BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – MBA-2018/MBA-2019/MBA-2020/MBA-2021
Course Name – Quantitative Techniques
Course Code - MBA208
(Semester II)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i) When solving a zero-sum game, what is the objective of the minimax rule?

a) To maximize the payoff for both players
b) To minimize the payoff for both players
c) To maximize the payoff for one player and minimize it for the other
d) To minimize the payoff for one player and maximize it for the other

(ii) The idea behind the maximin criterion is to select a strategy that maximizes what?

a) The minimum payoff for a player
b) The maximum payoff for a player
c) The average payoff for a player
d) The difference between the maximum and minimum payoffs for a player

(iii) A player\'s expected payoff for a mixed strategy is the average of what?

a) The player\'s payoff from using each of their pure strategies
b) The player\'s payoff from using their dominant strategy
c) The player\'s payoff from using their minimax strategy
d) The player\'s payoff from using their dominated strategy

(iv) In the assignment problem, what is the constraint that limits each agent to be assigned to only one task?

a) Capacity constraint
b) Assignment constraint
c) Demand constraint
d) Supply constraint

(v) Which decision-making approach is used under uncertainty?

a) AHP
b) PERT
c) Monte Carlo Simulation
d) None of the above

(vi) What is the objective of the Analytic Hierarchy Process (AHP)?

a) To determine the best solution among multiple options

b) To determine the time required for project completion

c) To determine the critical path of a project

d) To determine the risk associated with a project

(vii) What is a Linear Programming problem?

a) A problem involving linear relationships between variables

b) A problem involving non-linear relationships between variables

c) A problem involving only one variable

d) A problem involving no variables

(viii) Which of the following is not a type of Linear Programming problem?

a) Maximization

b) Minimization

c) Equalization

d) Differentiation

(ix) Which of the following is a graphical method of solving Linear Programming problems?

a) Simplex Method

b) Branch and Bound Method

c) Cutting Plane Method

d) Graphical Method

(x) Which of the following is not a step in the Simplex Method?

a) Initialization

b) Pivot Selection

c) Pivot Calculation

d) Objective Function Maximization

(xi) In the Simplex Method, what is a pivot element?

a) An element in the tableau that is used to pivot

b) An element in the objective function that is maximized

c) An element in the constraints that is equalized

d) An element in the feasible region

(xii) What is the duality principle in Linear Programming?

a) A relationship between the primal and dual problems

b) A relationship between the feasible and optimal solutions

c) A relationship between the objective function and the constraints

d) A relationship between the feasible region and the objective function

(xiii) Which of the following is not a property of the dual problem in Linear Programming?

a) The dual problem has the same number of constraints as the primal problem

b) The dual problem has the same number of variables as the primal problem

c) The optimal solution of the dual problem is greater than or equal to the optimal solution of the primal problem

d) The dual problem has a different objective function than the primal problem

(xiv) Form the option which is not a type of Linear Programming problem?

a) Maximization

b) Minimization

c) Equalization

d) Differentiation

(xv) What is the objective function?

a) The function that is to be minimized or maximized

b) A function that represents the constraints

c) The function that is to be equalized

d) A function that is not used in Linear Programming

Group-B
(Short Answer Type Questions)

3 x 5=15

2. What are the limitations of LP problem? (3)
3. What is meant by an optimality test in a transportation problem? (3)
4. What is the purpose of crashing a project network diagram, and how is it done? (3)
5. What do you mean by bottleneck of a network? Explain with example. (3)
6. How can a project manager use CPM and PERT to identify and manage project risks, and what are some common techniques for risk analysis and mitigation? (3)

OR

How can game theory be combined with other decision-making tools, such as decision analysis (3) and simulation, to improve strategic decision-making in complex and uncertain environments?

Group-C
(Long Answer Type Questions)

5 x 6=30

7. A factory manufactures two products A and B. To manufacture one unit of A, 1.5 machine (5) hours and 2.5 labour hours are required. To manufacture product B, 2.5 machine hours and 1.5 labour hours are required. In a month, 300 machine hours and 240 labour hours are available. Profit per unit for A is Rs. 50 and for B is Rs. 40. Formulate as LPP

8. A manufacturer of cylindrical containers receives tin sheets in widths of 30 cm and 60 cm (5) respectively. For these containers the sheets are to be cut to three different widths of 15 cm, 21 cm and 27 cm respectively. The number of containers to be manufactured from these three widths are 400, 200 and 300 respectively. The bottom plates and top covers of the containers are purchased directly from the market. There is no limit on the lengths of standard tin sheets. Formulate the LPP for the production schedule that minimises the trim losses

9. How can project managers use dummy variables to model complex project networks with (5) overlapping or concurrent activities, and what are some common techniques for identifying and resolving network conflicts?

10. Discuss the role of simulation in the analysis and design of queuing systems. Explain the basic (5) steps involved in building and validating a queuing simulation model, and discuss the advantages and limitations of simulation compared to analytical methods. Use a real-world example to illustrate your answer.

11. In a game matching coins with two players suppose A wins one unit of value when there are (5) two heads, wins nothing when there are two tails and losses ½ unit of value when there are one head and one tail. Determine the payoff matrix, the best strategies for each player and the value of game to A.

12. A farmer has 200 acres of land. He produces three products X, Y & Z. Average yield per acre (5) for X, Y & Z is 4000, 6000 and 2000 kg. Selling price of X, Y & Z is Rs. 2, 1.5 & 4 per kg respectively. Each product needs fertilizers. Cost of fertilizer is Rs. 1 per kg. Per acre need for fertilizer for X, Y & Z is 200, 200 & 100 kg respectively. Labour requirements for X, Y & Z is 10, 12 & 10 man hours per acre. Cost of labour is Rs. 40 per man hour. Maximum availability of labour is 20, 000 man hours. Formulate as LPP to maximise profit.

OR

A departmental Secretary receive an average of 8 job / hr. many are short jobs, while other (5) are quiet long. Assume however, that the time to perform a job has an ED mean of 6 mins determine a) The average elapsed time from the time the secretary receives a job, until it is completed. b) Average number of jobs in a system

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