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**PAPER : 6- SYSTEM ANALYSIS, DATA PROCESSING & QUANTITATIVE TECHNIQUES  
MAY 2002**

Question 1 is compulsory. Answer any four from the remaining six questions.

**Question 1**

- (a) Discuss various constraints that come in the way of operating an effective M.I.S. how these constraints could be avoided? **(10 Marks)**
- (b) A farm is engaged in breeding pigs. The pigs are fed on various products grown in the farm. In view of the need to ensure certain nutrient constituents (call them x, y and z) it becomes necessary to buy two additional products say A and B. One unit of product A contains 36 units of x, 3 units of y and 10 units of z. the minimum requirement of x, y and z is 108 units, 36 units and 100 units respectively. Product A costs Rs.20 per unit and Product b costs Rs.40 per unit.  
Formulate the above as a linear programming problem to minimize the total cost and solve this problem by using graphic method. **(10 Marks)**

**Question 2**

- (a) What do you understand by “requirement analysis”? what is the significance of analyzing the present system and how is it carried out? Explain briefly. **(10 Marks)**
- (b) An Electronic Data Processing (EDP) has three expert software professionals. The centre wants three application software programs to be developed. The head of EDP Centre estimates the computer time in minutes required by the experts for development Application Software Programs as follows:

Software Programs	Computer time(in minutes) Required by Software Professionals		
	1.	100	85
2.	50	70	110
3.	110	120	130

Assign the software professionals to the application software programs to ensure minimum usage of computer time.

**Question 3**

- (a) For an online real time sales order processing system, draw a system flow chart and explain the following:
- Transactions
  - Files
  - Processing
  - Output reports and documents. **(10Marks)**
- (b) A product is manufactured by four factories A, B, C and D. The unit production costs are Rs.2, Rs.3, Rs.1 and Rs.5 respectively. Their daily production capacities are 50, 70, 30 and 50 units respectively. These factories supply the product to four stores P, Q, R and S. the demands made by these stores are 25, 35,105 and 20 units respectively. Unit transportation cost in rupees from each factory to each store is given in the following table:

	Stores			
	P	Q	R	S
2	4	6	11	
10	8	7	5	
13	3	9	12	
4	6	8	3	

Determine the extent of deliveries from each of the factories to each of the stores so that the total cost (production and transportation together) is minimum.. **(10 marks)**

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**Question 4**

- (a) What are the major reasons for the development of methods standard? **(5 Marks)**
- (b) Discuss various testing procedures to be adopted by the programmer in order to make the program error free. **(5 Marks)**
- (c) Workers come to a storeroom to receive components for a particular project assigned to them. The average time between two arrivals is 60 seconds and the arrivals are assumed to be in Poisson distribution. The average service time by the storekeeper is 40 seconds.  
Determine the following:
- Average queue length
  - Average length of non-empty queues
  - Average number of workers in system including the worker being attended to
  - Average waiting time of an arrival in the queue
  - Average waiting time of an arrival (worker) who waits.

**Question 5**

- (a) Explain briefly the stages through which the program has to pass during its development. **(10 Marks)**
- (b) A small project consists of jobs as given in the table below. Each job is listed with its normal time and a minimum or crash time (in days). This cost (in Rs. per day) of each job is also.

Job(i-j)	Normal duration (in days)	Minimum (crash) Duration(in days)	Cost of crashing(Rs. per day)
1-2	9	6	20
1-3	8	5	25
1-4	15	10	30
2-4	5	3	10
3-4	10	6	15
4-5	2	1	40

1. What is the normal project length and the minimum project length?
2. Determine the minimum crashing cost of schedule ranging from normal length down to, and including the minimum length schedule. That is, if  $L =$  Length of the schedule, find the costs of schedules which are  $L, L-1, L-2$  and so on.
3. Overhead costs total Rs.60 per day. What is the optimum length schedule in terms of both crashing and overhead cost? List the schedule duration of each job for your solution. **(10 Marks)**

**Question 6**

- (a) Explain, why Data Communication Security is more essential. In order to ensure the security the security while communicating the data, what kind of controls you would like to employ? Explain them briefly.
- (b) A Car Manufacturing Company manufactures 40 cars per day. The sales of cars depend upon demand which has the following distribution:

Sales of Cars	Probability
37	0.10
38	0.15
39	0.20
40	0.35
41	0.15
42	0.05

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The production cost and sales price of each car are Rs.4 lakh and 5 lakh respectively. Any unsold car is to be disposed off at a loss of Rs.2 lakh per car. There is a penalty of Rs. 1 lakh per car, if the demand is not met. Using the following random numbers, estimate total profit/loss for the company for the next ten days:

9	98	64	98	94	01	78	10	15	19
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If the company decides to produce 39 cars per day, what will be its impact on profitability?

**Question 7**

**(5×4=20 Marks)**

Write short notes on the following?

- (i) Roll- back Technique in Decision Tree
- (ii) Benefits of Enterprise Resources Planning
- (iii) Resources Smoothing and Resource Levelling
- (iv) Material Requirement Planning