

PAPER : 5 SYSTEMS ANALYSIS, DATA PROCESSING & QUANTITATIVE TECHNIQUES**November 1997**

Question 1 is compulsory.

Answer any four from the remaining six questions.

Question 1

(a)

- i. Name the three approaches used to develop the Management Information System and explain them briefly. **(6 Marks)**
 - ii. Give a list of major “functional information areas” and their sub-systems. **(4 Marks)**
- (b) A firm produces 3 products A, B and C. It uses two types of raw materials I and II of which 5,000 and 7,500 units respectively are available. The raw material requirements per units of the products are given below:

Raw Material	Requirement per unit of product		
	A	B	C
I	3	4	5
II	5	3	5

The labour time for each unit of Product A is twice that of Product B and three times that of Product C. The entire labour force of the firm can produce the equivalent of 3,000 units. The minimum demand of the three products is 600, 650 and 500 units respectively. Also the ratios of the number of units produced must be equal to 2:3:4. Assuming the profits per unit of A, B and C as Rs. 50, 50 and 80 respectively.

Formulate the problem as a linear programming model in order to determine the number of units of each product which will maximize the profit. **(10 Marks)**

Question 2

- (a) What is the program life cycle? Explain the three states on which the program managers are usually involved. **(10 Marks)**
- (b) A particular product is manufactured in factories A, B, C and D and is sold at centers 1, 2 and 3. The cost in Rs. of product per unit and capacity in kgms per unit time of each plant is given below:

Factory	Cost (Rs.) per unit	Capacity (kgms) per unit
A	12	100
B	15	20
C	11	60
D	13	80

The sale Price in Rs. Per unit and the demand in kgms per unit time are as follows:

Sales Centre	Sale Price (Rs.) per unit	Demand (Kgms) per unit
1	15	120
2	14	140
3	16	60

Find the optimal sales distribution.

(10 Marks)**Question 3**

- (a) For the computerized “cost estimation statement”, explain briefly the following:
 - a. System Interfaces
 - b. Files and inputs
 - c. Output reports

(10 Marks)

- (b) A firm produces four products. There are four operators who are capable of producing any of these four products. The processing time varies from operator to operator. 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 give below:

Operators	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 (Rs.) per unit	8	6	5	4

Find the optimal assignment of products to operators.

(10 Marks)

Question 4

- (a) Bring out the suggested rules to be observed in all the phases in Methods Standards for the functions of program testing and documentation. (10 Marks)
- (b) A small project is having 7 activities. The relevant data about these activities is given below:

Activity	Dependence	Normal Duration (Days)	Crash Duration (Days)	Normal Cost (Rs.)	Crash Cost (Rs.)
A	-	7	5	500	900
B	A	4	2	400	600
C	A	5	5	500	500
D	A	6	4	800	1000
E	B,C	7	4	700	1000
F	C,D	5	2	800	1400
G	E,F	6	4	800	1600

- Find out the Normal duration and the minimum duration.
- What is the percentage increase in cost to complete the project in 21 days?

(10 Marks)

Question 5

- (a) Write short notes on:
- Roll-Back technique in decision tree.
 - Share accounting

(5 Marks)

(5 Marks)

- (b) Explain the various elements of a queuing system.

(10 Marks)

Question 6

- (a) Explain the two important aspects of financial decision making. Also exhibit the flow of information for financial decision making in the form of a diagram. (10 Marks)
- (b) A small maintenance project consists of the following twelve jobs whose precedence relations are identified with their node numbers: (5 Marks)

Job (i,j)	(1,2)	(1,3)	(1,4)	(2,3)	(2,5)	(2,6)
Duration (in days)	10	4	6	5	12	9
Job (i,j)	(3,7)	(4,5)	(5,6)	(6,7)	(6,8)	(7,8)
Duration (in days)	12	15	6	5	4	7

- (i) Draw an arrow diagram representing the project.
- (ii) Calculate earliest start, earliest finish, latest start and latest finish time for all the jobs.
- (iii) Find the critical path and project duration.
- (iv) Tabulate total float, free float and independent float.

Question 7

- (a) Explain the four general components of the disaster recovery plan giving the major procedures in each.
- (b) A Company manufactures 30 items per day. The sale of these items depends upon demand which has the following distribution:

Sales (Units)	Probability
27	0.10
28	0.15
29	0.20
30	0.35
31	0.15
32	0.05

The production cost and sale price of each unit are Rs. 40 and Rs. 50 respectively. Any unsold product should be disposed off at a loss of Rs. 15 per unit. There is a penalty of Rs. 5 per unit if the demand is not met.

Using the following random numbers estimate total profit/ loss of the company for the next 10 days: 10, 99, 65, 99, 95, 01, 79, 11, 16, 20.

If the company decides to produce 29 items per day, what is the advantage or disadvantage to the Company? **(2+8 Marks)**