coming year are expected to be 500 units.

If the company requires a return of 15% in the coming year on its investment of Rs. 15,00,000 in product P, the TARGET cost for each unit for the coming year is.

A. Rs. 930
B. Rs. 990
C. Rs. 1,050
D. Rs. 1,110

Q. 1. (c) Write out what the following abbreviations stands for in the context of Enterprise Performance Management.

i. CBS
ii. LCC
iii. WAITRO
iv. QFD
v. MPS

Q. 1. (d) Define the following terms in not more than two or three lines.

i. ERP
ii. MPS
iii. Decision Tree Analysis
iv. Quality Planning
v. Quality Circle

Answer 1. (a)

(i) False
(ii) False
(iii) True
(iv) False
(v) False
(vi) False

(vii) False

(viii) True

(ix) True

(x) True

Answer 1. (b)

(i) B

(ii) A

(iii) B

(iv) A

(v) C

Answer 1. (c)

(i) Cost Breakdown Structure

(ii) Life Cycle Costing

(iii) World Association of Industrial and Technological Research Organisation

(iv) Quality Function Deployment

(v) Master Production Schedule

Answer 1. (d)

(i) Enterprise resource planning (ERP) refers to a computer information system that integrates all the business activities and processes throughout an entire organization. ERP systems incorporate many of the features available in other types of manufacturing programs, such as project management, supplier management, product data management, and scheduling. The objective of ERP is to provide seamless, real-time information to all employees throughout the enterprise. Companies commonly use ERP systems to communicate the progress of orders and projects throughout the supply chain, and to track the costs and availability of value-added services.

(ii) The master production schedule (MPS) is basically the production schedule for finished goods. This schedule is usually derived from current orders, plus any forecast requirements. The MPS is divided into units of time called "buckets." While any time frame may be utilized, usually days or weeks is appropriate. The MPS is also said to be the aggregate plan "disaggregated." In other words, the plan for goods to be produced in aggregate is broken down into its individual units or finished goods.

(iii) Decision Trees are excellent tools for helping you to choose between several courses of action. They provide a highly effective structure within which you can lay out options and investigate the possible outcomes of choosing those options. They also help you to form a balanced picture of the risks and rewards associated with each possible course of action.

(iv) Quality Planning :

- Determine who are the customers
- Determine the needs of the customers
- Develop product features that respond to the customers' needs.
- Develop processes that are able to produce those product featurers
- Transfer the resulting plans to the operating forces.

(v) Quality Circle is a small group of 6 to 12 employees doing similar work who voluntarily meet together on a regular basis to identify improvements in their respective work areas using proven techniques for analysing and solving work related problems coming in the way of achieving and sustaining excellence leading to mutual upliftment of employees as well as the organisation. It is "a way of capturing the creative and innovative power that lies within the work force".

Q. 2. Short Notes :

(i) Drum – Buffer – Rope
(ii) Query Tools
(iii) CRP
(iv) Mainframes
(v) ERP

Answer 2. (i)

DRUM-BUFFER-ROPE :

Drum-buffer-rope is a TOC production application and the name given to the method used to schedule the flow of materials in a TOC facility. Srikanth and Umble (1997), define each component as follows :

- **Drum :** The drum is the *constraint* and therefore sets the pace for the entire system. The drum must reconcile the customer requirements with the system's constraints. In simpler terms, the drum is the rate or pace of production set by the system's constraint.
- **Buffer :** A buffer includes time or materials that *support throughput* and/or due date performance. A buffer establishes some protection against uncertainty so that the system can maximize throughput. A time buffer is the additional planned lead time allowed, beyond the required setup and run times, for materials to reach a specified point in the product flow. Strategically placed, time buffers are designed to protect the system throughput from the internal disruptions that are inherent in any process. A stock buffer is defined as inventories of specific products that are held in finished, partially finished, or raw material form, in order to fill customer orders in less than the normal lead-time. Stock buffers are designed to improve the responsiveness of the system to specific market conditions.
- **Rope :** The rope is a *schedule* for releasing raw materials to the floor. The rope is devised according to the drum and the buffer. The rope ensures that non-capacity constraint resources are subordinate to the constraint. Restated, the rope is a communication process from the constraint to the gating operation that checks or limits material released into the system to support the constraint.

Answer 2. (ii)

Query tools allow the users to find the information needed to perform any specific function. The inability to easily create and execute functional queries is a common weak link in many information systems. A significant cause of that inability, as noted earlier, can be the communication difficulties between a management information systems department and the system users.

Another critical issue toward ensuring successful navigation of the varied information levels and partitions is the compatibility factor between knowledge bases. For maximum effectiveness, the system administrator should ascertain that the varied collection, retrieval, and analysis levels of the system either operate on a common platform, or can export the data to a common platform. Although much the same as query tools in principle, intelligent agents allow the customization of the information flow through sorting and filtering to suit the individual needs of the users. The primary difference between query tools and intelligent agents is that query tools allow the sorting and filtering processes to be employed to the specifications of management and the system administrators, and intelligent agents allow the information flow to be defined in accord with the needs of the user.

Answer 2. (iii)

Capacity requirements planning is only applicable in firms using MRP or MRP II. CRP uses the information from one of the previous rough-cut methods, plus MRP outputs on existing inventories and lot sizing. The result is a tabular load report for each work center or a graphical load profile for helping plan-production requirements. This will indicate where capacity is inadequate or idle, allowing for imbalances to be corrected by shifts in personnel or equipment or the use of overtime or added shifts. *Finite capacity scheduling* is an extension of CRP that simulates job order stopping and starting to produce a detailed schedule that provides a set of start and fi nish dates for each operation at each work center.

A failure to understand the critical nature of managing capacity can lead to chaos and serious customer service problems. If there is a mismatch between available and required capacity, adjustments should be made. However, it should be noted that firms cannot have perfectly-balanced material and capacity plans that easily accommodate emergency order. If flexibility is the firm's competitive priority, excess capacity would be appropriate.

Answer 2. (iv)

The original computerized information systems were based on mainframes. "Mainframe" is a term originally referring to the cabinet containing the central processor unit or "main frame" of a room-filling computer. After the emergence of smaller mini-computer designs in the early 1970s, the traditional large machines were described as "mainframe computers," or simply mainframes. The term carries the connotation of a machine designed for batch rather than interactive use, though possibly with an interactive time-sharing operating system retrofi tted onto it.

It has been conventional wisdom in most of the business community since the late 1980s that the mainframe architectural tradition is essentially dead, having been swamped by huge advances in integrated circuit design technology and low-cost personal computing. Despite this, mainframe sales in the United States enjoyed somewhat of a resurgence in the 1990s, as prices came down and as large organizations found they needed high-power computing resources more than ever. Supporters claim that mainframes still house 90 percent of the data major businesses rely on for mission-critical applications, attributing this to their superior performance, reliability, scalability, and security compared to microprocessors.

Answer 2. (v)

Enterprise resource planning (ERP) refers to a computer information system that integrates all the business activities and processes throughout an entire organization. ERP systems incorporate many of the features available in other types of manufacturing programs, such as project management, supplier management, product data management, and scheduling. The objective of ERP is to provide seamless, real-time information to all employees throughout the enterprise. Companies commonly use ERP systems to communicate the progress of orders and projects throughout the supply chain, and to track the costs and availability of value-added services.

ERP systems offer companies the potential to streamline operations, eliminate overlap and bottle-necks, and save money and resources. But ERP systems are very expensive and time-consuming to implement, and surveys have shown that not all companies achieve the desired benefits. According to the online business resource Darwin Executive Guides, it is "a tall order, building a single software program that serves the needs of people in fi nance as well as it does the people in human resources and the warehouse... To do ERP right, the ways you do business will need to change and the ways people do their jobs will need to change too. And that kind of change doesn't come without pain."

Q. 3. (a) What is Management Control System? What are its purposes?

(b) Explain the impact of budgetary control system on human behavior.

(c) What is operations strategy? What are the criteria for evaluating an operation strategy?

Answer 3. (a)

Joseph Maciariello & Calvin Kirby have defined M.C.S. as follows MCS is a set of inter-related communication structures that facilitates the processing of information for the purpose of assisting managers in coordinating the parts and attaining the purpose of an organization on a continuous basis.

They view "the entire organization as a control system. 'Control' is seen as a characteristic of a control system; it occurs when the organization is attaining its purpose. Purpose and attainment of purpose are central to the work of control system."

Purposes of MCS, according to them are :

1. Coordination of parts of organization
2. Steering those parts to achieve organizational goals.
3. Bring along unity out of the diverse activities of an organization.

Answer 3. (b)

The budget process affects behavior in three aspects

(i) **Formulation of budgets -** The budgeting process may be top – down, determined wholly by top management. This may engender a feeling of budgets being thrust upon employees who perceive them as pressure devices; as a result their full enthusiasm may not be forthcoming in implementing it. In case the budget is formulated with a bottom-up approach, involving employees, commitment for meeting the budget can be assured.

(ii) **Fixing targets -** Sales, production and other targets that are fixed should be challenging but attainable so as to bring out the best efforts of individuals. If targets are so high, as to be unattainable, it may de motivate employees: in some cases it may also lead to manipulation of data to ensure conformity with budget. However such manipulations will have adverse effects in the long run. A common practice is for sales manager to dump stocks on their dealers at the year end to meet sales targets, perhaps giving unduly long credit.

(iii) **Evaluation of performance -** The evaluation of performance should be done in a constructive manner and not in vindictive style. While variances may be thrown up by the system, the causative factors may not be known readily. Hence it is necessary to analyze the reasons for variance and ensure proper accountability.

Answer 3. (c)

According to Slack and Lewis, operations strategy holds the following definition :

Operations strategy is the total pattern of decisions which shape the long-term capabilities of any type of operations and their contribution to the overall strategy, through the reconciliation of market requirements with operations resources.

Criteria for Evaluating an Operations Strategy

***Consistency* (*internal and external*)**

Between the operations strategy and the overall business strategy.
Between the operations strategy and the other functional strategies within the business.
Among the decision categories that make up the operations strategy
Between the operations strategy and the business environment (resources available, competitive behaviour, governmental restraints, etc.)

Contribution (to competitive advantage)

Making trade-offs explicit, enabling operations to set priorities that enhance the competitive advantage.
Directing attention to opportunities that complement the business strategy.
Promoting clarity regarding the operations strategy throughout the business unit so its potential can befully realized. Providing the operations capabilities that will be required by the business in the future.

Q. 4. (a) Seasonal Ltd. is manufacturing Woolen Garments. It faces high demand during Winter and slack demand during Summer. Advise The Production Manager of Seasonal Ltd. how to adjust the production capacity to meet the current demand.

(b) Enumerate the options available to a firm which wants to stimulate demand in order to utilize its idle capacity.

(c) What is Linear Decision Rule?

Answer 4. (a)

Options which can be used to increase or decrease capacity to match current demand include :

1. **Hire/lay off -** By hiring additional workers as needed or by laying off workers not currently required to meet demand, firms can maintain a balance between capacity and demand.
2. **Overtime -** By asking or requiring workers to work extra hours a day or an extra day per week, firms can create a temporary increase in capacity without the added expense of hiring additional worker.
3. **Part-time or casual labor -** By utilizing temporary workers or casual labor (workers who are considered permanent but only work when needed, on an on-call basis, and typically without the benefits given to full-time workers).
4. **Inventory -** Finished-goods inventory can be built up in periods of slack demand and then used to fill demand during periods of high demand. In this way no new workers have to be hired, no temporary or casual labor is needed, and no overtime is incurred.
5. **Subcontracting -** Frequently firms choose to allow another manufacturer or service provider to provide the product or service to the subcontracting firm's customer. By subcontracting work to an alternative source, additional capacity is temporarily obtained.
6. **Contract manufacturing:** Sub letting spare or idle manufacturing facilities to other firms needing extra facilities. This is the reverse of sub-contracting.
7. **Cross-training.** Cross-trained employees may be able to perform tasks in several operations, creating some flexibility when scheduling capacity.
8. **Other methods.** While varying workforce size and utilization, inventory buildup/ backlogging, and subcontracting are well-known alternatives, there are other, more novel ways that find use in industry. Among these options are sharing employees with countercyclical companies and attempting to find interesting and meaningful projects for employees to do during slack times.

