

D 140625**(Pages : 4)****Name.....****Reg. No.....****SECOND SEMESTER M.Com. (CBCSS) REGULAR/SUPPLEMENTARY
DEGREE EXAMINATION, APRIL 2026**

Master of Commerce

MCM 2C 10—MANAGEMENT SCIENCE

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

*Answers should be written in **English** only.***Part A***Answer any **four** questions.
Each question carries 2 weightage.*

1. Define Management Science.
2. What is feasible region in LPP ?
3. What is unbounded solution in LPP ?
4. What do you mean by VED analysis ?
5. What is 'dummy' activity ?
6. What is principle of dominance ?
7. State any two limitations of Operations Research.

(4 × 2 = 8 weightage)

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

8. A company produces two types of ornaments A and B. Both ornaments pass through two technicians, first a cutter and second a finisher. Ornament A requires 2 hours of the cutter's time and 1 hour of the finisher's time; ornament B requires 1 hour of cutter's and 2 hours of finisher's time. The cutter has 104 hours and finisher has 76 hours of available time each month. Profit on ornament A is Rs. 6.00 and on ornament B is Rs. 11.00. Formulate a Mathematical model.

Turn over

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9. Find the initial solution for the Transportation Problem by Vogel's Approximation method :

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

10. Solve the following minimal assignment problem :

		Man			
		1	2	3	4
Job	I	12	30	21	15
	II	18	33	9	31
	III	44	25	21	21
	IV	14	30	28	14

11. Find the EOQ for the following :—

Annual Usage	1000 units
Cost per unit	Rs. 250
Ordering Cost	Rs. 6 per order
Expediting Cost	Rs. 4 per order
Inventory holding cost	20 % of average inventory

12. A television repairman finds that the time spend on his job has an exponential distribution with a mean of 30 minutes. If he repairs sets in the order in which they came in and if the arrival of the sets follows a position distribution approximately with an average rate of 10 per hour day, what is the repairman's expected idle time each day ? How many jobs are ahead of the average that just brought in ?
13. Construct the arrow diagram comprising activities A, B, ... and I such that the following relationships are satisfied :

- A, B and C the first activities of the project, can start simultaneously
- A and B precede D
- B precedes E, F and H
- F and C precede G, E and H precede I, J
- C, D, F and J precede K
- K precedes L
- I, G and L are the terminal activates of the project.

14. Solve the following game :

		Firm A		
		A1	A2	A3
Firm B	B1	4	20	6
	B2	18	12	10

(4 × 3 = 12 weightage)

Part C

Answer any **two** questions.
Each question carries 5 weightage.

15. Solve the following LPP using Simplex method :

$$\text{Maximize } Z = 5x_1 + 3x_2$$

$$\text{Subject to } x_1 + x_2 \leq 2$$

$$5x_1 + 2x_2 \leq 10$$

$$3x_1 + 8x_2 \leq 12$$

$$x_1, x_2 \geq 0.$$

16. Solve the following transportation problem :

	D1	D2	D3	D4	D5	D6	a_j
O1	9	12	9	6	9	10	5
O2	7	3	7	7	5	5	6
O3	6	5	9	11	3	11	2
O4	6	8	11	2	2	10	9
b_j	4	4	6	2	4	2	

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

Activity	t_o	t_m	t_p
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

Turn over

- (a) Draw the project network and identify all the paths.
- (b) Determine the expected project length.
- (c) Calculate the standard deviation and variance of the project.
- (d) If the project due period is 19 weeks, what is the probability of not meeting the due date ?

18. Discuss in brief the role of Operations Research in Management decision-making.

(2 × 5 = 10 weightage)