

SECOND SEMESTER M.Com DEGREE EXAMINATION, APRIL 2025

(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 Management Science? Describe its characteristics.
2. Describe the cost associates with the inventories.
3. Elaborate on resource leveling.
4. What is meant by Markov chains?
5. Solve the game whose pay off matrix is given:

	Player B	
Player A	7	4
	5	6

6. In a bank, cheques are cashed at a single 'teller' counter. Customers arrive at the counter in a Poisson manner at an average rate of 30 customers per hour. The teller takes, on an average, a minute and a half to cash cheque has been shown to be exponentially distributed. Calculate the average time a customer is expected to wait.
7. P Ltd. has undertaken a project which has an expected duration of 17 weeks with a variance of 9 weeks. Determine the probability that project will be completed at least 3 weeks earlier than expected.

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

8. What are the main features of linear programming?
9. Explain degeneracy in a transportation problem? How is it solved?
10. Describe the basic elements of queues.
11. Find an initial basic feasible solution to the following transportation problem using Vogel's approximation method.

		Destination				Availability
		1	2	3	4	
Origin	A	21	16	15	3	11
	B	17	18	14	23	13
	C	32	27	18	41	19
Requirement		6	10	12	15	

12. Using the following cost matrix determine optimal job assignment and the cost of assignments.

		Job				
		1	2	3	4	5
Mechanic	A	10	3	3	2	8
	B	9	7	8	2	7
	C	7	5	6	2	4
	D	3	5	8	2	4
	E	9	10	9	6	10

(P.T.O.)

13. Draw a network diagram for the project whose activities and their relationships are given below.

Activities: A B C D E F G H I J K L

Predecessors: - - A B B C,D E E G H I,J F

14. A college cafeteria has three drink options, tea milk and juice. A study finds that 20% of those who drink tea one day will switch to milk the next day and 10% will switch to juice. 30% of those who drink milk one day will switch to tea the next day and 25% will switch to juice. 35% of those who drink juice one day will switch to tea the next day and 15% will switch to milk. On the first day of the week 50% drink tea, 30% drink milk and 20% drink juice. Construct the transition matrix. What percent of students drink milk on the second day?

(4 × 3 = 12 weightage)

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

15. State the opportunities and shortcomings of operations research.
16. Solve the following linear programming problem by simplex method.

Maximize $Z = 30x + 20y$

Subject to $3x + y \leq 1500$

$x + y \leq 3000$

$x, y \geq 0$

17. A manufacturing company purchases 9,000 parts of a machine for its annual requirements, presently ordering one month usage at a time. Each part costs ₹ 20. The ordering cost per order is ₹ 15 and the carrying charges are 15% of the average inventory per year. Suggest a more economical purchasing policy for the company. How much would it save the company per year?

18. A small project is composed of ten activities whose time schedule is detailed below:

Activity	Duration in weeks
1 – 2	6
1 – 3	2
2 – 3	3
2 – 4	3
2 – 5	5
3 – 6	4
4 – 7	2
5 – 7	3
6 – 7	2
7 – 8	2

Required to:

- Construct network diagram.
- Compute EST, LST, EFT and LFT values.
- Total float for each activity.
- Find critical path and project duration.

(2 × 5 = 10 weightage)