Answer 4. (b)

Demand can be stimulated by the following ways :

1. **Pricing -** Varying (lower) pricing to increase demand in periods when demand is less than peak. For example, matinee prices for movie theaters, off-season rates for hotels, night time rates for mobile telephone service, and off-season pricing for items that experience seasonal demand.
2. **Promotion -** Advertising, direct marketing, bulk purchase discounts, bonus/free offers and other forms of promotion are used to shift demand.
3. **Back ordering -** By postponing delivery on current orders demand is shifted to period when capacity is not fully utilized. This is really just a form of smoothing demand. Service industries are able to smooth demand by taking reservations or by making appointments in an attempt to avoid walk-in customer. Some refer to this as "partitioning" demand.
4. **New demand creation -** A new, but complementary demand is created for a product or service. When restaurant customers have to wait, they are frequently diverted into a complementary (but not complimentary) service, the bar. Other examples include the addition of video arcades within movie theaters, and the expansion of services at convenience stores.

Answer 4. (c)

Linear decision rule is an optimizing technique. It seeks to minimize total production costs (labor, overtime, hiring/lay off, inventory carrying cost) using a set of cost-approximating functions (three of which are quadratic) to obtain a single quadratic equation. Then, by using calculus, two linear equations can be derived from the quadratic equation, one to be used to plan the output for each period and the other for planning the workforce for each period.

Q. 5. (a) What is Intranet? What are its advantages?

(b) What is Benchmarking? Write a short note on Competitive Benchmarking.

Answer 5. (a)

An **intranet** is a private computer network that uses Internet protocols and network connectivity to securely share part of an organization's information or operations with its employees. Sometimes the term refers only to the most visible service, the internal website. Briefly, an **intranet** can be understood as "**a private version of an Internet,**" or as a version of the Internet confined to an organization. Through such devices and systems off-site employees can access company information, computing resources and internal communications.

Advantages of intranets

1. **Workforce productivity** – Intranets can help users to locate and view information faster and use applications relevant to their roles and responsibilities. Users can access data held in any database the organization wants to make available, anytime and - subject to security provisions - from anywhere within the company workstations.
2. **Time** – With intranets, organizations can make more information available to employees on a "pull" basis (i.e.: employees can link to relevant information at a time which suits them) rather than being deluged indiscriminately by emails.
3. **Communication** – Intranets can serve as powerful tools for communication within an organization, vertically and horizontally. From a communications standpoint, intranets are useful to communicate strategic initiatives that have a global reach throughout the organization. The type of information that can easily be conveyed is the purpose of the initiative and what the initiative is aiming to achieve, who is driving the initiative, results achieved to date, and who to speak to for more information. By providing this information on the intranet, staff have the opportunity to keep up-to-date with the strategic focus of the organization.
4. **Knowledge Management** – Web publishing allows '***cumbersome'*** corporate knowledge to be maintained and easily accessed throughout the company using hypermedia and Web technologies. Examples include: employee manuals, benefits documents, company policies, business standards, news feeds, and even training, can be accessed using common Internet standards (Acrobat files, Flash files, CGI applications). Because each business unit can update the online copy of a document, the most recent version is always available to employees using the intranet.
5. **Business operations and management** – Intranets are also being used as a platform for developing and deploying applications to support business operations and decisions across the internetworked enterprise.
6. **Cost-effective** – Users can view information and data via web-browser rather than maintaining physical documents such as procedure manuals, internal phone list and requisition forms.
7. **Promote common corporate culture** – Every user is viewing the same information within the Intranet.
8. **Enhance Collaboration** – With information easily accessible by all authorised users, teamwork is enabled.

Answer 5. (b)

Any performance standard viewed in isolation is of little value, it has to be compared in relation to similar objective standards to bring out its relative position and serve as a yardstick for measurement of progress. Thus, for example the turnover ratio of sales to capital employed can be studied over a period of time or as between different manufacturing plants of the same company to gauge the efficiency of asset utilization. While such insular evaluation have their utility, in a fiercely competitive environment, examination of one company's performance against a competing unit will afford meaningful insights into areas where the company is lagging behind. Such an understanding will trigger action for improvement, at least to close the gap, if not to better it, for the company to survive and progress. In fact such comparisons should be instituted against world class standards to attain excellence. In a market driven globalised economy, characterized by intense contest, this process has become an imperative necessity and has gained immense popularity as a distinct management concept under the style of "Benchmarking".

The International Benchmarking Clearing House ("IBC") of American Productivity and Quality Center ("APQC") has given the following definition of Benchmarking.

"A systematic and continuous measurement process; a process of continuously comparing and measuring an organization's business processes against business leaders anywhere in the world, to gain information that will help the organization take action to improve its performance".

Q. 6. (a) Bathing Care Ltd. manufactures and sells soaps under the brand name — Elite, Lovely, Fresh and Janata. The Janata soap is very popular as it is of good quality and at the same time reasonably priced. The company produces and sells per annum on an average 50,000 cakes of Elite, 1,00,000 cakes of Lovely, 75,000 cakes of fresh and 2,00,000 cakes of Janata at a unit selling price of Rs.3.50, Rs.3.00, Rs.2.50 and Rs.1.5 respectively.

At this level of production and sales the unit cost of a cake of each brand of soap is as follows :

			(Expressed in Paise)	
	Elite	Lovely	Fresh	Janata
Direct Material	50	40	35	45
Direct Labour	20	20	15	10
Production Expenses :				
Variable	10	10	5	5
Fixed	20	25	20	20
Administrative Expenses :				
Fixed	30	40	25	30
Variable	15	5	10	5
Selling & Distribution Expenses :				
Fixed	80	60	45	10
Variable	45	20	25	5
Total Cost	270	220	180	130

The Co. has lot of unutilised capacity and there is ample scope for improving production and sales volumes. Bathing Care Ltd. has built a name for its products in the market and with proper sales effort it should be possible to sell whatever is produced by the co., the production manager sees no problems. The sales manager put up a bold scheme for almost quartru pling the present profits of the company.

1. **An exclusive advertising campaign has to be undertaken to produce and sell Janata Soaps and it is estimated at Rs. 4,85,000.**

2. At the same time the selling price of Janata Soap should be reduced to Rs. 1/- by adopting this sales strategy the sales manager is confident that he is able to double the present sales volume of Janata Soap and with each 1 lack increase of Janata Soap he would be able to push 30,000 cakes of Elite, 70,000 of lovely, 50,000 of fresh in the market. You are required to find out the profit at present and profit if the sales managers scheme is implemented.

(b) What is Extended Supply Chain?

Answer 6. (a)

Statement showing computation of profi t at the current Mix :

		Elite	Lovely	Fresh	Janata	Total
(I)	SP	3.50	3.00	2.50	1.50	
(II)	VC :					
	DM	0.50	0.40	0.35	0.45	
	DL	0.20	0.20	0.15	0.10	
	Prod. Exp.	0.10	0.10	0.05	0.05	
	AOH	0.15	0.05	0.10	0.05	
	SOH	0.45	0.20	0.25	0.05	
		1.40	0.95	0.90	0.70	
(III)	Contribution (I - II)	2.10	2.05	1.60	0.80	
(IV)	Total Contribution (III × No. Units Sold)	1,05,000	2,05,000	1,20,000	1,60,000	5,90,000
(V)	F.C :					
	Prod. Exp.	0.20	0.25	0.20	0.20	
	Adv. Exp.	0.30	0.40	0.25	0.30	
	S & D Exp.	0.80	0.60	0.45	0.10	
		1.30	1.25	0.90	0.60	
(VI)	Total F.C (V × No. of Units Sold)	65,000	1,25,000	67,500	1,20,000	3,77,500
(VII)	Profit (IV - VI)	40,000	80,000	52,500	40,000	2,12,500

Statement showing computation of profit by adopting sales manager's scheme :

	Elite	Lovely	Fresh	Janata	Total
No. of Units	1,10,000	2,40,000	1,75,000	4,00,000	
Contribution per unit	2.10	2.05	1.60	(0.8 – 0.5) 0.30	
Total Contribution	2,31,000	4,92,000	2,80,000	1,20,000	11,23,000
FC (Existing + Advt.)					8,62,500
Profit					2,60,500

Answer 6. (b)

The extended supply chain is a clever way of describing everyone who contributes to a product. So if you make text books, then your extended supply chain would include the factories where the books are printed and bound, but also the company that sells you the paper, the mill where that supplier buys their stock, and so on. It is important to keep track of what is happening in your extended supply chain because with a supplier or a supplier's supplier could end up having an impact on you (as the old saying goes, a chain is only a strong as its weakest link). For example, a fire in a paper mill might cause the text book

manufacturer's paper supplier to run out of inventory. If the text book company knows what is happening in its extended supply chain it can find another paper vendor.

Q. 7. Nice and Warm, Ltd. manufactures and markets hot plates. During the first five years of operations, the company has experienced a gradual in crease in sales volume, and the current annual growth in sales of 5% is expected to continue in the foreseeable future. The plant is now producing at its full capacity of one lakh hot plates.

At the monthly Management Advisory committee meting, amongst other things, the plan of action for next year was discussed.

Managing Director proposed two alternatives. First, operations could be continued at full capacity and with the existing facilities, an output of one lakh hot plates at a selling price of Rs. 100 per plate per unit could be maintained. Secondly, production and sales could be increased by 5% to take advantage of the rate of expansion in demand for the product. But this could increase cost, as to achieve the output, the company will have to resort to weekend and over time workings. However, a policy of steady growth was preferable to maintaining status quo.

In view of the company's competitors having a substantial share of the market, the Works Director was of the view that it was not enough for the company to maintain merely the present share of the total market. A large share of the total market should be obtained. For that, the company should increase production by 10% through a modest expansion of the plant capacity. In order to sell the output of 1,10,000 units the selling price could be reduced to Rs. 95 per unit.

Thinking on the same lines, the Marketing Director put forth a more radical proposal. The strategy should be to seize the competitive leader ship in the market with regard to both price and volume. With this end in view, he suggested that the company should straightaway embark on an expen sive modernisation programme, which will initially increase volume by 20%. The entire output of 1,20,000 hot plates could be easily sold at a price of Rs. 90 per unit.

At this juncture, the Managing Director expressed concern about the probable behavior of the company's competitors. They might also expand in order to produce more and sell at lower prices. Suppose this happened, he wanted also the financial effects of the proposals of the Works Director and Marketing Director, if in these proposals, the expected increase in sales were to be only half of that predicted.

As a Cost Accountant of the company, you are required to critically evaluate the six alternative along with your recommendations and circulate the same to the Directors. In this connection, you have gathered the fol lowing details :

(i) If next year's production was maintained at the current year's level, variable cost would remain at Rs. 50 per unit. Fixed cost would remain unchanged at Rs. 30 lakhs.

(ii) The week-end and overtime working would increase with the variable and fixed costs. Variable cost would rise to Rs. 55 per unit while fixed cost would increase to Rs. 30,25,000

(iii) In the proposal of the Works Director, the ratio of variable costs to sales would continue to be 50%. Fixed costs would rise to Rs. 32,25,000.

(iv) In the proposal of Marketing Director, as a result of increased production, efficiency and some savings from purchase of materials, it is estimated that the ratio of variable cost of sales would decrease to 48% and the fixed costs would increase by Rs. 5,16,000.

Your answer should contain :

(a) A tabular statement of comparative figures pertaining to total turnover, total contribution, Percentage of Profit to Sales and Breakeven units as regard to each of the six proposals.

(b) Comments on the relative risk involved.

(c) Consideration of the short-term and long-term implications of the Managing Director's proposals.

(d) Comment on the price elasticity of demand for the company's products and your suggestions on the pricing policy and cost structure

(e) Comment on financial implications of the expansion scheme.

Answer 7.

