Paper 9 - Operations Management and Information Systems

Section –A

[Question no. 1 is compulsory and any 4 from the rest]

1 Answer the following questions:

(a) A work sampling study is to be made of a typist pool. It is felt that typists are idle 30 percent of the item. How many observations should be made in order to have 95.5% confidence that accuracy is within ±4%.

(b) A steel plant has a design capacity of 50,000 tons of steel per day, effective capacity of 40,000 tons of steel per day and an actual output of 36,000 tons of steel per day. Compute the efficiency of the plant and its utilization.

(c) The demand function of a firm is q = 200 – 10p and the average cost function is $AC = 10 + \frac{q}{25}$. If the firm's objective is to maximize profit, what will be its profit maximizing output?

(d) Consider the pay off matrix given below:

Player B

Player A		B_1	B_2
	A_1	2	6
	A_2	−2	λ

(i) Show that whatever be the value of λ, the game is strictly determinate.

(ii) Determine the value of game

(e) If a firm sells 8,000 units, its loss is ₹ 20,000. But if it sells 10,000 units, its profit is ₹ 20,000. Calculate Fixed Cost.

(f) List the name of the Qualitative Approaches regarding the Forecasting Technique. [6x2]

Answer of 1:

(a) Number of observations required for Work sampling study $N = \frac{C^2pq}{E^2}$

Where C = constant depending on confidence level

p = percentage of idling; q = percentage of activity; E = error

C = 2 for 95.5% confidence level; p = 0.3 ; q = 1 – p .= 0.7 ; E = ±4%

$\therefore \quad N = \frac{4 \times 0.3 \times 0.7}{(0.04)^2} = \frac{0.84}{0.0016} = 525$

(b) Efficiency of the plant = Actual output/ Effective Capacity
= (36,000 /40,000) x100 =90%

Utilization = Actual Output/Design Capacity
= (36,000/50,000) x 100 = 72%

(c) Here the equation of the demand curve is

$q = 200 - 10p$

or, $10p = 200 - q$

or, $p = \frac{200 - q}{10} = 20 - \frac{1}{10}q^2$

So, total revenue (R) = $pq = 20q - \frac{1}{10}q^2$

$\therefore$ Marginal Revenue (MR) $\left(\frac{dR}{dq}\right) = 20 - \frac{1}{5}q$

Again, AC = $10 + \frac{q}{25}$

$\therefore$ Total Cost (C) = AC x q = $10q + \frac{q^2}{25}$

$\therefore$ Marginal Cost $\left(\frac{dc}{dq}\right) = 10 + \frac{2}{25}q$

Now, the first order condition for profit maximization requires, MR =MC.

$\therefore\ 20 - \frac{1}{5}q = 10 + \frac{2}{25}q$

or, $\frac{1}{5}q + \frac{2}{25}q = 20 - 10$

or, $\frac{7}{25}q = 10 \therefore q = \frac{10 \times 25}{7} = \frac{250}{7}$

The second order condition requires that slope of MC>Slope of MR.

Now, slope of MR= $\frac{d(MR)}{dq} = -\frac{1}{5} < 0$ and slope of MC= $\frac{d(MC)}{dq} = \frac{2}{25} > 0$.

So, the second order condition is fulfilled.

Hence, to get maximum profit, the firm will produce $\frac{250}{7}$ units of output.

(d) (i) We determine the maximin and the minimax value, ignoring λ.

Player B

		B_1	B_2	r
Player A	A_1	2	6	2
	A_2	−2	λ	−2
	c	2	6	

Here maximin value = 2 and minimax value = 2. Thus, maximin value = minimax value.
So, whatever be the value of λ, the game is strictly determinable.

(ii) The value of the game is 2 to player A and – 2 to player B. The optimum strategy for A is A_1 and the optimum strategy for B is B_1. The Saddle point = (A_1, B_1).

(e) Change in quantity (10,000 – 8,000) units = 2,000 units
Change in profit =₹ [20,000 – (-20,000)] = ₹40,000.

