18239

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – M.Com.(BFA)-2025
Course Name – Decision Sciences
Course Code - MCM10501
(Semester I)

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) Define the main objective of the quantitative approach to management decision making.

a) To rely on personal judgment
b) To use mathematical and statistical models for decision making
c) To avoid data analysis
d) To follow intuition-based decisions

(ii) Select the technique used for solving linear programming problems graphically.

a) Simplex Method
b) MODI Method
c) Graphical Method
d) Transportation Method

(iii) State the basic components of a linear programming problem.

a) Objectives, probabilities, and simulations
b) Constraints, resources, and algorithms
c) Decision variables, objective function, and constraints
d) Alternatives, outcomes, and preferences

(iv) Recognize the type of solution where two or more optimal solutions exist in a linear programming problem.

a) Unbounded solution
b) Multiple optimal solution
c) Infeasible solution
d) Unique solution

(v) Define the term "feasible region" in linear programming.

a) The area representing all possible solutions
b) The point of intersection of all constraints
c) The solution maximizing profit only
d) The region outside the constraints

(vi) Select the correct definition of "duality" in linear programming.

a) The process of solving a problem graphically
b) The conversion of a primal problem into a dual problem
c) Solving a problem without constraints
d) A graphical solution approach

(vii) State the first step in solving a linear programming problem graphically.

a) Identify the corner points
b) Plot the constraints on a graph
c) Calculate the Z value
d) Solve the dual problem

(viii) Recognize the method used for analyzing the effect of changes in the coefficients of a linear programming problem.

a) Feasibility analysis
b) Sensitivity analysis
c) Graphical analysis
d) Regression analysis

(ix) Define the "objective function" in linear programming.

a) A function that minimizes or maximizes the decision variable
b) A function representing constraints
c) A function to plot a graph
d) A function that limits solutions

(x) Select the correct condition for an infeasible solution in linear programming.

a) When all constraints overlap
b) When there is no point satisfying all constraints
c) When there are multiple solutions
d) When the objective function has no maximum

(xi) Analyse the main goal of game theory in decision making.

a) To maximize production
b) To analyze competitive situations among decision makers
c) To minimize taxation
d) To study consumer behavior

(xii) Conclude the characteristic of a pure strategy game.

a) Each player uses probability distributions for strategies
b) Each player has a single, fixed course of action
c) Players randomly select strategies
d) Players adjust strategies continuously

(xiii) Estimate the condition under which a pure strategy becomes optimal.

a) When mixed strategies fail
b) When it always leads to the best payoff regardless of opponents' moves
c) When it minimizes resource usage
d) When randomization gives better results

(xiv) Analyse what a payoff matrix represents in game theory.

a) A diagram for logistics optimization
b) A chart showing risk analysis
c) A table showing outcomes for every combination of strategies
d) A graph of economic growth

(xv) Conclude the purpose of using mixed strategies in a game.

a) To reduce costs
b) To increase deterministic outcomes
c) To handle uncertainty and maximize expected payoff
d) To eliminate the need for a payoff matrix

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define the quantitative approach to management decision making. (3)
3. Describe the key features of the quantitative approach. (3)
4. Examine why the quantitative approach is useful in management. (3)
5. Distinguish between optimistic time and pessimistic time in PERT. (3)
6. Calculate the total float for a project activity. (3)

OR

Conclude why time-cost trade-off analysis is used in project management. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Define the quantitative approach to management decision making and explain its significance in modern organizations. (5)
8. Describe the key steps involved in the mathematical formulation of linear programming problems. (5)
9. A textile company produces **shirts** and **trousers**. (5)

- A shirt requires 3 hours of stitching and 2 hours of finishing.
- A trouser requires 4 hours of stitching and 3 hours of finishing.
- The company has at most 240 hours of stitching and 180 hours of finishing available per week.
- The profit per shirt is ₹60, and per trouser is ₹80.

Deduce an LPP to maximize profit.

10. Analyse the key elements of Linear programming with detail explanation. (5)
11. Explain how sensitivity analysis is performed in linear programming and its managerial implications. (5)
12. A company makes two products, **P1** and **P2**. (5)

- Each unit of **P1** requires 4 hours of labor and 2 kg of raw material.
- Each unit of **P2** requires 3 hours of labor and 5 kg of raw material.
- The company has at most 120 hours of labor and 150 kg of raw material available.
- The profit per unit is ₹50 for **P1** and ₹40 for **P2**.

Deduce an LPP to maximize profit.

OR

A dietician wants to mix two types of foods, **F1** and **F2**, to provide at least 30 units of vitamins and at least 20 units of minerals. (5)

- Each kg of **F1** provides 6 units of vitamins and 3 units of minerals.
- Each kg of **F2** provides 4 units of vitamins and 5 units of minerals.
- The cost per kg of **F1** is ₹40 and **F2** is ₹60.

Deduce an LPP to minimize cost.

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