(a) Statement showing contribution, profit at six alternatives

		Managing Director		Works Director		Marketing Director	
		I	II	I	II	I	II
(i)	No. of units	100,000.00	105,000.00	110,000.00	105,000.00	120,000.00	110,000.00
(ii)	Selling price per unit	100.00	100.00	95.00	95.00	90.00	90.00
(iii)	Sales turnover (Rs. Lakhs)	100.00	105.00	104.50	99.75	108.00	99.00
(iv)	Variable cost per unit	50.00	55.00	47.50	47.50	43.20	43.20
(v)	Contribution per unit (ii-iv)	50.00	45.00	47.50	47.50	46.80	46.80
(vi)	Total contribution (Rs. Lakhs)	50.00	47.25	52.25	49.88	56.16	51.48
(vii)	Fixed cost (Rs. Lakhs)	30.00	30.25	32.25	32.25	35.16	35.16
(viii)	Profit (Rs. Lakhs) (vi-vii)	20.00	17.00	20.00	17.63	21.00	16.32
(ix)	% of profi t on sales	20.00	16.19	19.14	17.67	19.44	16.48
(x)	Break even units (vii/v)	60,000.00	67,222.00	67,895.00	67,895.00	75,128.00	75,128.00
(xi)	Margin of safety units (i-x)	40,000.00	37,778.00	42,105.00	37,105.00	44,872.00	34,872.00
(xii)	P. V ratio	0.50	0.45	0.50	0.50	0.52	0.52

(b) Managing directors first proposal seems to be more favorable from the risk point of view because it has low break even and high margin of safety coupled with higher percentage of profit to sales.

(c) From the short run point of view, Managing director's second proposal, i.e steady growth of 5% a year would be better, even by resorting to weekend over time working. However, from the long term view point, the above proposal is not advisable because when they have steady growth, they can go for expansion of business rather than resorting to overtime working. If it is not possible to go for expansion, a steady status quo is the best solution.

(d) It was given that, annual growth of sales of 5% is expected to continue in foreseenable future. It is not clear, why the second proposal of the works director and marketing director should suggest, reduction in price for 5% and 10% respectively.

It seems no serious study has been made on the price elasticity of demand of the product. If there is demand for the product and increased production, they may reduce the price by adapting discriminate price policy.

(e) If the company desires to expand the production, it is necessary to find out the sources of financing of expansion scheme by relative profi tability of different funds.

Q. 8. A Local Government Authority owns and operates a leisure centre with numerous sporting facilities, residential accommodation, a cafeteria and a sports shop. The summer season lasts for 20 weeks including a peak period of 6 weeks corresponding to the school holidays. The following budgets have been prepared for the next summer season :

Accommodation :

60 single rooms let on a daily basis.

35 double rooms let on a daily basis at 160% of the single room rate.

Room rate :

Fixed costs Rs. 29,900.

Variable costs Rs. 4 per single room per day and Rs. 6.40 per double room per day

Sports centre :

Residential guests each pay Rs. 2 per day and casual visitors Rs. 3 per day for the use of facilities.

Fixed costs Rs. 15,500.

Sports Shop :

Estimated contribution Re.1 per person per day.

Fixed costs Rs. 8,250.

Cafeteria :

Estimated contribution Rs. 1.50 per person per day.

Fixed costs Rs. 12,750.

During the summer season the centre is open 7 day a week and the

Following activity levels are anticipated.

Double rooms fully booked for the whole season.

Single rooms fully booked for the peak period but at only 80% of

Capacity during the rest of the season.

30 casual visitors per day on average.

You are required to:

(a) Calculate the charges for single and double rooms assuming that the authority wishes to make a Rs. 10,000 profit on accommodation.

(b) Calculate the anticipated total profit for the leisure centre as a whole for the season.

(c) Advise the authority whether an offer of Rs. 2,50,000 form a private leisure company to operate the centre for five years is worth while, assuming that the authority uses a 10% cost of capital and operations continue as outlined above.

Answer 8.

Computation of usage of room days		
Single room		
(60 × 7 × 6)	2,520.00	
(60 × 7 × 14 × 80%)	4,704.00	
		7,224.00
Double room (35 × 7 × 20)		4,900.00
(i) Total sale value of accommodation		
Variable cost		
Single room (7224 × 4)	28,896.00	
Double room (4900 × 4)	31,360.00	60,256.00
Fixed cost		29,900.00
Required Profit		10,000.00
		100,156.00

Let 'S' be the room rent of single room and 1.6'S' is the rent of double room. Therefore,

7224S + 4900 (1.6S) = 100516

7224S + 7840S = 100516 = S = 6.67

Double room rent = (6.67 × 1.6) = 10.68

(ii) Statement showing computation of total profit to leisure centre

a. Accommodation			10,000.00
b. Sports centre :			
Total	[(7224×2)+(4900×2×2)+(30×7×20×3)]	46,648.00	
Less : Fixed Cost		15,500.00	31,148.00
c. Sports centre :			
Contribution	[(7224×1)+(4900×2×1)+(30×7×20×1)]	21,224.00	
Less : Fixed Cost		8,250.00	12,974.00
d. Cafeteria			
Contribution	[(7224×1.5)+(4900×2×1.5)+(30×7×20×1.5)]	31,836.00	
Less : Fixed Cost		12,750.00	19,086.00
			73,208.00

(iii) Present values

Present value compound factor @ 10% for 5 years	3.79
P.V. of profit for 5 years (73208×3.7906)	277,500.00

As the present value of profi t for 5 years is Rs. 277500, which is more than the lease rent of Rs. 250000, it is not worthwhile to give leisure centre for lease.

Q. 9. A Company with two manufacturing divisions is organised on profit centre basis. Division 'A' is the only source for the supply of a component that is used in Division B in the manufacture of a product KLIM. One such part is used each unit of the product KLIM. As the demand for the product is not steady. Division B can obtain orders for increased quantities only by spending more on sales promotion and by reducing the selling prices. The Manager of Division B has accordingly prepared the following forecast of sales quantities and selling prices.

Sales units per day	Average Selling price per unit of KLIM
1,000	**Rs. 5.25**
2,000	**3.98**
3,000	**3.30**
4,000	**2.78**
5,000	**2.40**
6,000	**2.01**

The manufacturing cost of KLIM in Division B is Rs. 3,750 first 1,000 units and Rs. 750 per 1,000 units in excess of 1,000 units.

Division A incurs a total cost of Rs. 1,500 per day for an output to 1,000 components and the total costs will increase by Rs. 900 per day for every additional 1,000 components manufactured. The Manager of Division A states that the operating results of his Division will be optimised if the transfer price of the component is set at Rs. 1.20 per unit and he has accordingly set the aforesaid transfer price for his supplies of the component to Division B.

You are required :

(a) Prepare a schedule showing the profitability at each level of output for Division A and Division B.

(b) Find the profitability of the company as a whole at the output level which

(i) Division A's net profit is maximum.

(ii) Division B's net profit is maximum.

(c) If the Company is not organised on profi t centre basis, what level of output will be chosen to yield the maximum profit.

Answer 9.

(i) Statement showing profit of division A :

Sale per day(units)	Sale value	Cost	Profit/(loss)
1000	1200	1500	(300)
2000	2400	2400	—
3000	3600	3300	300
4000	4800	4200	600
5000	6000	5100	900
6000	7200	6000	1200

Profit of division B :

No of units	Sales	Transfer price	Other manufacturing cost	Total cost	Profit/(loss)
1000	5250	1200	3750	4950	300
2000	7960	2400	4500	6900	1060
3000	9900	3600	5250	8850	1050
4000	11120	4800	6000	10800	320
5000	12000	6000	6750	12750	(750)
6000	12060	7200	7500	14700	(2640)

(ii) Profitability of the company at the output level where division A's net profit is maximum :

Profit of division A at 6000units	1200
Profit of division B at 6000units	(2640)
Profit /(loss)	(1440)
Division B's net profit is maximum:	
Profit of division A at 2000 units	–
Profit of division B at 2000units	1060
	1060

(iii) When the company is not organized on profit centre basis

Profit at different levels of output

Units	Division A	Division B	Total
1000	(300)	300	—
2000	—	1060	1060
3000	300	1050	1350
4000	600	320	920
5000	900	(750)	150
6000	1200	(2640)	(1440)

Best output level is 3000 units.

Q. 10. The Management Team of Exe Ltd. is considering the possibility of under taking a single production process which jointly produces four products in standard proportions. The output from each 10 kg. batch of raw material input into the process together with net realisable value per kg. of output immedi ately after the split-off point is :

Material	Output per 10 kg. Input	Net realisable value per kg. of output
A	4 kg.	Rs. 8
B	3	4
C	2	10
D	1	2

The cost of processing each 10 kg. input batch are Rs. 12 and cost of the raw material input is Rs. 4 per kg.

For each of the four materials jointly produced there is the possibility of further processing before sale. The further processing will entail both manual operation and mechanical processing as well as incurring some costs directly attributable to each product. Details of resources used in, and costs incurred by, the further processing as well as the final price per kg. are :

Material	Machine hours	Labour hours	Other direct costs	Sales price
A	2	1	Rs. 4	Rs. 17
B	6	1	2	13
C	4	5	3	36
D	2	2	2	9

"Other direct costs" are variable costs but exclude the cost of labour, also a variable cost at Rs. 3 per labour hour. Apart from "other direct cots" and labour costs, all other costs of this further processing are fixed and are expected to amount to Rs. 3,40,000 per annum.

Exe Ltd. has the opportunity to process 1,00,000 kg. of the basic raw material per year and machine capacity is capable of fully processing this amount.

The Managing Director feels that all products which are subjected to further processing must be treated as joint products and all products sold immedi ately after the split-off point without further processing are to be treated as by products of the original process. The net costs of the joint process are allocated to the joint products in proportion to the contribution of each product line, after considering the marginal costs after the split-off point and sales revenues.

However, the Managing Director is uncertain whether the Rs. 3,40,000 fixed production cots of further processing should be allocated to products in accordance with machine or labour hours.

Required :

(a) Specify which of the jointly produced materials should be subject to further processing if the joint process is carried out.

(b) Produce a product profitability report for the joint products, utilizing the Managing Director's approach to the determination of joint and

(c) Byproducts for each of the methods of allocating fixed production over head, he has mentioned. You may assume all production will be sold.

Answer 10.

(a) Statement showing profi tability after further processing :

	A	B	C	D
Selling price	17	13	36	9
Variable cost :				
Labour	3	3	15	6
Others	4	2	3	2
	7	5	18	8
Contribution	10	8	18	1
NRV	8	4	10	2
Gain /(loss)	2	4	8	(1)

Products A, B & C should be subject to further processing and hence treated as joint products and product D as by product.

(b) Working note :

Joint cost	Amount
Material 100000 x 4	4,00,000
Processing cost 100000 x (12/10)	1,20,000
	5,20,000
(-) Sale value of by product [100000 x (2/10)]	20,000
Joint cost	5,00,000

Ratio of apportionment of joint cost

Labour hour Contribution	Amount	Ratio
A (40000 x 10)	4,00,000	10
B (30000 x 8)	2,40,000	6
C (20000 x 18)	3,60,000	9
Machine hour		
A 40000 x 2	80000	FOH / Machine hour =
B (30000 x 6)	180000	340000 / 340000 = 1
C (20000 x 4)	80000	
	340000	

Profit when fixed costs are distributed on machine hour basis

	A	B	C	Total
No of units	40000	30000	20000	
Sales	680000	390000	720000	1790000
Joint cost	200000	120000	180000	500000
Labour	120000	90000	300000	510000
Other direct costs	160000	60000	60000	280000
Fixed cost	80000	180000	80000	340000
	560000	450000	620000	1630000
Profit/(loss)	120000	(60000)	100000	160000

Profit when fixed costs are distributed on the basis of labour hours

	A	B	C	Total
Sales	680000	390000	720000	1790000
Variable cost	480000	270000	540000	1290000
Contribution	200000	120000	180000	500000
Fixed cost	80000	60000	200000	340000
Profit /(loss)	120000	60000	(20000)	160000

Working notes :

Labour hours

A	40000 x 1	40000
B	30000 x 1	30000
C	20000 x 5	100000
		170000

Fixed cost per labour hour (340000 / 170000) = 2

Q. 11. (a) A machine used on a production line must be replaced at least every four years. The costs incurred in running the machine according to its age are :

(Rs.)

	Age of machine (years)				
Particulars	**0**	**1**	**2**	**3**	**4**
Purchase price	**3,000**				
Maintenance		**800**	**900**	**1,000**	**1,000**
Repairs			**200**	**400**	**800**
Net realisable value		**1,600**	**1,200**	**800**	**400**

Future replacement will be identical machines with the same costs. Revenue is unaffected by the age of the machine. Assume there is no inflation and ignore tax. The cost of capital is 15%. Determine the optimum replacement cycle.