$\therefore$ Unit contribution = $\frac{\text{Change in Profit}}{\text{Change in Output}} = \frac{₹40,000}{2,000} = ₹ 20$

So, when output = 10,000 units
Total contribution= (₹ 20 x 10,000) = ₹ 2,00,000

We know Contribution = Fixed Cost + Profit
2,00,000 = Fixed Cost + 20,000
or, 2,00,000 – 20,000 = Fixed Cost
or, Fixed cost = 1,80,000

(f) Qualitative approaches include five forecasting techniques:

- Grass – Root Forecasting
- Focused Forecasting
- Historical Analogy
- Panel Consensus
- Delphi Method

2 (a) At Dr. Prachi's clinic patients arrive at an average of 6 patients per hour. The clinic is attended to by Dr. Prachi himself. Some patients require only the required prescription. Some come for minor checkup while some others require through inspection for the diagnosis. This takes the doctor 6 minutes per patient on an average. It can be assumed that arrivals follow a Poisson Distribution and the Doctor's inspection time follows an Exponential Distribution.
Determine:

(i) The percentage of time that a patient can walk to the doctor without having to wait;
(ii) The average number in the system.
(iii) The average number in the queue.
(iv) The average waiting time / unit in the system.

(b) Describe the role of Project Manager [7+5]

Answer of 2

(a) Here, λ = Mean arrival rate per unit of time=6 Patients per hour

μ = Mean service Rate per unit of time= $\frac{1}{6} \times 60$ = 10 Patients per hour

(i) The probability that a patient can walk to a doctor without waiting or the probability of an empty or idle system:

$P_0 = 1 - \frac{\lambda}{\mu} = 1 - \frac{6}{10} = \frac{4}{10}$ or 40%

(ii) The average number in the system:

$L_s = \frac{\lambda}{\mu - \lambda} = \frac{6}{10-6} = \frac{6}{4} = \frac{3}{2}$

(iii) The average number in the queue:

$L_q = \frac{\lambda}{\mu} \times \frac{\lambda}{\mu - \lambda} = \frac{6}{10} \times \frac{3}{2} = \frac{9}{10}$

(iv) The average waiting time/unit in the system:

$W_s = \frac{1}{\mu - \lambda} = \frac{1}{10-6} = \frac{1}{4}$ hour or 15 minutes.

(b) The project manager's job is important and challenging. The manager is responsible for getting work performed but often has no direct, formal authority over most of the people who perform the job.

The project manager often relies on broader knowledge of the project and skills at negotiation and persuasion to influence participants. A project manager may have the assistance of a staff if the project is large. Therefore, it is important that the project leaders have an effective means of identifying and communicating the planned activities and the ways in which they are interrelated.

The basic roles for a Project Manager could be broadly grouped under following heads:

(i) Project sing and problem solving. Projectising work as much as possible, e.g., create a number of projects such as daily, weekly, monthly, quarterly, biannually and annual package activities of entire plant.
(ii) Defining and maintaining integrity of a project.
(iii) Development of Project Execution Plan. Organization for execution of the plan.
(iv) Setting of cost and time targets for each of the projects, e.g., daily, weekly, monthly activities, etc
(v) Development of systems and procedures for accomplishment of project objectives and targets.
(vi) Line up vendors and contractors for the supply of materials and erection skills and contract Management.
(vii) Negotiation for commitments and Man-management.
(viii) Non-human resource management, including fiscal matters.
(ix) Direction and co-ordination of project activities. Matrix and co-ordinate with other departments for preparation of drawing, specification, procurement of materials, providing skills including labour and supervision.
(x) Monitor and control these projects using schedules, budgets and contracts.
(xi) Satisfaction of customer, government and the public.
(xii) Achievements of project objectives, cash surplus and higher productivity.

3 (a) A firm produce three products A, B, and C, each of which passes through three departments: Fabrication, Finishing and Packing. Each unit of Product A requires 3, 4 and 2; each unit of products B requires 5, 4 and 4, while each unit of product C requires 2, 4 and 5 hours respectively in the three departments. Every day, 60 hours are available in the fabrication department, 72 hours in the finishing department and 100 hours in the packing department.

The unit contribution of product A is ₹5, of product B is ₹10, and of product C is ₹8.

Required:

(i) Formulate the problem as an LPP (Not required to Solve)

(ii) (b) Discuss the Classification of Production Planning and Control Functions (PPC).

