

SECOND SEMESTER M.Com DEGREE EXAMINATION, APRIL 2024**(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 is PERT?
2. Comment non-negative constraints?
3. What is an Assignment Problem?
4. Give a short account on queuing theory.
5. Write a short note on the advantages of graphical method in linear programming.
6. Elaborate on Markov chain.
7. What is EFT?

(4 × 2 = 8 weightage)**Part B: Answer any *four* questions. Each carries 3 weightage.**

8. A manufacturer of furniture makes two products- chairs and tables. Processing of these products is done on two machines A & B. A chair requires 2 hours on Machine A and 6 hours on Machine B. A table requires 5 hours on Machine A and no time on Machine B. There are 16 hours of time per day available on machine A and 30 hours on machine B. Profit gained by manufacturer from a chair is Rs. 1 and from a table is Rs. 5 respectively. Formulate problem into a LPP in order to maximize the total profit.
9. Find the initial solution for the transportation problem by using VAM.

	W1	W2	W3	Supply
F1	2	7	4	5
F2	3	3	1	8
F3	5	4	7	7
F4	1	6	2	14
Demand	7	9	18	

(P.T.O.)

10. From the following Payoff Matrix of Firm A, determine the optimum strategy for both the firms and value of the game (using Maxmin and Minmax principle).

		Firm B				
		3	-1	4	6	7
Firm A	-1	8	2	4	12	
	16	8	6	14	12	
	1	11	-4	2	1	

11. A company is faced with the problem of assigning five jobs to five machines. Each job must be done on only one machine, the cost of processing each job on each machine is given below (in Rupees)

	M1	M2	M3	M4	M5
J1	7	5	9	8	11
J2	9	12	7	11	10
J3	8	5	4	6	9
J4	7	3	6	9	5
J5	4	6	7	5	11

Assign the jobs in such a way that total cost is least.

12. A project has following activities.

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration	20	25	10	12	6	10

- i) Draw the network diagram.
 - ii) Find free, total and independent float for each activity.
 - iii) Which are the critical activities?
13. What are the factors effecting inventory control?
14. What are the basic elements of queuing system?

(4 × 3 = 12 weightage)

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

15. A manufacturing company needs 2000 units of a particular component every year. The company buys it at the rate of Rs. 20 per unit. The order processing cost for this part is estimated at Rs. 10 and the cost of carrying a part in stock comes to about Rs. 2 per year. The company can manufacture this part internally. In that case, it saves 20% of the price of the product, but it

estimates a set up cost of Rs. 100 per production run. The annual production rate would be 2500 units. However, inventory holding cost remains unchanged.

- i) Determine EOQ and optimum number of orders to be placed in a year.
- ii) Determine the optimum production lot size and average duration of the production run.
- iii) Should the company manufacture the component internally or continue to purchase it from the supplier?

16. Linear programming is one of the important tool used on managerial decision making in business, industry and numerous other areas. Explain in detail the areas in which it is applied.
17. Labourers arrive to a tool store to receive special tools for accomplishing a particular project assigned to them. The average time between two arrivals is 60 seconds and arrivals are assumed to be in Poisson distribution. The average service time (of the tools room attendant) is 40 seconds.

Determine:

- i) Average queue length.
- ii) Average length of non-empty queue.
- iii) Average no of workers in system including the workers being attended.
- iv) Mean waiting time of an arrival.
- v) Average waiting time of an arrival who waits.
- vi) Determine whether to go in for additional tool store room attendant which will minimize combined cost of attendance idle time and the cost of workers waiting time. Assume the charges of skilled labourer Rs. 4 per hour and that of tool store room attendant Rs. 0.74 per hour.

18. Solve the following game by using graphical method.

	B			
	1	7	0	4
A	6	4	7	8
	5	2	6	10

(2 × 5 = 10 weightage)