SECOND SEMESTER M.Com DEGREE EXAMINATION, APRIL 2023
(Regular/Improvement/Supplementary)
COMMERCE
FMCM2C10: MANAGEMENT SCIENCE

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

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

1. Explain Pure strategy game with saddle point and steps involved in such game.

2. What is a basic feasible solution?

3. Discuss briefly various industrial applications of Linear Programming Problems.

4. What is resource allocation? How is it different from resource leveling?

5. Explain different phases of Inventory Management.

6. Describe various applications of Network Techniques.

7. Write notes on Shortage cost, Holding cost, Buffer stock, and EOQ.

(4 × 2 = 8 weightage)

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

8. Explain different types of mathematical models.

9. Philips India Ltd. has a product for which the assumption of the inventory model with planned shortages are valid. Annual demand- 2000 units/year, Cost of an item Rs. 50/- unit, Ordering cost 25/- per order, Inventory carrying cost :20%, Bulk order cost :30 /- unit/year. Find out Minimum Cost order quantity, Maximum no. of bulk order units, Maximum inventory level, time between Orders, and total annual cost.

10. Determine the value of the game by applying Dominance principle.

		Player B			
	I	II	III	IV	V
Player A					
I	2	4	3	8	4
II	5	6	3	7	8
III	6	5	9	8	7
IV	4	2	8	4	3

(P.T.O.)

11. Distinguish between PERT and CPM.

12. Explain degeneracy in Transportation problem.

13. A company has one surplus truck in each of the cities A, B, C, D and E and one deficit truck in each of the cities 1, 2, 3, 4, 5 and 6 . The distance between cities in kilometers is shown in the matrix below. Find the assignment of truck from cities in surplus to cities in deficit so that the total distance covered by vehicles is minimum.

	1	2	3	4	5	6
A	12	10	15	22	18	8
B	10	18	25	15	16	12
C	11	10	3	8	5	9
D	6	14	10	13	13	12
E	8	12	11	7	13	10

14. Explain assumptions of Markov analysis and Markov analysis algorithm.

(4 × 3 = 12 weightage)

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

15. Explain the steps in Hungarian method.

16. Find the optimum solution to the following transportation problem in which the cells contain the transportation cost in rupees

	W1	W2	W3	W4	W5	Available
F1	7	6	4	5	9	40
F2	8	5	6	7	8	30
F3	6	8	9	6	5	20
F4	5	7	7	8	6	10
Required	30	30	15	20	5	100

17. The time estimates (in weeks) for the activities of a PERT network are given below

Activity	to	tm	tp
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

a) Draw the project network and identify all the paths through it.
b) Determine the expected project path.

c) Calculate the standard deviation and variance of the project length.

d) What is the probability that the project will be completed: (i) at least 4 weeks earlier than the expected time? (ii) not more than 4 weeks late than expected time?

e) If the project due date is 19 weeks, what is the probability of not meeting the due date?

f) The probability that the project will be completed on schedule if the scheduled completion time is 20 weeks.

18. Nagarjuna Ltd. manufactures and sells two products Beeta and Teeta. Each unit of Beeta requires 2 hours of machining and 1 hour of skilled labour whereas each unit of Teeta consumes 1 hour of machining and 2 hours of skilled labour. For the coming month the machine capacity is limited to 620 machine hours and skilled labour is limited to 680 hours. Not more than 300 units of Beeta can be sold in the market during the month.

- Develop a suitable model that will enable determination of the optimal product mix.
- Determine the optimal product mix and maximum contribution. Unit contribution from Beeta is 4 /-and from Teeta is 6/-
- What will be the incremental contribution per unit of machine hour, per unit of labour and per unit of Beeta saleable?

(2 × 5 = 10 weightage)