[5+7]

Answer of 3:

(a) Let x_1, x_2 and x_3 represent the number of units of products A, B and C respectively. The given problem can be expressed as a LPP as follows:

Maximize	$Z = 5x_1 + 10x_2 + 8x_3$	**[Contribution]**
Subject to		
	$3x_1 + 5x_2 + 2x_3 \leq 60$	**[Fabrication hours]**
	$4x_1 + 4x_2 + 4x_3 \leq 72$	**[Finishing hours]**
	$2x_1 + 4x_2 + 5x_3 \leq 100$	**[Packing hours]**
	$x_1, x_2, x_3 \geq 0$	**[Non- negative constraint]**

(b) **The functions of PPC can be classified under the following:**

(i) Materials: Raw materials, spare parts and components which must be available in the correct quantities and specifications at the right time.

(ii) Methods: It involves deciding the best sequence of operations for manufacturing the parts, building up subassemblies and major assemblies which in turn will make up the finished product, within the limitations of existing layout and workflow.

(iii) Machines and Equipments: PPC is concerned with selection of machines and equipments and also with maintenance policy, procedure and schedules, replacement policy and tooling.

(iv) Routing: Routing prescribes the flow of work in the plant and is related to consideration of layout, of temporary storage locations for raw materials, components and semi processed parts, and of material handling systems. Routing is a basic PPC function.

(v)Estimating: The processing times (both set up time and operation time per piece) required for the parts to be manufactured in-house are estimated and the standard time (both machine time and labour time) are established as performance standards.

(vi) Loading and Scheduling: Machines have to be loaded according to their capacity and capability. Machine loading is carried out in conjunction with routing (as indicated in process layouts or operations analysis and routing sheets) to ensure smooth workflow and the prescribed feeds. Speeds of machines are adhered to as well as the estimated time.

(vii)Scheduling: Determines the utilization of equipment and manpower and hence the efficiency of the plant. Scheduling determines the starting time and completion time for each and every operation for each and every part to be manufactured and sub-unit to be assembled so that the finish product is ready to be shipped to the customer as per the predetermined delivery schedules.

(viii) Dispatching: This is concerned with the execution of planning functions. Production orders and instructions are released according to the schedule, sequences indicated in route sheets, and machine loading schedules are adhered to and authorization is given for release of materials and tools to the operators to carry out the work.

(ix) Expediting or Progressing: This means follow-up or keeping track of the progress made in completing the production as per schedules. This follows dispatching function logically.

(x)Inspection: This function relates to checking the quality of production and of evaluating the efficiency of the processes, methods and workers so that improvements can be made to achieve the desired level of quality.

(xi) Evaluating or Controlling: The objective of evaluation or controlling is to improve performance. Methods and facilities are evaluated to improve their performance. To sum up, we can state that PPC is a management tool, employed for the direction of the manufacturing operations and their Co-ordination with other activities of the firm.

4(a) A firm produces four products. There are four operators who are capable of producing any of these four products. The firm records 8 hours a day and allows 30 minutes for lunch. The processing time in minutes and the profit for each of the products are given below:

Operator	Products			
	A	B	C	D
1	15	9	10	6
2	10	6	9	6
3	25	15	15	9
4	15	9	10	10
Profit (₹) per unit	8	6	5	4

Find the optimal assignment of products to operators.

(b) Mention the characteristics of Just – in – Time system. [10+2]

Answer of 4:

(a) An 8 – hour working day, with a 30- minutes lunch time allowed, implies that net working time available per day is 7 hours and 30 minutes that is 450 minutes. The number of units of different products which could be produced by the four operators can be calculated by dividing 450 by the given processing times. With the profit per unit of each product being given, we may calculate the profit resulting from each possible assignment. The profit matrix is given in Table below. The values in this matrix are derived as follows. For example, operator 1 can produce 450/15 = 30 units of product A which, at a profit rate of ₹8 per unit, implies a total profit of ₹ 240.

Profit Matrix

Operator	Products			
	A	B	C	D
1	240	300	225	300
2	360	450	250	300
3	144	180	150	200
4	240	300	225	180

To solve the problem, it is first converted into a minimization problem by obtaining opportunity loss matrix by subtracting each value from 450 – the highest profit value in the table.