Present value factors at 15% for years 1, 2, 3 and 4 are 0.8696, 0.7561, 0.6575 and 0.5718 respectively. Present value of annuity at 15% for years 1, 2, 3 and 4 are 0.8696, 1.6257, 2.2832 and 2.8550 respectively.

(b) Why Life Cycle Costing is important?

Answer 11. (a)

The possible replacement options of the machine are every one, two, three & four years.

The annual equivalent cost of each of these replacement policies are as follows :

Replacement every year **(Rs.)**

Particulars	Year	
Cost	(3000)	—
Maintenance	—	(800)
Resale value	—	1600
Total	(3000)	800
DCF @ 15%	1.0	0.8696
Present value of cash flows	(3000)	696

Total PV of Costs = Rs. 2,304

Annual equivalent cost = $\frac{2,304}{0.8696}$ = Rs. 2,649

Replacement every two years **(Rs.)**

Particulars	Year		
	0	1	2
Cost	(3000)	—	—
Maintenance	—	(800)	(900)
Repairs	—	—	(200)
Resale value	—	—	1200
Total	(3000)	(800)	100
DCF @ 15%	1.0	0.8696	0.7561
Present value of cash flows	(3000)	(696)	76

Total PV of Costs = Rs. 3,620

Annual equivalent cost = $\frac{3,620}{1.6257}$ = Rs. 2,227

Replacement every three years **(Rs.)**

Particulars	Year			
	0	1	2	3
Cost	(3000)	—	—	—
Maintenance	—	(800)	(900)	(1,000)
Repairs	—	—	(200)	(400)
Net realisable value	—	—	—	800
Total	(3000)	(800)	(1100)	(600)
DCF @ 15%	1.000	0.8696	0.7561	0.6575
Present value of cash flows	(3000)	(696)	(832)	(395)

Total PV of Costs = Rs. 4,923

Annual equivalent cost = $\frac{4,923}{2.2832}$ = Rs. 2,156

Replacement every four years **(Rs.)**

Particulars	**Year**				
	0	1	2	3	4
Cost	(3,000)	—	—	—	—
Maintenance	—	(800)	(900)	(1000)	(1000)
Repairs	—	—	(200)	(400)	(800)
Net realisable value	—	—	—	—	400
Total	(3,000)	(800)	(1,100)	(1,400)	(1,400)
DCF @ 15%	1.000	0.8696	0.7561	0.6575	0.5718
Present value of cash flows	(3,000)	(696)	(832)	(921)	(800)

Total PV of Costs = Rs. 6,249

Annual equivalent cost = $\frac{6,249}{2.8550}$ = Rs. 2,189

Analysis : The machine is suggested to be replaced every three years.

Answer 11. (b)

The visible costs of any purchase represent only a small proportion of the total cost of ownership. In many departments, the responsibility for acquisition cost and subsequent support funding are held by different areas and, consequently, there is little or no incentive to apply the principles of LCC to purchasing policy. Therefore, the application of LCC does have a management implication because purchasing units are unlikely to apply the rig ours of LCC analysis unless they see the benefit resulting from their efforts.

There are 4 major benefits LCC analysis :

- evaluation of competing options in purchasing;
- improved awareness of total costs;
- more accurate forecasting of cost profiles; and
- performance trade-off against cost.

Q. 12. (a) Industrial Metal Works Ltd., have received an enquiry from Calcutta Enterprises for the manufacture and supply of 200 units of a product. The offer if finished would be a repeat order. The first 100 units at the selling price of Rs. 300 each was completed last month but IMWL did not make any profit or loss on the order. Analysis of the completed order shows the following :

(i) Tooling cost to the extent of Rs. 1,000 was charged totally to the order since the tools would not benefit the production of any subsequent order.

(ii) Raw material cost per unit was Rs. 80. An increase of 10% is estimated for the new order.

(iii) Finishing cost of the product was Rs. 6 per unit. The operation is highly mechanical and no learning function is applicable.

(iv) The cost of inspection was Rs. 2 per unit. This is manual work to which learning function would apply.

(v) Direct labour cost was Rs. 202 per unit. Negotiations with the worker's union is almost complete and as a result of which labour costs are likely to go up by 10% by the time the order materialise.

IMWL expects profit of 10% on the cost of the proposed contract but insists on retaining for itself the benefit of learning function. On the other hand, Calcutta Enterprises is prepared to allow for all cost increase and higher profit margin of 15% on cost but wants to have the advantage of cost saving taking into account 80% learning effect.

You are required to determine the manufacturer's price and determine the buyer's price.

(b) What is Quality Function Deployment?

Answer 12. (a)

(1) Labour cost

For 300 units — 70.21% of Rs. 222.20 (only labour cost) = Rs. 156 (approx.) per unit.

(Rs.)

For 300 units	46,800
Less : 100 units	22,220
For 200 units	24,580

(2) Inspection cost

(Rs.)

For units	Average per 100	Total
100	200	200
300 (70.21%)	140.42	421
200		221

Tooling cost for 200 units has been taken as double the tooling cost of 100 units. (Rs.)

	For 1st order of 100 units	For 2nd order (without learning) Manufacturer's price	200 units (with 80% learning) Buyer's price
Raw materials	8,000	17,600	17,600
Direct wages	20,200	44,440	24,580
Finishing cost (Rs. 6/unit)	600	1,200	1,200
Inspection cost	200	400	221
Tooling cost	1,000	2,000	2,000
	30,000	65,640	45,601
Profit	—	(10%) 6,564	(15%) 6,840
Selling price		72,204	52,441

Answer 12. (b)

Quality Function Deployment (QFD) is a structured approach to defining customer needs or requirements and translating them into specific plans to produce products to meet those needs. The "voice of the customer" is the term to describe these stated and unstated customer needs or requirements. The voice of the customer is captured in a variety of ways : direct discussion or interviews, surveys, focus groups, customer specifications, observation, warranty data, field reports, etc. This understanding of the customer needs is then summarized in a product planning matrix or "house of quality". These matrices are used to translate higher level "what's" or needs into lower level "how's" — product requirements or technical characteristics to satisfy these needs.

While the Quality Function Deployment matrices are a good communication tool at each step in the process, the matrices are the means and not the end. The real value is in the process of communicating and decision-making with QFD. QFD is oriented toward involving a team of people representing the various functional departments that have involvement in product development: Marketing, Design Engineering, Quality Assurance, Manufacturing/ Manufacturing Engineering, Test Engineering, Finance, Product Support, etc.

The active involvement of these departments can lead to balanced consideration of the requirements or "what's" at each stage of this translation process and provide a mechanism to communicate hidden knowledge - knowledge that is known by one individual or department but may not otherwise be communicated through the organization. The structure of this methodology helps development personnel understand essential requirements, internal capabilities, and constraints and design the product so that everything is in place to achieve the desired outcome - a satisfied customer. Quality Function Deployment helps development personnel maintain a correct focus on true requirements and minimizes misinterpreting customer needs. As a result, QFD is an effective communications and a quality planning tool.

Q. 13. (a) What is Margin of Safety? How it is calculated? How it can be improved?

(b) Ever Forward Ltd., is manufacturing and selling two products : Splash and Flash at selling prices of Rs. 3 and Rs. 4 respectively. The following sales strategy has been outlined for the year 2009:

(i) Sales planned for year will be Rs. 7.20 lakhs in the case of Splash and Rs. 3.50 lakhs in the case of Flash.

(ii) To meet competition, the selling price of Splash will be reduced by 20% and that of Flash by 12½%.

(iii) Break-even is planned at 60% of the total sales of each product.

(iv) Profit for the year to be achieved is planned as Rs. 69,120 in the case of Splash and Rs. 17,500 in the case of Flash. This would be possible by launching a cost reduction programme and reducing the present annual fixed expenses of Rs. 1,35,000 allocated as Rs. 1,08,000 to Splash and Rs. 27,000 to Flash.

You required to present the proposal in financial terms giving clearly the following information :

(i) Number of units to be sold of Splash and Flash to break-even as well as the total number of units of Splash and Flash to be sold during the year.

(ii) Reduction in fixed expenses product-wise that is envisaged by the Cost Reduction Programme.

Answer 13. (a)

(a) The margin of safety refers to sales in excess of the break-even volume. It represents the difference between sales at a given activity level and sales at break-even point. It is important that there should be a reasonable margin of safety to run the operations of the company in profitable position. A low margin of safety usually indicates high fixed overheads so that profits are not made until there is a high level of activity to absorb the fixed costs. A margin of safety provides strength and stability to a concern.

The margin of safety is an important measure, especially in times of receding sales, to know the real position to operate without incurring losses and to take steps to increase the margin of safety to improve the profitability.

Margin of safety is calculated by using the following formulae :

Margin of safety = (Actual Sales) – (Break – even Sales)

The higher the margin of safety, the better profitability of the product/product line. The margin of safety can be improved by adopting any of the following steps :

- Keeping the break-even point at lowest level and try to maintain actual sales at highest level.
- Increase in sales volume
- Increase in selling price
- Change in product mix increasing contribution
- Lowering fixed cost
- Lowering variable cost
- Discontinuance of unprofitable products in sales mix

Answer 13. (b)

Statement showing number of units to be sold of Splash and Flash to break-even and their total units to be sold during the year 2009.

Particulars		Products		Total
		Splash	Flash	
1. Planned sales for the year	(Rs.)	7,20,000	3,50,000	10,70,000
2. Selling price per unit (after price reduction)	(Rs.)	2.40	3.50	
3. Total units to be sold during the year	[(1) / (2)]	3,00,000	1,00,000	4,00,000
4. Break-even sale in units (60% of total sales in units)		1,80,000	60,000	2,40,000

Reduction in fixed expenses product-wise envisaged by Cost Reduction Programme

Particulars		Products		Total
		Splash	Flash	
1. Budgeted Sales	(Rs.)	7,20,000	3,50,000	10,70,00
2. Break-even Sales (60% of total Sales)	(Rs.)	4,32,000	2,10,000	6,42,000
3. Sales above break-even	(1) - (2)	2,88,000	1,40,000	4,28,000
4. Planned profit for the year		69,120	17,500	86,620
5. Planned profit as percentage of Sales above break-even or P.V. ratio		24%	12.5%	
6. Contribution at break-even sales *i.e.,* fixed costs (Break-even Sales × P.V. ratio)		1,03,680	26,250	1,29,930
7. Existing fixed expenses		1,08,000	27,000	1,35,000
8. Reduction in Fixed expenses envisaged		4,320	750	5,070

Q. 14. A single product company recovers its fixed factory overheads of Rs. 80,000 on the basis of normal output of 1,60,000 units. The actual fixed overheads are same as budgeted fixed overheads. The management accountant presented, the following statement of profit for 3 years on absorption costing basis :

Particulars	2007	2008	2009
Production (units)	176000	192000	128000
Sales (units)	160000	128000	160000
	Rs.	Rs.	Rs.
Cost of sales at standard	3,84,000	3,07,200	3,84,000
Production cost variance	1,760 A	1,920 A	1,280 A
Volume variance	8,000 F	16,000 F	16,000 A
Sales	4,80,000	3,84,000	4,80,000
S/Adm. costs (fixed)	48,000	48,000	48,000
Closing stock	38,400	1,92,000	1,15,200
Profit	54,240	42,880	30,720

A means adverse and F means favourable.

***Required* :**

(i) Redraft the statement on marginal costing basis to show the closing stocks, contribution and profit.

(ii) Prepare a statement reconciling the profit arrived at by you with the profits given above.

Answer 14.

Factory fixed overhead rate = 80,000/1,60,000 = Re. 0.50 per unit

Particulars		2007	2008	2009
Std. cost of sales	(Rs.)	3,84,000	3,07,200	3,84,000
Sales quantity	(Units)	1,60,000	1,28,000	1,60,000
Std. cost per unit	(Rs.)	2.40	2.40	2.40
Variance	(Rs.)	1,760	1,920	1,280
Production	(Units)	1,76,000	1,92,000	1,28,000
Variance/unit	(Re.)	0.01	0.01	0.01
Total cost	(Rs.)	2.41	2.41	2.41
Fixed costs	(Rs.)	0.50	0.50	0.50
Variable cost/unit	(Rs.)	1.91	1.91	1.91

(i) Statement showing the value of Closing Stock, Contribution and Profit (Marginal costing basis) (Rs.)

