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

Question No.1 is compulsory

Answer any four from the remaining questions.

Question 1

(a) What are different categories of Information Systems? Explain each one of them briefly. **(10 Marks)**

(b) A Sports Club is engaged in the development of their players by feeding them certain minimum amount of Vitamins (say A, B and C), in addition to their normal diet. In view of this, two types of products X and Y are purchased from the market. The contents of Vitamin constituents per unit, are shown in the following table:

Vitamin Constituents	Vitamin contents in products		Minimum requirement for each player
	X	Y	
A	36	06	108
B	03	12	36
C	20	10	100

The cost of product X is Rs.20 and that of Y is Rs.40.

Formulate the linear programming problem for the above and minimize the total cost, and solve problem by using graphic method. (10 Marks)

Question 2

(a) What are different Performance Standards? List out the major advantages of performance standards. (5 Marks)

(b) "In order to improve current information systems and to develop new ones, several System Development Tools have been developed." What are these system development tools? Explain them briefly. (5 Marks)

(c) A production supervisor is considering, how he should assign five jobs that are to be performed, to five mechanists working under him. He wants to assign the jobs to the mechanists in such manner that the aggregate cost to perform the jobs is the least. He has following information about the wages paid to the mechanists for performing these jobs:

Mechanist	Jobs				
	1	2	3	4	5
A	10	3	3	2	8
B	9	7	8	2	7
C	7	5	6	2	4
D	3	5	8	2	4
E	9	10	9	6	10

Assign the jobs to the mechanists so that the aggregate cost is the least. **(10 Marks)**

Question 3

(a) Describe briefly the points to be considered while designing the inputs for the computerized systems. **(5 Marks)**

(b) Explain the characteristics of a good coding scheme. Enumerate and discuss some of the commonly used coding schemes. (5 Marks)

(c) A Compressed Natural Gas (CNG) company has three plants producing gas and four outlets. The cost of transporting gas from different production plants to the outlets, production capacity of each plant and requirement at different outlets is shown in the following cost-matrix table:

Plants	Outlets				Capacity of Production
	A	B	C	D	
X	4	6	8	6	700
Y	3	5	2	5	400
Z	3	9	6	5	600

Requirement	400	450	350	500	1,700

Determine a transportation schedule so that the cost is minimized.
The cost in the cost-matrix is given in thousand of rupees. **(10 Marks)**

Question 4

(a) Discuss the basic functions to be performed by the Computer Service Department of a firm dealing with computer hardware and software. **(5 Marks)**

(b) Describe five advantages of Standardization. **(5 Marks)**

(c) At a certain filling station, customers arrive in a Poisson process with an average time of 12 per hour. The time intervals between services follow exponential distribution and as such the mean time taken to service a unit is 2 minutes. Evaluate: **(10 Marks)**

i. the probability that there is no customer at the counter,
ii. the probability that there are more than two customers at the counter,
iii. the probability that there is no customer to be served,
iv. the probability that a customer is being served, but no body is waiting.
v. the expected number of customers in the waiting line, and
vi. the expected time a customer spends in the system.

Question 5

(a) What functions are performed by the "work-in-process control system"? Draw the system flow chart and explain the following:

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

(b) An Engineering Project has the following activities, whose time estimates are listed below:

Activity (i-j)	Estimated duration (in months)		
	Optimistic	Most likely	Pessimistic
1-2	2	2	14
1-3	2	8	14
1-4	4	4	16
2-5	2	2	2
3-5	4	10	28
4-6	4	10	16
5-6	6	12	30

i. Draw the project network and find the critical path.
ii. Find the expected duration and variance for each activity. What is the expected project length?
iii. Calculate the variance and standard deviation of the project length.
iv. What is the probability that the project will be completed at least eight months earlier than expected time?
v. If the project due date is 38 months, what is the probability of not meeting the due date? Given:

Z	0.50	0.67	1.00	1.33	2.00
Prob.	0.3085	0.2514	0.1587	0.0918	0.0228

(10 Marks)

Question 6

(a) Explain different File Control procedures. **(10 Marks)**

(b) A Cell Phone Company located in Bangalore wants to determine the number of units of cell phone to be stocked on monthly basis. The past pattern of demand for cell phone units is as under:

Units sold per month	100	101	102	103	104	105
No. of months	20	40	5	10	20	5

Assuming that the stock levels of cell phones are restricted to the range 101-105 and that cell phones left unsold at the end of the month must be sent back to the Head Office at Mumbai. The cell phones costs Rs.3,000 to the company, which it sells for Rs.4,000.

From the above:

(i) Construct a conditional pay-off table.

(ii) Determine the action alternatives with the expected profit.

(iii) Determine EVPI. **(10 Marks)**

Question 7

Write short notes on the following: **(5×4=20)**

(i) Programmed and non-programmed decisions

(ii) General frame work of PERT/CPM.

(iii) Monte Carlo simulation.

(iv) Program debugging.