PAPER 6: SYSTEM ANALYSIS DATA PROCESSING & QUANTITATIVE TECHNIQUES
MAY 2001

Question No.1 is compulsory
Answer any four from the remaining questions.

Question 1

(a) Discuss the various factors on which the information requirements of executives depend **(10 marks)**

(b) 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 assembly time are 1,000 hours and 1,500 hours respectively. The selling price and other variable costs for three models are:

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

The company has taken a loan of Rs.50, 000 from a Nationalized Bank, which is required to be repaired on 1.4.2001. In addition, the company has borrowed Rs.1, 00,000 from XYZ Cooperative Bank. However, this bank has given its consent to renew the loan.

The Balance Sheet of the company as on 31.3.2001 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		Vehicles	40,000
Cooperative Bank	1,00,000	Cash	2,10,000
Loan from Nationalized	50,000		
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. Inertest on loan from XYZ Cooperative and Nationalized Banks may be taken as Rs.1, 500 per month. The company has already promised to deliver three PIII, Two PII and five Celeron types 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.(10 marks)

Question 2

(a) Explain the term CASE tools. Describe briefly various CASE tools **(5 Marks)**

(b) What is an Executive Information System (EIS)? Discuss its various characteristics **(5 Marks)**

(c) A project consists of four (4) major jobs, for which four (4) contractors have submitted tenders. The tender amounts, in thousands of rupees, are given below:

Contractors	Jobs			
	A	B	C	D

1	120	100	80	90
2	80	90	110	70
3	110	140	120	100
4	90	90	80	90

Find the assignment, which minimizes the total cost of the profit. Each contractor has to be assigned one job **(10 marks)**

Question 3

(a) Explain the benefits of centralized and decentralized data processing approaches **(5 marks)**

(b) Explain the various general components of Disaster recovery Plan. **(5 marks)**

(c) A company has 3 plants and 3 warehouses. the cost of sending a unit from different plants to the warehouses, production at different plants and demand at different warehouses are shown in the following cost matrix table:

Plants	Warehouses			Production
	A	B	C	
X	8	16	16	152
Y	32	48	32	164
Z	16	32	48	154
Demand	144	204	82	

Determine a transportation schedule, so that the cost is minimized. Assume that the cost in the cost matrix is given thousand of rupees. **(10 marks)**

Question 4

(a) Discuss the various factors, which a system analyst should consider while designing user output. **(5 Marks)**

(b) Discuss in brief the duties of a top computer executive of a Computer Center **(5 Marks)**

(c) In a particular single server system, the arrival rate $\lambda=5$ per hour, and the service rate $\mu=8$ per hour. Assuming the conditions regarding the use of single channel queuing model; find:

1. the probability that server is idle
2. the probability that there are at least 3 customers in the system
3. expected time that a customer is in the system
4. expected time that a customer is in the system
5. expected number of customer in the waiting line

State the model assumed for the arrivals as well as the service time. **(10 Marks)**

Question 5

a) For a Material Inventory Control system, draw the system flowchart and explain the following:

i. System Interfaces
ii. Files and Inputs
iii. Reports (10 marks)

b) Consider the schedule of activities and related information as given below, for the construction of a Plant:

Activity	Expected Time (Months)	Variance	Expected Cost (Millions of Rs.)
1-2	4	1	5
2-3	2	1	3
3-6	3	1	4
2-4	6	2	9
1-5	2	1	2
5-6	5	1	12
4-6	9	5	20
5-7	7	8	7

7-8	10	16	14
6-8	1	1	4

Assuming that the cost and time required for one activity is independent of the time and cost of any other activity and variations are expected to follow normal distribution, draw a network based on the above data and calculate:

1) Critical path
2) Expected cost of construction of the plant
3) Expected time required to build the plant
4) The Standard Deviation of the expected time. **(10 marks)**

Question 6

a) Describe the steps which are essential to ensure the software and data security in a Computer Department. (10 marks)

b) An investment company wants to study the investment projects based on market demand, profit and the investment required, which are independent of each other. Following probability distribution are estimated for each of these three factors:

Annual Demand (Units in thousands):	25	30	35	40	45	50	55
Probability	0.05	0.10	0.20	0.30	0.10	0.10	0.05

Profit per Unit:	3.00	5.00	7.00	9.00	10.00
Probability:	0.10	0.20	0.40	0.20	0.10

Investment Required (in thousands of Rupees) :	2,750	3,000	3,500
Probability :	0.25	0.50	0.25

Using simulation process, repeat the trial 10 times, compute the investment on each trial taking these factors into trial. What is the most likely return?

Use the following random numbers:

(30, 12, 16); (59, 09, 69); (63, 94, 26); (27, 08, 74);
(64, 60, 61); (28, 28, 72); (31, 23, 57); (54, 85, 20);
(64, 68, 18); (32, 31, 87).

In the brackets above, the first random number is for annual demand, the second one is for profit and the last one is for the investment required. **(10 marks)**

Question 7

Write short notes on the following:

1. E-commerce
2. System Testing
3. System Maintenance
4. Maximax and Maximin criteria of decision-making. **(5 × 4 = 20 marks)**