Particulars		2007	2008	2009
Production (units)		1,76,000	1,92,000	1,28,000
Sales (units)		1,60,000	1,28,000	1,60,000
Sales		4,80,000	3,84,000	4,80,000
Production V.C. (@ 1.91)		3,36,160	3,66,720	2,44,480
Less : Closing stock (@ 1.91) (16,000; 80,000; 48,000)		30,560	1,52,800	91,680
		3,05,600	2,13,920	1,52,800
Add : Opeaning stock (@ 1.91) (Nil; 16,000; 80.000)		—	30,560	1,52,800
Total variable cost		3,05,600	2,44,480	3,05,600
Contribution		1,74,400	1,39,520	1,74,400
Fixex costs —				
Production	80,000			
Selling & Admn.	48,000	1,28,000	1,28,000	1,28,000
Profit		46,400	11,520	46,400

(ii) Statement of Reconciliation of Profits under Marginal Costing and Absorption Costing Basis (Rs.)

Particulars	2002	2003	2004
Profit as per Absorption Costing	54,240	42,880	30,720
Less : Closing stock overvalued	7,840	39,200	23,520
	46,400	3,680	7,200
Add : Opening stock overvalued	—	7,840	39,200
Profit as per Marginal Costing	46,400	11,520	46,400

Q. 15. The marketing Director of a company engaged in the manufacture and sale of a range of products wants to increase the market share and for that purpose proposes to spend Rs. 5,00,000 on advertisement campaign. Two alternative sales budgets have been pur forward as under :

Product		A	B	C	D
Budget : (Units '000)					
A : Before advertisement		**360**	**560**	**520**	**300**
B : After advertisement		**380**	**590**	**545**	**315**
The selling prices on variable cost data are as under :					
Selling price/unit	**(Rs.)**	**20**	**24**	**50**	**42**
Direct materials/unit	**(Rs.)**	**8**	**11**	**25**	**21**
Direct labour/unit	**(Rs.)**	**3**	**3**	**6**	**5**
Variable overheads/unit	**(Rs.)**	**2**	**2**	**4**	**3**

Direct labour hour rate is Rs. 5 per hour. Fixed overheads amount to Rs. 51,40,000 per annum. The production capacity is limited to 15,00,000 direct labour hours for the ensuing year. A and C however, could be bought on subcontract basis at Rs. 17 and Rs. 40 per unit respectively for sale.

Required :

Present a statement showing profitability of the proposed scheme and state whether the investment in the advertisement campaign is worthwhile.

Answer 15.

Calculation of contribution P.U.

Particulars		A	B	C	D
Selling price	(i)	20	24	50	42
Variable cost :					
Direct material		8	11	25	21
Direct Labour		3	3	6	5
Variable overhead		2	2	4	3
	(ii)	13	16	35	29
Contribution	(i) - (ii)	7	8	15	13
Direct Labour hours P.U.		0.6	0.6	1.2	1.0
Contribution per Direct Labour hr.		11.67	13.33	12.50	13.0
Rank		IV	I	III	II

Calculation of Direct labour hours required :

As per Budget A (Before advertisement) (Hours)

A	3,60,000 units × 0.6 hr.	=	2,16,000
B	5,60,000 units × 0.6 hr.	=	3,36,000
C	5,20,000 units × 1.2 hr.	=	6,24,000
D	3,00,000 units × 1.0 hr.	=	3,00,000
	Total		14,76,000

As per Budget B (After advertisement) (Hours)

A	3,80,000 units × 0.6 hr.	=	2,28,000
B	5,90,000 units × 0.6 hr.	=	3,54,000
C	5,45,000 units × 1.2 hr.	=	6,54,000
D	3,15,000 units × 1.0 hr.	=	3,15,000
	Total		15,51,000

Budget B required 51,000 Direct labour hours in excess of 100% capacity of 15,00,000 Direct Labour hours. Therefore product A or C can be purchased from outside to meet the excess demand.

Profitability statement (Before advertisement)

Particulars	A	B	C	D	Total
Units	3,60,000	5,60,000	5,20,000	3,00,000	
Contribution P.U.	7	8	15	13	
Total contribution	25,20,000	44,80,000	78,00,000	39,00,000	1,87,00,000
Less : Fixed cost Profit					51,40,000
					1,35,60,000

Profitability statement if product C is bought on sub-contract basis for balance hours

Particulars	A	B	D	C	C (bought out)	Total
Units	3,80,000	5,90,000	3,15,000	5,02,500	42,500	—
Direct Labour hrs. P.U.	0.6	0.6	1.0	1.2	—	—
Total D.L. Hours	2,28,000	3,54,000	3,15,000	6,03,000	—	15,00,000
Contribution P.U.	7	8	13	15	10	—
Total Contribution	26,60,000	47,20,000	40,95,000	75,37,500	4,25,000	1,94,37,500
Less : Fixed cost						51,40,000
Profit						1,42,97,500

Profitability statement if product A is bought on sub-contract basis for balance hours

Particulars	B	C	D	A	A (bought out)	Total
Units	5,90,000	5,45,000	3,15,000	2,95,000	85,000	—
Direct Labour hours P.U.	0.6	1.2	1.0	0.6	—	—
Total D.L. Hours	3,54,000	6,54,000	3,15,000	17,70,000	—	15,00,000
Contribution P.U.	8	15	13	7	3	—
Total contribution	47,20,000	81,75,000	40,95,000	20,65,000	2,55,000	1,93,10,000
Less : Fixed cost						51,40,000
Profit						1,41,70,000

Incremental profit if product C is bought out for balance hours = 1,42,97,500 – 1,41,70,000 = Rs. 1,27,500

Therefore, product C can be procured.

Profit, if advertisement campaign is taken up = 1,42,97,500 – 5,00,000 = Rs. 1,37,97,500.

Profit, if no advertisement campaign is taken up = 1,35,60,000

Incremental profit if advertisement campaign is taken up = = 1,37,97,500 – 1,35,60,000 = Rs. 2,37,500.

Suggestion : Hence it is suggested to take up advertisement campaign and procure product C from outside for excess direct labour hours over the normal capacity.

Q. 16. A company produces two *joint products M* and *N* in 60:40 ratio in Department 'T' from a basic raw material . The input output ratio of Department 'T' is 100:90. *Product M* can be either sold at the split-off stage or can be further processed in department 'S' where upon it becomes *Product MS*. The input output ratio of Department 'S' is 100:85.

If processing of *M* into *MS* is not undertaken, the capacity of Department 'S' will remain idle. The selling price of these products are :

***M* Rs. 60 per kg, *N* Rs. 135 per kg; *MS* Rs. 80 per kg. The department expenses, raw material available for production in the next month and the selling expenses are as under :**

(a) Departmental expenses per month ***(Rs. lakhs)***

	Departments	
	T	*S*
Direct materials	**20.00**	**6.00**
Direct wages	**30.00**	**10.00**
Variable overheads	**40.00**	**14.00**
Fixed overheads	**50.00**	**20.00**

(b) Raw materials available for production in the next month 8,00,000 kg. @ Rs. 50 per kg.

(c) Selling expenses for the next month :

***M* Rs. 9,20,000; *N* Rs. 13,80,000; *MS* Rs. 9,00,000.**

Required :

(i) Prepare a statement showing the apportionment of joint costs.

(ii) State whether *Product M* should be processed further into *MS* or not (show all workings).

(iii) Present a statement of profit based on your decision in (ii) above.

Answer 16.

Input into department 'T' = 8,00,000 kgs.
Yield = 90%
Output = 7,20,000 kgs.
M : N = 60 : 40 M = 4,32,000 Kgs
N = 2,88,000 kgs.

If *M* is processed into *MS*

Output of *MS* = 4,32,000 × (85/100) = 3,67,200 kgs.

(i) (*Rs. lakhs*)

		M	**N**	**Total**
Production	*(Units)*	4,32,000	2,88,000	
Selling price	*(Rs.)*	60	135	
Sales		259.20	388.80	648.00
Selling expenses		9.20	13.80	23.00
Net sales		250.00	375.00	625.00
Joint costs		40%	60%	100%
Raw material (8,00,000 × 50)				400.00
Process costs Dept. T				140.00
Total				540.00
Apportioned 40 : 60	=	216.00	324.00	

(ii) If *M* is processed into *MS* (*Rs. lakhs*)

Joint costs of *M*		216.00
Department *S* costs		50.00
Selling expenses		9.00
Total costs		275.00
Sales	(3,67,200 × 80)	293.76
Profit		18.76

If *M* is not processed further (*Rs. lakhs*)

Sales		259.20
Joint cost	216.00	
Selling expenses	9.20	
Fixed expenses of Dept. *S*	20.00	245.20
Profit		14.00

Hence *M* should be processed into *MS*.

(iii) Overall profit (*Rs. lakhs*)

		MS	N	Total
Sales	*(Units)*	3,67,200	2,88,000	
Selling price	*(Rs.)*	80	135	
Sales	(a)	293.76	388.80	682.56
Joint costs		216.00	324.00	540.00
Further costs		50.00	—	50.00
Selling expenses		9.00	13.80	22.80
Total	(b)	275.00	337.80	612.80
Profit	(a) - (b)	18.76	51.00	69.76

Q. 17. (a) DB Ltd. operates a conventional stock control system based on re-order levels and Economic Ordering Quantities. The various control levels were set originally based on estimates which did not allow for any uncertainty and this has caused difficulties because, in practice, lead times, demands and other factors do vary.

As part of a review of the system, a typical stock item, Part No. X206, has been studied in detail as follows :

Data for Part No. X206	
Lead times.	**Probability**
15 working days	**0.2**
20 working days	**0.5**
25 working days	**0.3**
Demand per working day	**Probability**
5,000 units	**0.5**
7,000 units	**0.5**

Note: It can be assumed that the demands would apply for the whole of the appropriate lead time.

DB Ltd. works for 240 days per year and it costs Re. 0.15 p.a. to carry a unit of X 206 in stock. The re-order level for this part is currently 1,50,000 units and the re-order cost is Rs. 1,000.

You are required :

(a) To calculate the level of buffer stock implicit in a re-order level of 1,50,000 units.

(b) To calculate the probability of a stock-out

(c) To calculate the expected annual stock-outs in units;

(d) To calculate the stock out cost per unit at which it would be worth while raising the re-order level to 1,75,000 units.

Q. 17. (b) What is Enterprise Risk Management?

Answer 17. (a)

(a) Buffer stock level

Expected value = lead time × total demand in lead time × joint probability

15 × 5000 × 0.2 × 0.5 =	7500
15 × 7000 × 0.2 × 0.5 =	10500
20 × 5000 × 0.5 × 0.5 =	25000
20 × 7000 × 0.5 × 0.5 =	35000
25 × 5000 × 0.3 × 0.5 =	18750
25 × 7000 × 0.3 × 0.5 =	26250
	123000

Expected value of demand in lead time = 123000

Buffer stock = 150000-123000 = 27000 units

(b) Stock out(shortage) = p>150000 = 0.15 joint probability at 1,75,000 units

(c) EOQ = $\frac{\sqrt{2 \cdot 6000 \cdot 240 \cdot 1000}}{0.15}$ = 138564 units

Demand per working day = (5000 × 0.5) + (7000 × 0.5) = 6000 units

Orders per annum = $\frac{(6000 \cdot 240)}{138564}$ =10.39 (on an average)

Expected stock out per annum = (175000-150000) × 0.15 × 10.39 = 38962 units

(d) At 150000 reorder level, stock out is 38962 units

At 175000 reorder level, stock out is nil

Additional cost is 25000 × 0.15 = Rs.3750

Additional cost per unit = $\frac{3750}{38962}$ = Rs. 9.62 paise

Answer 17. (b)

Enterprise risk management deals with risks and opportunities affecting value creation or preservation, defined as follows :

Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.

The underlying premise of enterprise risk management is that every entity exists to provide value for its stakeholders. All entities face uncertainty, and the challenge for management is to determine how much uncertainty to accept as it strives to grow stakeholder value. Uncertainty presents both risk and opportunity, with the potential to erode or enhance value. Enterprise risk management enables management to effectively deal with uncertainty and associated risk and opportunity, enhancing the capacity to build value.

Value is maximized when management sets strategy and objectives to strike an optimal balance between growth and return goals and related risks, and efficiently and effectively deploys resources in pursuit of the entity's objectives.

