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 finsiher 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

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

		To			
		W1	W2	W3	Supply
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
FirmB	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 :

Maximize $Z = 5x_1 + 3x_2$

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)

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Master of Commerce

MCM 2C 10—MANAGEMENT SCIENCE

(2019 Admission onwards)

(Multiple Choice Questions for SDE Candidates)

Time : 20 Minutes	**Total No. of Questions : 20**	**Maximum : 5 Weightage**

INSTRUCTIONS TO THE CANDIDATE

1. This Question Paper carries Multiple Choice Questions from 1 to 20.
2. The candidate should check that the question paper supplied to him/her contains all the 20 questions in serial order.
3. Each question is provided with choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and enter it in the main answer-book.
4. The MCQ question paper will be supplied after the completion of the descriptive examination.

MCM 2C 10—MANAGEMENT SCIENCE

(Multiple Choice Questions for SDE Candidates)

1. Management Science came into existence in a ———— context.

   (A) Business. (B) Academic.

   (C) Military. (D) Religious.

2. In India, first Operations Research application was made by ————.

   (A) Pranab K Sen. (B) Prof. Mahalonobis.

   (C) Samarendra Nath Roy. (D) Raghu Raj Bahadur.

3. ———— are called mathematical models.

   (A) Iconic models. (B) Symbolic models.

   (C) Analogue models. (D) None of these.

4. ———— models consider time as one of the important variable.

   (A) Dynamic. (B) Static.

   (C) Both (A) and (B). (D) None of these.

5. If there are more than one optimal solutions for the decision variables, the solution is ————.

   (A) Infeasible. (B) Unbounded.

   (C) Alternative. (D) None of these.

6. The solution to a transportation problem with 'm' rows and 'n' columns is feasible if the number of positive allocations are :

   (A) $m + n$. (B) $m \times n$.

   (C) $m + n - 1$. (D) $m + n + 1$.

7. For salesman who has to visit 'n' cities, which of the following are the ways of his tour plans :

   (A) $n!$. (B) $(n + 1)!$.

   (C) $(n - 1)!$. (D) n.

8. Graphic method can be applied to solve a linear programming problem when there are only ———— variables.

   (A) One. (B) Two.

   (C) Three. (D) More than three.

9. ———— is considered as the pioneer of Linear Programming technique.

(A) Churchman. (B) D.W. Miller.

(C) James Lundy. (D) George B Dantzig.

10. When at least one of the basic variables is zero, then the basic feasible solution to a Linear Programming Problem is said to be ————.

(A) Infeasible. (B) Unbounded.

(C) Degenerate. (D) Non-degenerate.

11. Before formulating a formal L.P. model, it is better to :

(A) Verbally identify decision variables.

(B) Express the objective function in words.

(C) Express each constraint in words.

(D) All of the above.

12. Which of the following is true with regard to a Linear Programming Model ?

(A) No guarantee to get integer valued solution.

(B) The relationship among decision variables is linear.

(C) Both (A) and (B).

(D) None of these.

13. While solving a LPP graphically, the area bounded by constraints is called ————.

(A) Feasible region. (B) Infeasible region.

(C) Unbounded region. (D) None of these.

14. Straight lines shown in a linear programming graph indicates ————.

(A) Objective function. (B) Constraints.

(C) Points. (D) All of the above.

15. An activity which does not consume either resource or time is called ————.

(A) Predecessor activity. (B) Successor activity.

(C) Dummy activity. (D) Terminal activity.

16. Actvities that cannot be started until one or more of the other activities are completed, are called ————.

(A) Dummy activities. (B) Initial activities.

(C) Successor activities. (D) Predecessor activities.

17. In a network diagram, activity is denoted by ————.

(A) Node. (B) Arrow.

(C) Triangle. (D) None of these.

18. In waiting line theory, number of customers waiting in the queue is referred to as ————.

(A) Traffic intensity. (B) Queuing system.

(C) Service pattern. (D) Queue length.

19. Commonly assumed probability distribution of arrival pattern is ————.

(A) Poisson distribution. (B) Binomial distribution.

(C) Normal distribution. (D) None of these.

20. A customer's behaviour of leaving the queue due to impatience is called ————.

(A) Jockying. (B) Reneging.

(C) Collusion. (D) Balking.