Opportunity Loss Matrix

Operator	Products			
	A	B	C	D
1	210	150	225	150
2	90	0	200	150
3	306	270	300	250
4	210	150	225	270

Using Hungarian Method, we first obtain zeros in every row and column as given in tables

Reduced Cost Table 1

Operator	Products			
	A	B	C	D
1	60	0	75	0
2	90	0	200	150
3	56	20	50	0

4	60	0	75	120

Reduced Cost table 2

Operator	Products			
	A	B	C	D
1	4	0	25	0
2	34	0	150	150
3	0	20	0	0
4	4	0	25	120

It is observed that all zeros are covered by three lines, which is one less than the order of the matrix. The improved matrix is obtained as shown in Table below, with adjustment with the least uncovered value of 4.

Reduced cost Table 3

Operator	Products			
	A	B	C	D
1	0	0	21	0
2	30	0	146	150
3	0	24	0	4
4	0	0	21	120

Since the minimum number of lines to cover all zeros is 4, which matches with the order of the matrix, assignments can be made as shown in table below. Thus, the optimal assignment is:

Operator	Product	Profit
1	D	300
2	B	450
3	C	150
4	A	240
	Total	1,140

(b) Characteristics of Just-In-Time System

JIT systems focus on reducing inefficiency and unproductive time in the production process to improve continuously the process and quality of the product or service. Employee involvement and inventory reductions are essential to JIT operations.

The salient characteristics of JIT are:

(i) Pull method of material flow

(ii) Constantly high quality

(iii) Small lot sizes

(iv)Uniform workstation loads

5 (a) The number of breakdowns of equipment over the past 2 years below:

No. of Break downs	No. of month this occurred
0	3
1	7
2	9
3	3
4	2
Total	24

Each break down costs an average of ₹ 300. Preventive maintenance service can be hired at a cost of ₹ 150 per month and it will limit the breakdowns to an average of one per month. Which maintenance arrangement is preferable, the current break down maintenance policy or a preventive maintenance service contract?

(b) Discuss the advantages of Network Scheduling. [9+3]

Answer of 5:
(a) Step 1: Calculation of probability distribution of break downs:

No. of breakdown (x)	Frequency in month f (x)	Probability of breakdown P(x)
0	3	3/24 = 0.125
1	7	7/24 = 0.292
2	9	9/24 = 0.375
3	3	3/24 = 0.125
4	2	2/24 = 0.083
Total	24	1.000

Step 2: Calculation of expected value of breakdowns:

Probability of breakdown P(x)	No. of breakdown (x)	Expected value of breakdowns [x. P(x)]
0.125	0	0
0.292	1	0.292
0.375	2	0.750
0.125	3	0.375
0.083	4	0.332
Total		1.749 = 1.75

Step 3: Calculating of breakdown cost:
Expected breakdown cost = (1.75 break-downs per month) x (cost per break-down)
= 1.75 x 300
= ₹ 525 per month
Step 4: Cost of preventive maintenance service contract per month
= ₹ 150 + ₹ 300 (i.e., cost of one breakdown per month) = ₹ 450

Savings due to preventive maintenance service contract = ₹ 525 – ₹ 450 = ₹ 75 per month.

Since there is a saving of ₹ 75 per month by entering into preventive maintenance service contract, it is preferable to go for preventive maintenance service contract.

(b) Advantages of Network Scheduling

Network based scheduling techniques can be beneficial in many ways if they are properly used. Like all other scheduling techniques, however, they are not panaceas or substitutes for judgment of good management. Since scheduling is an attempt to plan future work, and estimate the time for the required work. No technique will make poor estimates any better. Scheduling can help plan the work, but the accuracy of plans and schedules depends on the accuracy of the time estimates used in their development. Knowledgeable people and/or reliable techniques should be used to provide the time estimates.

Assuming that the estimates for a network scheduling method are as good as those for other scheduling methods, the network techniques may offer some advantages:

(i) They lead to planning a project to the selected level of details so that all parts of the project and their intended order of accomplishment are known.
(ii) They provide a fairly accurate estimate of the length of time it will take to complete the project and activities that must be kept on time to meet the schedule.
(iii) They provide a graphical picture and standardized vocabulary to aid in understanding the work assignments and communicate it among the people involved in the project.
(iv) They provide means to track the progress on a project, i.e., show where work is with respect to the plan.
(v) They identify and focus attention on potentially troublesome activities to facilitate management by exception.
(vi) They provide a means of estimating the time and cost impact of changes in the project plan at any stage.