Q. 18. A Computer Company produces three types of models, which are first required to be machined and then assembled. The time (in hours) for these operations for each model is given below :

Model	*Machine Time*	*Assembly Time*
P III	20	5
P II	15	4
Celeron	12	3

The total available machine time and asembly time are 1,000 hours and 1,500 hours respectively. The selling price and other variable costs for three models are :

Particulars	*P III*	*P II*	*Celeron*
Selling Price (Rs.)	3,000	5,000	15,000
Labour, Material and other Variable Costs (Rs.)	2,000	4,000	8,000

The company has taken a loan of Rs. 50,000 from a Nationalised Bank, which is required to be repaid on 1-4-2009. In addition, the company has borrowed Rs. 1,00,000 from XYZ Co-operative Bank. However this bank has given its consent to renew the loan.

The Balance Sheet of the company as on 31-3-2010 is as follows :

Liabilities	*Rs.*	*Assets*	*Rs.*
Equity Share Capital	1,00,000	Land	80,000
Capital Reserve	20,000	Buildings	50,000
Profit & Loss Account	30,000	Plant & Machinery	1,00,000
Long-term Loan	2,00,000	Furniture etc.	20,000
Loan from XYZ Co-op. Bank	1,00,000	Vehicles	40,000
Loan from Nationalized Bank	50,000	Cash	2,10,000
Total	5,00,000	Total	5,00,000

The company is required to pay a sum of Rs. 15,000 towards the salary. Interest on long-term loan is to be paid every month @ 18% per annum. Interest on loan from XYZ Cooperative and Nationalised Banks may be taken as Rs. 1,500 per month. The company has already promised to deliver three P III, Two P II and five Celeron type of Computers to M/s. ABC Ltd. next month. The level of operation in the company is subject to the availability of cash next month.

The Company Manager is willing to know that how many units of each model must be manufactured next month, so as to maximize the profit.
Formulate a linear programming problem for the above.

Answer 18.

Let X_1, and X_2, and X_3 denote the number of P III, P II and Celeron computer respectively to be manufactured in the company. The following data is given :

Particulars	*P III*	*P II*	*Celeron*
Selling price per unit	3,000	5,000	15,000
Labour, Material & other Variable cost per unit	2,000	4,000	8,000
Profit per unit	1,000	1,000	7,000

From the data given for time required for various models and the total number of hours available for machine time and assembly time we get the following constraints :

$20X_1 + 15X_2 + 12X_3$ £ 1000 (Machine Time Restriction)

$5X_1 + 4X_2 + 3X_3$ £ 1500 (Assembly Time Restriction)

The level of operations in the company is subject to availability of cash next month *i.e.,* the cash required for manufacturing various models should not exceed the cash available for the next month.

The cash requirements for X_1 units of P III, X_1 units of P II and X_3 units of Celeron computers are :

$2000X_1 + 4000X_2 + 8000X_3$ ..... (1)

The cash availability for the next month from the balance sheet is as below :

Cash availability (Rs.) = Cash balance (Rs. 2,10,000)
- Loan to repay to Nationalized Bank (Rs. 50,000)
- Interest on loan from XYZ Cooperative Bank and Nationalized Bank (Rs. 1500)
- Interest on long term Loans $\left(\frac{0.18 \cdot 2,00,000}{12}\right)$
- Salary to staff (Rs. 15,000)

or, Cash availability = Rs. 2,10,000 – (Rs. 50,000 + Rs. 1,500 + Rs. 3,000 + Rs. 15,000)
= Rs. 1,40,500 ..... (2)

Thus, from (1) and (2),

$2000X_1 + 4000X_2 + 8000X_3$ £ Rs. 1,40,500

The company has also promised to deliver 3 P III, 2 P II and 5 Celeron computers to M/s. Kingspen Ltd.

Hence, $X_1 \geq 3$, $X_2 \geq 2$, $X_3 \geq 5$

Since the company wants to maximize the profit, hence the objective function is given by :

Maximize $Z = 1000X_1 + 1000X_2 + 7000X_3$ – (Rs. 15000 + Rs. 3000 + Rs. 1500)

The LP formulation of the given problem is as follows :

Maximize $Z = 1000\ X_1 + 1000\ X_2 + 7000\ X_3$ – (Rs. 15000 + Rs. 3000 + Rs. 1500)

Subject to the constraints :

$20X_1 + 15X_2 + 12X_3$ £ 1000

$5X_1 + 4X_2 + 3X_3$ £ 1500

$2000\ X_1 + 4000\ X_2 + 8000\ X_3$ £ Rs. 1,40,500

$X_1 \geq 3$, $X_2 \geq 2$, $X_3 \geq 5$

X_1, X_1 and X_3 can take only positive integral values.

Q. 19. (a) A captain of a cricket team has to allot five middle batting positions to five batsmen. The average runs scored by each batsman at these positions are as follows :

		Batting Position				
		III	IV	V	VI	VII
Batsmen	A	40	40	35	25	50
	B	42	30	16	25	27
	C	50	48	40	60	50
	D	20	19	20	18	25
	E	58	60	59	55	53

Make the assignment so that the expected total average runs scored by these batsmen are maximum.

(b) What are the limitations of LP Technique?

Answer 19. (a)

	III	IV	V	VI	VII
A	40	40	35	25	50
B	42	30	16	25	27
C	50	48	40	60	50
D	20	19	20	18	25
E	58	60	59	55	53

Loss Matrix

20	20	25	35	10
18	30	44	35	33
10	12	20	0	10
40	41	40	42	35
2	0	1	5	7

Row Operation

M_3

10	10	15	25	0
0	12	26	17	15
10	12	20	0	10
5	6	5	7	0
2	0	1	5	7

Column Operation

10	10	14	25	0
0	2	25	17	15
10	12	19	0	10
5	6	4	7	0
2	0	0	5	7

Improved Matrix

10	6	10	25	0
0	8	21	17	15
10	8	15	0	10
5	2	0	7	0
6	0	0	9	11

Maximum Profit

A	®	VII	—	50
B	®	III	—	42
C	®	VI	—	60
D	®	V	—	20
E	®	IV	—	60
				232

Answer 19. (b)

The limitations of LP technique are as follows :

- The estimation of the parameter. In all practical situations there are likely to be substantial problems involved in estimating the values to use as the total constraints. Furthermore, the final estimates used are likely to be subject to considerable uncertainty. It is possible to study the effects of uncertainty using sensitivity analysis.
- There is an assumption of linearity. In practice, this assumption may be totally invalid over small ranges. For example, in a profit maximization problem, it may well be found that there are substantial changes in unit variable costs arising from increasing or decreasing returns to scale.
- The linear programming model is essentially static and is, therefore, not really suitable for analyzing in detail the effects of changes in the various parameters, for example over time.
- In some circumstances, a practical solution derived from a linear programming model may be of limited use as, for example, where the variables may only take on integer values. A solution must then be found by a combination of rounding up and trial and error.

Q. 20. Departmental store wishes to purchase the following quantities of Sprees :

Types of sprees	A	B	C	D	E
Quantity	150	100	75	250	200

Tenders are submitted by 4 different manufacturers who undertake to supply not more than the quantities mentioned below (all types of sprees combined) :

Manufacturer	W	X	Y	Z
Total quantity	300	250	150	200

The store estimates that its profit/spree will vary with the manufacturer as shown in the following matrix.

	Sprees				
Manufacturers	A	B	C	D	E
W	275	350	425	225	150
X	300	325	450	175	100
Y	250	350	475	200	125
Z	325	275	400	250	175

How should the orders be placed?

Answer 20.

Profit matrix

	A	B	C	D	E	F	
W	275	350	425	225	150	0	300
X	300	325	450	175	100	0	250
Y	250	350	475	200	125	0	150
Z	325	275	400	250	175	0	200
	150	100	75	250	200	125	

Loss Matrix

200	125	50	250	325	475	300/275/225/25
25			50	200	25	
175	150	25	300	375	475	250/100/0
					100	25/25/125/75/5
225	125	0	275	350	475	150/75/0
	75	75				125* 100*
150	200	75	225	300	475	200/0
			200			

75/50/50/75/75/75*

150	150	75	250	200	125
0	25	0	50	0	100
	0		0		0
25	0	25	25	25	0
25	0		25	25	0
25	25		25	25	0
25			25	25	0
			25	25	0
			50	50	0

m + n – 1 allocations are there, optimality test can be performed.

200	125	50	250	325	475	**0**
25	25	50	50	200	25	
175	150	25	300	375	475	**0**
150	25	25	50	50	100	
225	125	0	275	350	475	**0**
50	75	75	25	25	0	
150	200	75	225	300	475	**-25**
0	100	100	200	0	25	
175	**125**	**0**	**250**	**325**	**475**	

			Qty.		Minimum Cost
W	→	B	25 × 350	=	8750
		D	50 × 225	=	11250
		E	200 × 150	=	30000
		F	25 × 0	=	0
X	→	A	150 × 300	=	45000
		F	100 × 0	=	0
Y	→	B	75 × 350		26250
		C	75 × 475		35625
Z	→	D	200 × 250		50000
Max Profit					2,06,875

Q. 21. A book store wishes to carry 'Ramayana' in stock. Demand is probabilis tic and replenishment of stock takes 2 days (i.e. if an order is placed on March 1, it will be delivered at the end of the day on March 3).

The proba bilities of demand are given below :

Demand (daily)	0	1	2	3	4
Probability	0.05	0.10	0.30	0.45	0.10

Each time an order is placed, the store incurs an ordering cost of Rs. 10 per order. The store also incurs a carrying cost of Rs. 0.50 per book per day. The inventory carrying cost in calculated on the basis of stock at the end of each day.

The manager of the bookstore wishes to compare two options for his inventory decision.

Order 5 books when the inventory at the beginning of the day plus order outstanding is less than 8 books.

Order 8 books when the inventory at the beginning of the day plus order outstanding is less than 8.

Currently (beginning 1st day) the store has a stock of 8 books plus 6 books ordered two days ago and expected to arrive next day.

Using Monte-Carlo Simulation for 10 cycles, recommend, which option the manager, should choose.

The two digit random numbers are given below :

89 34 70 63 61 81 39 16 13 73

Answer 21.

Demand	Probability	Cumulative Probability	Range
0	0.05	0.05	0-4
1	0.10	0.15	5-14
2	0.30	0.45	15-44
3	0.45	0.90	45-89
4	0.10	1.00	90-99

Option - A

Day	R No.	Demand	Option	Stock order	Closing Stock	Order Placed
1	89	3	8	-	5	-
2	34	2	5	6	9	-
3	70	3	9	-	6	0
4	63	3	6	-	3	5
5	61	3	3	0	0	-
6	81	3	0	5	2	5
7	39	2	2	-	0	5
8	16	2	0	5	3	-
9	13	1	3	5	7	-
10	73	3	7	-	4	5
					39+5 = 44	

Ordering cost 4 × 10	40
Ordering cost 0.5 × 44	22
Total Cost	62

Option - B

Day	R No.	Demand	Option	Orders received	Closing Stock	No. of Orders
1	89	3	8	-	5	-
2	34	2	5	6	9	-
3	70	3	9	-	6	-
4	63	3	6	-	3	8
5	61	3	3	-	0	-
6	81	3	0	8	5	-
7	39	2	5	-	3	8
8	16	2	3	-	1	-
9	13	1	1	8	8	-
10	73	3	8	-	5	-
					45	

Ordering cost 2 × 10	20
Ordering cost 0.5 × 45	22.5
Total Cost	42.5

Option 'B' is better because it has low Inventory costs.

Q. 22. Sportech Ceramics Ltd. is about to replace its rapidly deteriorating boiler equipment. Three types of boiler system are being considered as a suitable replacement :

a. Coal-fired, b. Gas-fired, c. Oil-fired.

The associated costs are as follows :

(Rs. '000)

Boiler system	*A*	*B*	*C*
Cost of boiler (including installation and commissioning)	55	74	67
Annual fuel cost	27	23	25
Annual operating labour costs	8	–	–
Annual maintenance costs	4	3	3
Annual electricity costs	1	1	1
Total annual operating costs	40	27	29

The new boiler system is expected to last at least ten years. The Company has an opportunity cost of finance of 15% per year. Which system should be chosen?

Answer 22.

