C 42725   (Pages : 4)   Name..

Reg. No....................................

SECOND SEMESTER M.Com. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2023

(CBCSS)

M.Com.

MCM 2C 10—MANAGEMENT SCIENCE

(2019 Admission onwards)

Time : Three Hours   Maximum : 30 Weightage

Part A

Answer any **four** *questions.*
Each question carries 2 *weightage.*

1. What do you mean by degeneracy in transportation problem ?

2. Explain the Minimax and Maximin principle used in the theory of games.

3. What do you mean by transition probability in Markov analysis ?

4. Name the elements of decision theory.

5. Explain VED analysis.

6. What is head event slack ?

7. What is simplex method in LPP ?

(4 × 2 = 8 weightage)

Part B

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

8. Differentiate between PERT and CPM.

9. What is inventory management ? Discuss the techniques of inventory management.

Turn over

10. In a departmental store one cashier is there to serve the customers. And the customers pick up their needs by themselves. The arrival rate is 9 customers for every 5 minutes and the cashier can serve 10 customers in 5 minutes. Assuming Poisson arrival rate and exponential distribution for service rate, find :

    (a) Average number of customers in the system ;

    (b) Average number of customers in the queue or average queue length ; and

    (c) Average time a customer spends in the system.

11. Five salesmen are to be assigned to five districts. Estimates of sales revenue (in thousands) for each salesman are given as follows :

	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

    Find the assignment pattern that maximises the sales revenue.

12. Solve the game whose payoff matrix is given below :

    Player B

		I	II	III	IV	V
	I	– 2	0	0	5	3
Player A	II	4	2	1	3	2
	III	– 4	– 3	0	– 2	6
	IV	5	3	– 4	2	– 6

13. ABC company estimates that it will sell 12000 units of its product for the forthcoming year, the ordering cost is Rs. 100 per order and the carrying cost per year is 20 % of the purchase price per unit. The purchase price per unit is Rs. 50. Find :

    i)   Economic Order Quantity ;

    ii)   No. of orders/year ; and

    iii)   Time between successive order.

14. Find out the minimum cost solution for the following transportation problem, using North West Corner Rule method :

To \ From	P	Q	R	Availability
A	16	19	12	14
B	22	13	19	16
C	14	28	8	12
Requirement	10	15	17	

(4 × 3 = 12 weightage)

Part C

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

15. What is decision-making under uncertainty ? Explain the various quantitative methods that are useful for decision-making under uncertainty

16. Solve graphically the given linear programming problem.

Minimize $Z = 3x_1 + 5x_2$
subject to $-3x_1 + 4x_2 \leq 12$
                 $2x_1 - x_2 \geq -2$
                 $2x_1 + 3x_2 \geq 12,$
           $x_1 \leq 4, x_2 \geq 2$
           $x_1, x_2 \geq 0.$

Turn over

17. The time estimates of a project are given (in days) below :

Activity	Time estimates in days			Immediate Predecessor
	P	M	O	
A	20	10	5	–
B	12	7	5	–
C	12	10	8	A
D	40	20	6	C
E	90	60	30	D
F	14	10	7	D
G	50	30	20	C
H	12	10	8	E, F, G
I	6	4	3	B
J	1	1	1	H, I

a) Draw network diagram, find project duration and variance

b) What is the probability that product manager will be able to complete the task within 80 days-time ?

18. Define Theory of Game. Discuss the assumptions and strategies of theory of game.

$(2 \times 5 = 10$ weightage)