6 (a) Discuss the characteristics of Good Product Design.
(b) Briefly explain about Designing for Manufacture and Assembly (DFMA). [9+3]

Answer of 6:

(a) A good product design must ensure the following:

(i) Function or performance: The function or performance is what the customer expects the product to do to solve his/her problem or offer certain benefits leading to satisfaction. For example, a customer for a motor bike expects the bike to start with a few kicks on the kick peddle and also expects some other functional aspects such as pick-up, maximum speed, engine power and fuel consumption etc.

(ii) Appearance or aesthetics: This includes the style, colour, and look, feels, etc. which appeals to the human sense and adds value to the product.

(iii) Reliability: This refers to the length of time a product can be used before it fails. In other words, reliability is the probability that a product will function for a specific time period without failure.

(iv) Maintainability: Refers to the restoration of a product once it has failed. High degree of maintainability is desired so that the product can be restored (repaired) to be used within a short time after it breaks down. This is also known as serviceability.

(v)Availability: This refers to the continuity of service to the customer. A product is available for use when it is in an operational state. Availability is a combination of reliability and maintainability. High reliability and maintainability ensures high availability.

(vi) Productibility: This refers to the ease of manufacture with minimum cost (economic production).This is ensured in product design by proper specification of tolerances, use

of materials that can be easily processed and also use of economical processes and equipments to produce the product quickly and at a cheaper cost.

(vii) Simplification: This refers to the elimination of the complex features so that the intended function is performed with reduced costs, higher quality or more customer satisfaction. A simplified design has fewer parts which can be manufactured and assembled with less time and cost.

(viii) Standardization: Refers to the design activity that reduces variety among a group of products or parts. For example, group technology items have standardized design which calls for similar manufacturing process steps to be followed. Standard designs lead to variety reduction and results in economies of scale due to high volume of production of standard products. However, standardized designs may lead to reduced choices for customers.

(ix) Specification: A specification is a detailed description of a material, part or product, including physical measures such as dimensions, volume, weight, surface finish etc. These specifications indicate tolerances on physical measures which provide production department with precise information about the characteristics of products to be produced and the processes and production equipments to be used to achieve the specified tolerances (acceptable variations).
Interchangeability of parts in products produced in large volumes (mass production and flow line production) is provided by appropriate specification of tolerances to facilitate the desired fit between parts which are assembled together.

(x)Safety: The product must be safe to the user and should not cause any accident while using or should not cause any health hazard to the user. Safety in storage, handling and usage must be ensured by the designer and a proper package has to be provided to avoid damage during transportation and storage of the product. For example, a pharmaceutical product while used by the patient should not cause some other side effect threatening the user.

(b) Designing for Manufacture and Assembly (DFMA)

Traditionally the attitude of designers has been "we design it, you build it" which is termed as **"over-the-wall approach",** where the designer is sitting on one side of the wall and throwing the design over the wall to the manufacturing engineers. The manufacturing engineers have to deal with the problems that arise because they were not involved in the design effort. This problem can be overcome by an approach known as **concurrent engineering** (or simultaneous engineering). Concurrent engineering means bringing design and manufacturing people together early in the design phase to simultaneously develop the product and processes for manufacturing the product. Recently this concept has been enlarged to include manufacturing personnel, design personnel, marketing and purchasing personnel in loosely integrated cross-functional teams. In addition, the views of suppliers and customers are also sought frequently. This will result in product designs that will reflect customer wants as well as manufacturing capabilities in the design stage itself. **Design for Manufacturing (DFM)** and **Design for Assembly (DFA)** are related concepts in manufacturing. The term design for manufacturing is used to indicate the designing of products that are compatible with an organization's capability. Design for assembly focuses on reducing the number of parts in a product or on assembly methods and sequence that will be employed.

Designing for manufacture includes the following guidelines:

(i) Designing for minimum number of parts.
(ii) Developing modular design.

(iii) Designing for minimum part variations (i.e., communication or using standardized parts)
(iv) Designing parts for ease of fabrication.