If the decision is taken on the basis of initial cost only, then the coal-fired boiler system would be selected. However, over its life time (at least ten years) the annual operating costs are much higher than for the gas-fired and oil-fired systems. The life cycle costs for ten years are as follows :

(Rs. '000)

Boiler system	A	B	C
Cost of boiler	55	74	67
Operating costs (Annual costs × 10)	400	270	290
	455	344	357

However, we need to discount the annual costs at a 15% discount rate to arrive at the present value cost of each system. The discount factor for year 1-10 at 15% is 5.019.

The present value of each system then is : *(Rs. '000)*

Boiler system	A	B	C
Cost of boiler	55	74	67
Operating costs (Annual costs × 5.019)	201	136	146
Present value of costs	256	210	213

On the basis of financial consideration only, the gas-fired system is the most economical. Unless there are other important considerations the gas-fired system should be chosen. A more intricate analysis might attempt to forecast the likely changes in each of the annual operating costs (*e.g.,* fuel costs, maintenance costs, etc.). It might be useful, to see how much each of the three fuel costs would need to change to alter the decision. In addition to looking at the importance of fuel costs to the decision, we can also check the sensitivity of the expected system life. For instance, if the expected life is reduced to five years, the oil-fired system (C) becomes the most economical, as follows :

(Rs. '000)

Boiler system	A	B	C
Cost of boiler	55	74	67
Operating costs (Annual costs × 3.353)	134	91	97
Present value of costs	189	165	164

If the expected life is reckoned to be six years or more, the decision is in favour of the gas-fired system.

Q. 23. The assistant management accountant of your company has been preparing the profit and loss account for the week ended 31st October. Unfortunately, he had a traffi c accident and is now in a hospital, so as senior cost analyst you have been asked to complete this statement. The uncompleted statement and relevant data are shown below.

Week ended 31st October

			Rs.	Rs.
Sales				**50,000**
Standard Cost :				
Direct materials				
Direct wages				
Overhead			—	—
Standard profit				
Variances	**Fav./(adv.)**	**Fav./(adv.)**		
	Rs.	**Rs.**		
Direct materials : Price	**(400)**			
Usage	**(300)**			
Total :		**(700)**		
Direct Labour :				
Rate				
Effi ciency				
Total		—		
Overhead expenditure				
Volume				
Total	—			
Total variance		—		
Actual Profit		—		

Standard Data

The standard price of direct material used is Rs. 600 per tone. From each tone of material it is expected that 2,400 units will be produced. A forty hour week is operated. Standard labour rate per hour is Rs. 4. There are 60employees working as direct labour.

The standard performance is that each employee should produce one unit of product in 3 minutes. There are 4 working weeks in October. The budgeted fixed overhead for October is Rs. 76,800.

Actual data

Materials used during the week were 20 tones at Rs. 620 per tone. During the week 4 employees were paid of Rs. 4.2 p.h and 6 were paid Rs. 3.8 p.h and Remaining were paid at Standard Rate. Overheads incurred was Rs. 18000.

You are required to complete the P & L Statement for the week ended 31st Oct.

Answer 23.

Actual cost of material 620 × 20		Rs. 12400/-
(–) Direct material: price variance	(400)	
Usage variance	(300)	(700)
		11700

For Rs 600/- production = 2400 units

For Rs 11700/- production = (2400/600) × 11700 = 46800 units

Labour variances :

(1)	(2)	(3)
SRSH	SRAH	ARAH
4 × 2340	4 × (40 × 60)	[(4 × 4.20) + (6 × 3.80) + (50 × 4)] 40
9360	9600	9584

Labour rate variance (2) – (3) : 16(F)

Labour effi ciency variance : (1) – (2) : 240(A)

Overhead variances :

(1)	(2)	(3)	(4)
SRSH	SRAH	SRBH	ARAH
8 × 2340	8 × 2400		
18720	19200	19200	18000

OHs expenditure variance: (3) – (4) : 1200(F)

OHs volume variance: (1) – (3) : 480(A)

P&L statement for the week ended 31st October :

		Rs.	**Rs.**
Sales			**50000**
Standard cost			
Direct material		11700	
Direct wages		9360	
Overheads		18720	39780
Standard profit			10220
Variances	F/(A)	F/(A)	
Direct material :			
Price	(400)		
Usage	(300)		
Total		(700)	

		Rs.	Rs.
Direct labour :			
Rate	16		
Efficiency	(240)		
Total		(224)	
Overheads :			
Expenditure	1200		
Volume	(480)		
Total		720	
Total variance			(204)
Actual profit			10016

Q. 24. Standard Cost card of a product is as under :

Direct Materials :	**Rs.**
A. 2Kg. @ Rs. 3 per kg.	**6.00**
B. 1Kg. @ Rs. 4 Per Kg.	**4.00**
Direct wages 5 Hours @ Rs. 4 per hour	**20.00**
Variable overheads 5 hours @ Re. 1 per hour	**5.00**
Fixed overheads 5 hours @ Rs. 2 per hour	**10.00**
Total :	**45.00**
Standard profit	**5.00**
Standard selling price	**50.00**

Budgeted out put are 8,000 units per month. In April 2009, the company produced 6,000 units.

The actual sales value was Rs. 3,05,000. Direct material consumed was Material A 14,850 Kg valued at Rs. 43,065 and material B 7,260 kg valued at Rs. 29750. The total direct labour hours worked was 32,000 and the wages paid there fore amounted to Rs. 1,27,500. The direct labour hours actually booked on production was 31,800. Overheads recorded were : Fixed Rs. 80,600 and variable Rs. 30,000. Closing work in progress 600 units in respect of which materials A and B were fully issued and labour and over heads were 50% complete.

Analyse the variance and present an operating statement showing the recon ciliation between budgeted and actual profit for the month in the following format :

Operating Statement	**Rs.**
Budgeted Profit	
Sales Variances	
	Price
	Volume
	Total

Cost Variances

Direct Material
Price
Yield
Mix

Direct Wages

Rate
Efficiency
Idle time

Variable overheads

Expenses
Efficiency

Fixed Overheads

Expenses
Efficiency
Idle time
Capacity

Total cost variance

Actual Profit.

Answer 24.

Sales margin or profit variances :

(1)	(2)	(3)
AQAR	AQSR	SQSR
6000 x (50.83 – 45)	6000 x 5	8000 x 5
35000	30000	40000

(a) Profit variance due to selling price = (1) – (2) = 5000(A)

(b) Profit variance due to sales volume = (2) – (3) = 10000(A)

(c) Profit value variance = (1) – (3) = 5000(A)

Material variances :

	Standard			Actual		
	Q	P	V	Q	P	V
A	13200	3	39600	14850		43065
B	6600	4	26400	7260		29750
	19800		66000	22110		72815

	SQSP	RSQSP	AQSP	AQAP
A		14740 x 3	14850 x 3	
B		7370 x 4	7260 x 4	
	66000	73700	73590	72815
(6000/6600) x	60000	67000	66900	66195

(a) Material yield variance :(1) – (2) = 7000(A)

(b) Material mix variance : (2) – (3) = 100(F)

(c) Material price variance : (3) – (4) = 705(F)

Labour variances :

	(1)	(2)	(3)
	SRSH	SRAH	ARAH
	4 x 31500	4 x 32000	
	126000	128000	127500
(6000 / 6300) x	120000	121905	121429

(a) Labour idle time variance : 200 x 4 = 800 (A)

(b) Labour rate variance: (2) – (3) = 476(F)

(c) Labour effi ciency variance: 1905 – 800 = 1105 (A)

Variable overheads variances :

	(1)	(2)	(3)
	SRSH	SRAH	ARAH
	1 x 31500	1 x 31800	
	31500	31800	30000
(6000/6300) x	30000	30286	28571

(a) VOH efficiency variance : (1) – (2) = 286 (A)

(b) VOH budget variance : (2) – (3) = 1715(F)

Fixed overhead variance :

	(1)	(2)	(3)	(4)
	SRSH	SRAH	SRBH	ARAH
	2 x 31500	2 x 32000		
	63000	64000	80000	80600
(6000/6300) x	60000	60952	80000	76762

(a) FOH idle capacity variance :200 x 2 = 400(A)

(b) FOH efficiency variance : 952 – 400 = 552 (A)

(c) FOH capacity variance = 19048 (A)

(d) FOH budget variance : 3238(F)

Operating statement showing reconstruction of budgeted and actual profit :

Budgeted profit		40000
Sales margin variance due to :		
Price	5000(F)	(5000)
Volume	10000(A)	35000
Cost variances		
Direct material variances :		
Price	705(F)	
Mix	100(F)	
Yield	7000(A)	(6195)
Direct wages variances :		
Rate	476(F)	
Effi ciency	1105(A)	
Idle time	800(A)	(1429)
Variable OHs variances :		
Expenditure	1715(F)	
Efficiency	286(A)	1429
Fixed OHs variances :		
Effi ciency	552(A)	
Expenditure	3238(F)	
Idle time	400(A)	
Capacity	19048(A)	(16762)
Actual profit		12043

Q. 25. As a cost auditor of a company manufacturing electric lamps, you collect the following information.

		2009-10	2008-09
Production of Fluorescent lamps	**(in million pieces)**	**120**	**115**
Glass Tubes used	**(in million pieces)**	**140**	**126**
Cost per Glass Tube	**(in Rupees)**	**2.67**	**2.54**

The glass tubes are manufactured by the company. You note that wastages of glass tubes, due to breakage and other causes cannot be entirely avoided by the company, particularly in such a mass production. The usage figures relating to glass tubes include wastages and one finished lamp requires only one glass tube.

Wasted glass tubes are added to raw materials fed into furnace and is used for subsequent glass tube production and is known as 'cullet'. Credit for such cullet is given to the cost of lamps at the standard rate of Rs. 2.75 per kg. Each glass tube is assumed to have a standard weight of 250 gms., for purposes of this calculation. The standard rate and standard weight is same in both the years.

As you are aware, para 6 of the Annexure to the Cost Audit Report requires the cost auditor to comment on the material usage.

With the above available information prepare your analysis and comments under that para in your report of that cost audit.

Answer 25.

Analysis :

		2009-10	2008-09
Usage for 100 lamps	(Tubes/production cost per tube)	116.67	109.57
Imput cost	(Usage × cost per tube)	311.51	278.31
Cullet qty. in kg.	(Usage - 100) × 0.25	4.17	2.39
Credit for cullet	(Qty. × Rs. 2.75)	11.47	6.57
Net Material cost	(Input cost - Cullet Credit)	300.04	271.74
Cost per tube	(Data given)	2.67	2.54
Material Cost Variance	(300.04 - 271.74)	29.30	

If the usage for both year had been the same, the higher cost of production of glass tubes would have resulted in an increase of (0.13/2.54) × 271.74 or 13.91.

Therefore usage variance, as compared to the earlier year has been responsible for cost increase of 29.30 - 13.91 or Rs. 15.39.

Comments : The increase in cost of manufacture of glass tubes is about 5%. This may not be unreasonable considering that fuel costs are quite significant in manufacture of glass tubes, as it involves melting of materials for glass.

The usage of glass tubes is higher than the previous year by more than 6% as it has gone up from about 109.6 to 116.7. It therefore seems worthwhile to monitor such variations more closely to identify the major reasons for such increase to enable corrective action.

Q. 26. Ravi, Richard, Rahim and Roop Singh are regional salesman distributing the product of Super Perfumes Ltd. The selling price of the product is Rs. 400 per unit. The sales quota and the standard selling expenses for the year are :

(Rs.)

Salesman	*Sales quota*	*Standard selling expenses*
Ravi	**7,50,000**	**2,25,000**
Richard	**9,00,000**	**2,47,500**
Rahim	**11,50,000**	**2,87,500**
Roop Singh	**6,00,000**	**2,25,000**

Actual data for the year were as follows :

Particulars	Ravi	Richard	Rahim	Roop Singh
Days on field work	200	175	225	250
Kilometres covered	20,000	18,000	18,000	30,000
	Rs.	Rs.	Rs.	Rs.
Sales	8,00,000	10,00,000	10,50,000	5,20,000
Salary	80,000	80,000	80,000	80,000
Free Samples	9,000	7,500	5,375	8,000
Postage and Stationery	8,000	9,000	10,000	6,000
Other Expenses	9,000	5,000	4,000	10,000

The Salesmen are allowed conveyance allowance of Rs. 1.50 per kilometre and a daily allowance of Rs. 80 per day for the days spent on field work. Ravi gets a commission of 6 per cent on sale and others are given a commission of 5 per cent on sales. Corporate sales office expenses are chargeable at the rate of Rs. 30 per unit sold in the case of Ravi and Richard and Rs. 40 per unit in the case of Rahim and Roop Singh. Prepare a schedule showing the selling cost variances by salesmen.

