

SECOND SEMESTER M.Com DEGREE EXAMINATION, APRIL 2022
(Regular/Improvement/Supplementary)

COMMERCE
FMCM2C10: MANAGEMENT SCIENCE

Time: 3 Hours

Maximum Weightage: 30

Part A: Answer any four questions. Each carries 2 weightage.

1. What are slack and surplus variables?
2. Explain briefly principle of dominance.
3. A PERT network has 9 activities on its critical path. The standard deviation of each activity on critical path is 3. What will be the standard deviation of the critical path?
4. What are the essential characteristics of the queuing process?
5. A company requires ball bearings worth ₹ 28,800 per year. The cost of placing an order is ₹ 48 and the carrying costs as a percentage of average inventory is 12%. Determine the value of each assignment and number of orders per year.
6. What is meant by critical path?
7. Solve the game whose pay off matrix is given

$$\begin{array}{c} \text{Player B} \\ \text{Player A} \begin{bmatrix} 7 & 6 & 3 \\ -2 & 2 & -3 \\ 5 & 9 & 7 \end{bmatrix} \end{array}$$

(4 × 2 = 8 weightage)

Part B: Answer any four questions. Each carries 3 weightage.

8. Explain the following terms.
(a) Objective function; (b) Decision variable; (c) Feasible solution.
9. Draw the network diagram from the following.
Activity B follows A
C and D follow B
E follows D
F and G follow C
H follows F
I follows G and E
J follows H
K follows I
L follows K and J
10. Discuss the role of management science in improving productivity.
11. Explain different types of costs in inventory system.

(P.T.O.)

12. Given below is the time (days) required when a particular programme is assigned to a particular programmer.

		Programmers			
		A	B	C	D
Programmes	1	12	10	8	9
	2	8	9	11	7
	3	11	14	12	10
	4	9	9	8	9

Assign the programmers to the programmes in such a way that the total computing time is least.

13. Persons arrive at an average inter arrival rate of 2 minute. The receptionist in duty takes an average of one minute per person.
- 1) What is the chance that a person will straight away meet the receptionist?
 - 2) For what portion of time the receptionist will busy?
 - 3) What is the average number of persons in the system?
 - 4) What is the average waiting time of a person?

14. An orange juice company (Brand A) controls 20%, of the market. They hire a market research company to predict effects of an ad-campaign.

They conclude:

Someone using Brand A will stay by Brand A with 90% probability.

Someone not using Brand A will switch to Brand A with 70% probability.

Determine the market share of Brand A in the steady state.

(4 × 3 = 12 weightage)

Part C: Answer any two questions. Each carries 5 weightage.

15. What are models in management science? Explain different management science models used in business world.
16. A company is manufacturing two products A and B. The net profit for these products is ₹ 60 and ₹50 respectively. These products require working in two departments C and D. The available hours per month in these departments are 150 each. Product A requires 2 hours in department C and 3 hours in department D. Product B requires 3 hours in department C and 2 hours in department D. The production of the products A and B cannot exceed 40 units each because of marketability constraints. Formulate the LP model and solve it by simplex method.

17. Solve the following transportation problem

		Distribution centers				Supply
		1	2	3	4	
Plant	1	2	3	11	7	6
	2	1	0	6	1	1
	3	5	8	15	9	10
Requirement		7	5	3	2	

18.

Activity	Duration (days)
1-2	4
1-3	12
1-4	10
2-4	8
2-5	6
3-6	8
4-6	10
5-7	10
6-7	0
6-8	8
7-8	10
8-9	6

With the help of the activities given above draw a network. Determine its critical path, and total float.

(2 × 5 = 10 weightage)