C 4697   (Pages : 3)   Name...

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

SECOND SEMESTER M.Com. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2021

(CBCSS)

M.Com.

MCM 2C 10—MANAGEMENT SCIENCE

(2019 Admissions)

Time : Three Hours   Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*

2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*

3. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Part A

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

1. What do you mean by degeneracy in transportation ?

2. What are the stock out cost ?

3. Define deterministic model.

4. Explain Jockeying.

5. Explain network diagram.

6. What do you mean by value of game in pure strategy ?

(4 × 2 = 8 weightage)

Part B

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

7. An animal feed company must produce at least 2000 kg of a mixture consisting of ingredients X and Y daily. X cost Rs 30 per kg and Y cost Rs 80 per kg. No more than 800 kg of X can be used and at least 600 kg of Y must be used. Formulate a mathematical model to the problem.

Turn over

8. A smart phone repairman finds that the times spend on his job has an exponential distribution with mean 30 minutes. If he repairs sent in the order in which they came in, and if the arrival of sets is approximately Poisson with an average rate of 10 per 8 hours day, what is repairman's expected idle time each day. How many jobs are ahead of the average set just brought in .

9. XYZ company uses 12,000 units of component A in a year Component A is currently made in 30 batches of 400 units on a machine that makes 8 units per hour. The company operates for 2000 hours per year and it costs Rs. 60 to set up the machine, irrespective of batch size. For work in progress purposes, component A is valued at Rs. 10. Investigate whether the existing production plan is optimal and if not, to suggest a new plan showing what savings are possible.

10. From the following pay off matrix for firm A, determine the optimal strategies for both the firms and the value of the game using maximin-minimax principle.

Firm B				
8	12	−3	50	30
40	12	10	20	50
−40	−30	−10	−30	60
50	10	−50	−20	−60

11. Explain Characteristics of Management Science.

12. What do you mean by assignment problem ? Explain the assignment algorithm.

13. Explain the decision making process under Markov analysis.

14. A Small project consisting of eight activities has the following characteristics :

Activity	Preceding activity	Most optimistic time	Most likely time	Most pessimistic time
A	None	2	4	12
B	None	10	12	26
C	A	8	9	10
D	A	10	15	20
E	A	7	7.5	11
F	B, C	9	9	9
G	D	3	3.5	7
H	E, F, G	5	5	5

Draw the PERT network for the project, determine critical path.

(4 × 3 = 12 weightage)

Part C

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

15. Solve the following assignment problem :

Employees Task	I	II	III	IV	V
A	1	3	2	3	6
B	2	4	3	1	5
C	5	6	3	4	6
D	3	1	4	2	2
E	1	5	6	5	4

16. Solve the following problem :

    Maximize $Z = 6x_1 + 4x_2$

    Subject to $-2x_1 + x_2 \leq 2$
    $x_1 - x_2 \leq 2$
    $3x_1 + 2x_2 \leq 9$
    $x_1, x_2 \geq 0.$

17. A Project Schedule has the following characteristics :

Activity	Time	Activity	Time
1-2	4	5–6	4
1-3	1	5–7	8
2-4	1	6–8	1
3-4	1	7–8	2
3-5	6	8–10	5
4-9	7	9–10	7

    • Construct Network Diagram.

    • Compute T_E and T_L for each event.

    • Find critical path.

    • Find EST, LST, EFT, LFT values of all activities.

18. What are the application areas of Linear Programming ?

$(2 \times 5 = 10 \text{ weightage})$