Answer 26.

Working Notes :

Particulars	Ravi	Richard	Rahim	Roop Singh
Std. Sales (Units) (sales quota/Rs. 400)	1,875	2,250	2,875	1,500
Std. Selling expenses per unit (Rs.)	120	110	100	150
Actual Sales (Actual sales/Rs. 400) (Units)	2,000	2,500	2,625	1,300

Staement of Actual selling expenses of 4 salesmen (*Rs.*)

Particulars	Ravi	Richard	Rahim	Roop Singh
Conveyance allowance	30,000	27,000	27,000	45,000
Daily allowance	16,000	14,000	18,000	20,000
Sales Commission	48,000	50,000	52,500	26,000
Salaries	80,000	80,000	80,000	80,000
Free Samples	9,000	7,500	5,375	8,000
Postage & Stationery	8,000	9,000	10,000	6,000
Other Expenses	9,000	5,000	4,000	10,000
Corporate Sales office Expenses	60,000	75,000	1,05,000	52,000
(*a*) Total actual Selling expenses	2,60,000	2,67,500	3,01,875	2,47,000
(*b*) Standard Selling Cost (Actual Sales × Std. selling expenses per unit	2,40,000	2,75,000	2,62,500	1,95,000
Selling Cost Variance (*a*) - (*b*)	(20,000) Adverse	7,500 Favbourable	(39,375) Adverse	(52,000) Favbourable

The total selling cost variance (Adverse) = Rs. 1,03,875.

Q. 27. (a) What is Cost of lost opportunity?

(b) What is cost of quality? How it can be reduced?

(c) What is the definition of quality? Explain.

Answer 27. (a)

The most difficult cost of quality to quantify is the cost of lost opportunities. This is the lost revenue resulting from the loss of existing customers, the loss of potential customers and the lost business growth arising from the failure to deliver products and services at the required quality standards. Examples include cancellations due to inadequate service response times, ordering of competitors' products because the company's products are not available, and the wrong products offered for the specific customer's application.

Answer 27. (b)

The cost of quality is the sum of cost of conformance, cost of non-conformance and cost of lost opportunity. The quality costs amount to some where between 5-25% of turnover depending on industry. The quality cost will be much more if we include the potential loss of business from the affected customers. With cost of quality accounting for such a large proportion of turnover any reduction in quality cost will improve profitability and provide competitive edge to the company.

The quality cost reduction can be achieved in the following two stages :

- First, when prevention costs are increased to pay for the right kind of systems engineering work in quality control, a reduction will occur in rejection, defect and rework of output. This defect reduction means a substantial reduction in both types of failure costs.
- Secondly, a reduction in defective output will have a positive effect on appraisal costs because defect reduction means a reduced need for routine inspection and test activities. It follows that as prevention is increased the need for appraisal decreases. The end result is a substantial reduction in the cost of quality and an increase in the level of quality.

Answer 27. (c)

Quality is defined as "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs."

Within the context of manufacturing, the definition of quality would include the following factors :

- **Form :** All dimensions, appearance, configuration of the manufacturing practice must meet the prescribed requirement.
- **Fix :** Features of the product must be applicable to its use, including proper function, interchangeability, consistent geometry and so forth.
- **Function :** The products performance should conform to the design and meet the customer applications.
- **Reliability :** The product item should function according to the expectations over a reasonable life time.
- **Consistency :** Every product has the same properties, functions and performance. The customers will expect consistent service from each product.

Q. 28. (a) What is PDCA?

(b) A manufacturing company purchase one of the components required for the manufacture of product from two sources, viz, *Supplier A* and *Supplier B*. The price quoted by *Supplier A* is Rs. 15.00 per hundred numbers of the component and it is found that on the average 3% of the total receipt from this source is defective. The corresponding quotation from *Supplier B* is Rs. 14.50 but the defectives would go up to 5% for the total supply. If the defectives are not detected, they are utilised in production causing a damage of Rs. 15.00 per hundred component The company intends to introduce a system of inspection for the components on receipt which would cost Rs. 2 per hundred components. Such an inspection will, however, be able to detect only 90% of the defectived received. No payment will be made for components found to be defective in inspection.

Offer your opinion, (a) whether inspection at the point of receipt is justified, and (b) which of the two suppliers be asked to supply. Assume total requirements of components to be 10,000 numbers.

Answer 28. (a)

PDCA ("**Plan-Do-Check-Act**") is an iterative four-step problem-solving process typically used in quality control. PDCA was made popular by Dr. W. Edwards Deming, who is considered by many to be the father of

modern quality control; however it was always referred to by him as the "Shewhart cycle." Later in Deming's career, he modified PDCA to "Plan, Do, Study, Act" (PDSA) so as to better describe his recommendations.

The concept of PDCA comes out of the Scientific Method. The scientific method can be written as "hypothesis" - "experiment" - "evaluation" or Plan, Do, and Check. Shewhart described manufacture under "control" - under statistical control - as a three step process of specification, production, and inspection. The also specifically related this to the Scientific Method of hypothesis, experiment and evaluation. Shewhart, says that the statistician "must help to change the demand [for goods] by showing... how to close up the tolerance range and to improve the quality of goods." Clearly, Shewhart intended the analyst to take action based on the conclusions of the evaluation. PDCA has an inherent circular paradigm, it assumes that everything starts with Planning. Plan has a limited range of meaning. Shewart intended that experiments and quality control should be planned to deliver results in accordance with the specifications, which is good advice. However, Planning was not intended to cover aspects such as creativity, innovation, invention. In these aspects particularly when based upon imagination, it is often impossible or counterproductive to plan. Hence, PDCA is inapplicable in these situations.

Answer 28. (b)

(*i*) If not inspected

Supplier		*A*	*B*
Units supplies	(Nos.)	10,000	10,000
Defectives expected	(Nos.)	300	500
Costs		Rs.	Rs.
Purchase cost of components		1,500.00	1,450.00
Production damage on defective components (@Rs. 15 per 100 components)		45.00	75.00
	Total	1,545.00	1,525.00
Good components (Nos.)		9,700	9,500
Cost per 100 good components		Rs. 15.93	Rs. 16.05

(*ii*) If inspected

Supplier		*A*	*B*
Defectives not detected	(Nos.)	30	50
Defectjves detected	(Nos.)	270	450
Components paid for	(Nos.)	9,730	9,550
Costs		Rs.	Rs.
Purchase cost		1,459.50	1,384.75
Inspection cost		200.00	200.00
Production damage (@ Rs.15 per 100 components)		4.50	7.50
	Total	1,664.00	1,592.25
Good Components (Nos.)		9,700	9,500
Cost per 100 good components		Rs. 17.15	Rs. 16.76

On comparing the cost under I and II above, we find that it will not be economical to install a system of inspection. Further, it will be advantageous to purchase the components from Supplier A.

Q. 29. (a) What is the structure of the quality circle?

(b) What is EFQM?

(c) What are the benefits of Kaizen Procedure?

Answer 29. (a)

A Quality Circle has an appropriate organisational structure for its effective and efficient performance. It varies from industry to industry, organisation to organisation. But it is useful to have a basic framework as a model. The structure of a Quality Circle consists of the following elements.

i. *A steering committee*: This is at the top of the structure. It is headed by a senior executive and includes representatives from the top management personnel and human resources development people. It establishes policy, plans and directs the program and meets usually once in a month.

ii. *Co-ordinator*: He may be a Personnel or Administrative officer who co-ordinates and supervises the work of the facilitators and administers the programme.

iii. *Facilitator*: He may be a senior supervisory officer. He co-ordinates the works of several quality circles through the Circle leaders.

iv. *Circle leader*: Leaders may be from lowest level workers or Supervisors. A Circle leader organises and conducts Circle activities.

v. *Circle members* : They may be staff workers. Without circle members the porgramme cannot exist. They are the lifeblood of quality circles. They should attend all meetings as far as possible, offer suggestions and ideas, participate actively in group process, takes training seriously with a receptive attitude. The roles of Steering Committee, Co-0rdinator, Facilitator, Circle leader and Circle members are well defined.

Answer 29. (b)

EFQM a non-profit membership foundation, is the primary source for organizations in Europe looking to excel in their market and in their business. Founded in 1989 by the CEOs of prominent European businesses, EFQM is now the hub of excellent, globally minded organizations of all sizes and sectors, and both private and public. Specifi cally designed to help organizations achieve excellence in their business initiatives, the EFQM organization works to capture the best practices of globally-minded organizations and to turn this knowledge into practical resources for the business community. EFQM is a vibrant network of organizations that share the same ambitions to drive excellence through the organization and aspire to reach excellence. The **EFQM Excellence Model** is a framework for organizational management systems, promoted by the **European Foundation for Quality Management** (EFQM) and designed for helping organizations in their drive towards being more competitive.

Regardless of sector, size, structure or maturity, to be successful, organizations need to establish an

appropriate management system. The EFQM Excellence Model is a practical tool to help organizations do this by measuring where they are on the path to excellence; helping them understand the gaps; and then stimulating solutions.

Answer 29. (c)

Due to proper implementation of Kaizen Procedure, the following Tangible and Intangible benefits can be made available to the organizations :

Tangible Benefits – Sum total of small improvements contributed by all levels of employees can results in a big pile of improvements viz. Reduced Time/ Rejection/ Energy consumption etc. along with improved quality.

Intangible Benefits – There are many intangible benefits that go a long way in developing participative culture. These are :

- As the stress is on number (of small step improvements) it can be a single motivating factor for individual employees. They take pride in increasing this number.
- As these are small step improvements calling for very negligible investment, it is virtually risk free.
- It results in better team work due to certain principles of spiral thinking involved in basic philosophy.
- With increased emphasis on waste elimination it gives the employees a sense of belonging towards organization while building a culture of loyalty.
- With emphasis on energy savings it helps the society as a whole in conserving improvement resources like electricity, fuel etc.
- It results in change in attitude of work force from hostile to loyal, from destructive to constructive.

Q. 30. (a) What is Quality Management Principle? Discuss different types of Quality Management Principles.

(b) What are the disadvantages of Simulation technique?

Answer 30. (a)

A Quality Management Principle is a comprehensive and fundamental rule or belief, for leading and operating an organization aimed at continually improving performance over the long-term by focusing on customers while addressing the needs of all other stakeholders.

Eight Quality Management Principles have been identified. These are :

PRINCIPLE-1 : CUSTOMER FOCUS

Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

PRINCIPLE-2 : LEADERSHIP

Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving organization's objectives.

PRINCIPLE-3 : INVOLVEMENT OF PEOPLE

People of all levels are the essence of an organization and their full involvement enables their abilities to be used for the organizations benefit.

PRINCIPLE-4 : PROCESS APPROACH

A desired result is achieved more efficiently when activities and related resources are managed as a process.

PRINCIPLE-5 : SYSTEM APPROACH TO MANAGEMENT

Identifying, understanding and managing interrelated processes as a system contributes to organization's effectiveness and efficiency in achieving its objectives.

PRINCIPLE-6 : CONTINUAL IMPROVEMENT

Continual improvement of the organisation's overall performance should be a permanent objective of the organization.

PRINCIPLE-7 : FACTUAL APPROACH TO DECISION MAKING

Effective decisions are based on the analysis of data and information.

PRINCIPLE-8 : MUTUALLY BENEFICIAL SUPPLIER RELATIONSHIPS

An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

Answer 30. (b)

Disadvantages of Simulation Technique are as follows :

- Simulation is not an optimizing technique. It simply allows us to select the best of the alternative systems examined.
- Reliable results are possible only if the simulation is continued for a long period.
- A computer is essential to cope with the amount of calculation in simulation modeling.
- To develop a simulation model means consumption of voluminous data and it may be very costly. Each simulation model is unique and its solution cannot be applied to other problems however similar they may be.
- The simulation model does not produce answers by itself. Managers must generate all of the conditions and constraints for solutions they want to examine.
- Simulation methods generally are not as efficient as the analytical methods.