Section – B

Question No. 7 is compulsory and any 4 from the rest

7. (a) What is Operation Manuals in relation to a system? [4×2]

Answer: Operation Manuals is a user's guide, it is a document intended to give assistance to people in using a particular system.

(b) What is meant by "key pair" in the context of Asymmetric Crypto System?

Answer:

"**Key pair**", in an asymmetric crypto system, means a private key and its mathematically related public key, which are so related that the public key can verify a digital signature created by the private key.

(c) What is Program Debugging?

Answer:

Program Debugging is the form of testing activity which refers to correcting programming language syntax and diagnostic errors so that the program compiles cleanly and thus in this process, errors are found and then they are corrected.

(d) State the duties and responsibilities of an Information System Manager?

Answer:

Following are the duties and responsibilities of the Information System Manager:

(i) Planning the resources and time frame of implementation.
(ii) Supervising the overall implementation of system and day to day operation.

8. (a) State the major characteristics of Transaction Processing System. [6]

Answer:

The major characteristics of Transaction Processing System are:

- Large amounts of data are processed;
- The sources of data are mostly internal, and the output is intended mainly for an internal audience;
- The Transaction Processing System processes information on a regular basis - daily, weekly, monthly, etc.;
- Large storage (database) capacity is required;
- High processing speed is needed due to the high volume;
- Transaction Processing System basically monitors and collects past data;
- Input and output data are structured (i.e., standardized);
- Low computation complexity is usually evident in Transaction Processing System;
- A high level of accuracy, data integrity, and security is needed;

- High reliability is required;
- Inquiry processing is a must.

(b) List the functions of a Steering Committee involved in a System Development Life Cycle. [2]

Answer:

The functions of a Steering Committee are as below:

(i) To provide overall direction
(ii) To be responsible for all cost and timetables
(iii) To conduct a regular review of progress of the project
(iv) Taking corrective actions like rescheduling, e-staffing, change in the project objectives etc.

9. List the advantages of E – commerce. [8]

Answer:

E-commerce has several advantages:

• **Businesses without the barriers of time or distance:** E-commerce plays very important role in allowing people to carry out businesses without the barriers of time or distance. One can log on to the Internet at any time, whether day or night and purchase or sell anything at his desires.

• **Lower cost-of-sale:** As there is no human interaction (whole seller, retailer etc.) during the on-line electronic purchase order processing, therefore, the direct cost-of-sale for an order taken from a website is lower than through traditional means. Further, electronic selling also eliminates processing errors, and it is more convenient for the visitor.

• **Cheapest means of doing business:** Another important benefit of E-commerce is that as compared to paper based commerce it is the cheapest means of doing business.

• **Advantages to buyer:** From the buyer's perspective also E-commerce offers a lot of advantages.

i. Reduction in buyer's sorting out time.
ii. Better buyer decisions;
iii. Less time is spent in resolving invoice and order discrepancies.
iv. Increased opportunities for buying alternative products.

• **Less delivery time, labour cost etc.**: A significant benefit of E-commerce is that it helps to reduce the delivery time, labour cost and the cost incurred in the following areas:

i. Document preparation;
ii. Error detection and correction;
iii. Mail preparation;
iv. Communication;
v. Data entry;
vi. Overtime for completing the work; and
vii. Supervision expenses

• **Price fixation:** The day-to-day pressures of the marketplace have played their part in reducing the opportunities for companies to invest in improving their competitive position. A matured market, increased competitions have reduced the amount of money available to invest. If the selling price cannot be increased and the manufacturing cost cannot be

decreased then the difference can be in the way the business is carried out. E-commerce has provided the solution by decimating the costs, which are incurred.

10. (a) List and describe the contents of a System Manual. [6]

Answer:

A System Manual is an output of the system design that describes the task to be performed by the system with complete layouts and flow charts.

