SECOND SEMESTER M.Com DEGREE EXAMINATION, APRIL 2021

(Improvement/Supplementary/Special)

M.Com

FMCM2C10: MANAGEMENT SCIENCE

Time: 3 Hours   **Maximum Weightage: 30**

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

1.   What is PERT?

2.   What is an Assignment Problem?

3.   What are the advantages of graphical method?

4.   What are non-negative constraints?

5.   What do you understand about queuing theory?

6.   What is 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 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**	

                                                              (PTO)

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

Firm A

$$\begin{pmatrix} 3 & -1 & 4 & 6 & 7 \\ -1 & 8 & 2 & 4 & 12 \\ 16 & 8 & 6 & 14 & 12 \\ 1 & 11 & -4 & 2 & 1 \end{pmatrix}$$

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). Solve the problem.

	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

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

a) Draw the network diagram b) find free, total and independent float for each activity
c) Which are the critical activities?

13. Explain the various types of decisions.

14. Illustrate the model building steps. **(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 Rs20 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 Rs2 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 remain unchanged. Determine

i) EOQ and optimum no 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 changes of skilled labourer Rs. 4 per hour and that of tool storeroom 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)