

**PAPER 6: SYSTEM ANALYSIS DATA PROCESSING AND QUANTITATIVE TECHNIQUES
NOVEMBER 2000**

Question No.1 is compulsory

Answer any four from the remaining questions.

Question 1

- (a) Define Personal Information system. What sub-systems are generally responsible to control the operational efficiency of the Personnel Management? Explain each one of them **(10 Marks)**
- (b) A manufacturer produces three products Y1, Y2, Y3 from three raw materials X1, X2, X3 is Rs.30, Rs.50 and RS.120 per Kg respectively and they are available in a limited viz., 20 kg of X1, 15 kg of X2 and 10 kg of X3. The selling price of Y1, Y2 and Y3 is Rs.90, Rs.100 and Rs.120 per kg respectively. In order to produce one kg of Y1, 1/2 kg of X1, 1/4 kg of X2 and 1/4 kg of X3 are required. Similarly to produce 1 kg of Y2, 3/7kg of X1, and 2/7 kg of X2 and 2/7 kg of X3 and to produce 1 kg Y3, 2/3kg of X2 and 1/3 kg of X3 will be required.
Formulate the linear programming problem to maximize the profit **(10 Marks)**

Question 2

- (a) What is the system development Life cycle? Explain the different activities coming under this cycle. **(10 Marks)**
- (b) A car hiring company has one car at each of the five deposits A, B, C, D and E. A customer in each of the five towns V, W, X, Y and Z requires a car. the distance in kms, between depots (origin) and the towns (destination) are given in the following table:

	A	B	C	D	E
V	3	5	10	15	8
W	4	7	15	18	8
X	8	12	20	20	12
Y	5	5	8	10	6
Z	10	10	15	25	10

Find out as to which car should be assigned to which customer so that the total distance traveled is a minimum. How much is the total traveled distance? **(10 Marks)**

Question 3

- (a) For a production scheduling system, draw the system flow chart and explain the following:
- (i) System interfaces
 - (ii) Files and inputs
 - (iii) Output reports
- (b) Following is the profit matrix based on four factories and three sales depots of the company:

Factories	Sales deposits			Availability
	S1	S2	S3	
F1	6	6	1	10
F2	-2	-2	-4	150
F3	3	2	2	50
F4	8	5	3	100
Requirement	80	120	150	

Determine the most profitable distribution schedule and the corresponding profit, assuming no profit in case of surplus production **(10 Marks)**

Question 4

- (a) Discuss various objectives and factors that should be kept in mind while designing outputs from an information system **(10 Marks)**

- (b) At a certain petrol pump, customers arrive in a Poisson process with an average time of 5 minutes between arrivals. The time interval between servers at the petrol pump follows an exponential distribution and the mean time taken to service a unit is 2 minutes. Find the exponential distribution and the mean time taken to service a unit is 2 minutes. Find the following:
- Expected average queue length
 - Average number of customers in the system
 - Average time a customer has to wait in the queue
 - Average time a customer has to spend in the system
 - By how much time the flow of the customer be increased to justify the opening of another service point, where the customer has to wait for 5 minutes for the service? **(10 Marks)**

Question 5

- Explain the distinction between Centralization and Decentralization of an Authority **(5 Marks)**
- Discuss the benefits of centralized data processing approach **(5 Marks)**
- The time schedule for different activities of a project is given below:

Activity(i-j)	Time in days
1-2	8
1-3	10
1-4	8
2-3	10
2-6	16
3-5	17
4-5	18
4-6	14
5-6	9

Construct the PERT network and compute

- Critical path and its duration
- Total and free float for each activity **(10 Marks)**

Question 6

- What are the different types of securities required for a computer system? Explain briefly the different components of physical security **(10 Marks)**
- A retailer deals in a particular commodity. The daily demand and supply are variables. The data for the past 500 days show the following demand and supply:

Supply		Demand	
Availability	No of Days	Demand	No of days
10	40	10	50
20	50	20	110
30	190	30	200
40	150	40	100
50	70	50	40

The retailer buys the commodity at Rs.20 per kg and sells it at Rs.30per kg.Any commodity remains at the end of the day, has no saleable value. Moreover, the loss (unearned profit) on any unsatisfied demand is Rs.8 per kg given the following pair of random numbers; simulate 6 days sales, demand and profit.

(31, 18); (63, 84); (15, 79); (07, 32); (43, 75); (81, 27)

The first random number in the pair is for supply and the second random number is for demand viz.in the first pair (31, 18), use 31 to stimulate supply and 18 to stimulate demand **(10 Marks)**

Question 7

Write short notes on any four of the following:

- (i) Enterprise Resource Planning (ERP)
- (ii) Information systems Audit
- (iii) Computer aided Software Engineering (CASE) tools
- (iv) Distinction between PERT and CPM
- (v) Applications and limitations of Linear Programming Techniques

(5×4=20 Marks)