It contains:

i. **General description of the existing system:** It describes the general structure of the existing system from top management to the bottom management.
ii. **Flow of the existing system:** It describes the input, processing and output of the data that flows at various levels of organization's structure.
iii. **Outputs of the existing system:** The documents produced by existing system are listed.
iv. **General description of the new system:** A brief justification for the changes is specified.
v. **Flow of the new system:** It defines the flow of the system from and to the computer operation and within the computer department.
vi. **Output Layouts:** It describes the user interface or layout for the user that is used for better communication in near future.
vii. **Output distribution:** The output distribution is summarized.
viii. **Input layouts:** The inputs to the new system are described as well as a complete layout of the input documents, input disks or tapes are described.
ix. **Input responsibility:** The source of each input document is indicated. The user department is responsible for each item on the input documents.
x. **Macro Logic:** It defines the logic of the internal flows as to be defined by system analysts.
xi. **Controls:** This shall include type of controls, and the method in which it will be operated.

(b) State how a Structure Chart differs from a Flow Chart. [2]

Answer:

Flow Chart is a convenient technique to represent the flow of control in a program. A Structure Chart differs from a Flow Chart in the following three principal ways:

(i) It is difficult to identify the different modules of the software from its Flow Chart representation.
(ii) Data interchange among different modules is not represented in a Flow Chart.
(iii) Sequential ordering of tasks inherent in a Flow Chart is suppressed in a Structure Chart.

11. (a) Discuss the important characteristics of a Good Management Information System (MIS). [5]

Answer:

(i) Management Oriented: A good Management Information System (MIS) is not necessarily meant for top management only it may also meet the information requirements of middle level or operating levels of management. Here the Management should be responsible for

setting system specifications as well as management should also be involved in directing changes when occur.

(ii) Integrated: It means that all the functional and operational information sub-systems should be integrated together and there must be a capability of generating more meaningful information.

(iii) Common data flows: It means that common input, processing and output procedures and media should be used. It eliminates data duplication and produces an efficient information system.

(iv) Heavy planning element: A management information system usually takes 3 to 5 years and sometimes even longer period to get established firmly within a company. It means that MIS designer should keep in view future objectives and requirements of firm's information in mind.

(v) Computerized: The use of computer system increases the effectiveness of MIS. It processes the data fast and accurate.

(b) What is meant by the term "Non-Programmed Decision Making"? [3]

Answer:
Non-programmed decision making refers to those decision making process which does not go by any pre-determined set of guidelines. Normally this type of decision making takes place to handle special business situations with the help of experience, judgment and vision of the decision maker. In case of non-programmed decision making, information is unstructured and external environmental information is a must along with internal information sets. For example, for decision on business policy many non-standard information like technology change, competitors market share etc. is required apart from internal information of sales of different products.

12. (a) State the benefits of Electronic Data Interchange. [3]

Answer:

Electronic Data Interchange (EDI) has following benefits:

(i) The use of EDI eliminated many problems associated with traditional information flow such as the delay associated with making of documents.
(ii) As data is not repeatedly keyed (typed) therefore the chances of error are reduced.
(iii) Time required to re-enter data is saved.
(iv) As data is not re-entered at each step of the process, labour costs are reduced.
(v) As time delays are reduced therefore more certainty in information flow is there.
(vi) EDI generates functional acknowledgement that the EDI message has been received by the recipient and is electronically transferred to sender. Therefore this acknowledgement which is sent electronically by the recipient to sender, states that the message has been received.

(b) List the major features of Enterprise Resource Planning. [5]
Answer:

The major features of an Enterprise Resource Planning (ERP) are stated below:

- An ERP system is flexible enough to respond fast to the changing needs of the organization.

- It supports various organizational functions. It has in depth features in accounting, material management, sales and distribution management, human resource management etc.
- It has end-to-end Supply Chain Management to optimize the overall demand and supply.
- It facilitates integrated Information Systems covering all functional areas like manufacturing, procurement, sales and distribution, payables, receivables, human resources, inventory and finance etc. and it bridges the information gap across organization.
- ERP is the solution for better project management.
- It allows introduction of latest technologies like Electronic Funds Transfer, Electronic Data Interchange, Internet, Intranet, E-commerce etc.
- It eliminates business problems like material shortages, productivity, customer service, cash management, quality and prompt delivery.
- It provides intelligent business tools like Decision Support System, Executive Information System etc.
- It provides multi-platform, multi-facility, multi-mode of manufacturing, multi-currency and multi-lingual facilities.
- It supports strategic and business planning activities, operational planning and execution activities, material and resource planning.