

# MT 21 - Optimization Techniques

**1. What is the primary objective of linear programming?**

- a) Maximizing profits
- b) Minimizing costs
- c) Optimizing a linear objective function
- d) None of the above

**Answer: c) Optimizing a linear objective function**

**2. Which method is commonly used to solve linear programming problems graphically?**

- a) Simplex method
- b) Two-phase simplex method
- c) Graphical method
- d) Monte Carlo simulation

**Answer: c) Graphical method**

**3. What are the limitations of linear programming?**

- a) Only applicable to small-scale problems
- b) Assumes linearity and certainty
- c) Infeasibility to model complex scenarios
- d) All of the above

**Answer: b) Assumes linearity and certainty**

**4. In linear programming, what does the Simplex method aim to do?**

- a) Maximize the objective function
- b) Minimize the objective function

- c) Find the optimal solution through iteration
- d) None of the above

**Answer: c) Find the optimal solution through iteration**

**5. When would you use the Two Phase Simplex Method?**

- a) When dealing with nonlinear constraints
- b) When the initial basic feasible solution is not apparent
- c) When the problem has only one decision variable
- d) When the problem has no constraints

**Answer: b) When the initial basic feasible solution is not apparent**

**6. What are Markov chains commonly used for?**

- a) Modeling systems with memoryless properties
- b) Modeling deterministic systems
- c) Predicting future events with certainty
- d) None of the above

**Answer: a) Modeling systems with memoryless properties**

**7. In Markov chains, what are steady-state probabilities?**

- a) Probabilities that remain constant over time
- b) Probabilities that change with each iteration
- c) Probabilities of transitioning between states
- d) Probabilities of reaching an absorbing state

**Answer: a) Probabilities that remain constant over time**

**8. Monte Carlo Simulation is used for:**

- a) Solving linear programming problems

- b) Estimating probabilities through repeated random sampling
- c) Analyzing deterministic systems
- d) None of the above

**Answer: b) Estimating probabilities through repeated random sampling**

**9. Which of the following is an application area of Markov chains?**

- a) Weather forecasting
- b) Cryptography
- c) Sorting algorithms
- d) Data compression

**Answer: a) Weather forecasting**

**10. In the processing of  $n$  jobs through  $m$  machines, what is the objective?**

- a) Maximizing the number of machines used
- b) Minimizing the processing time
- c) Balancing the workload across machines
- d) None of the above

**Answer: b) Minimizing the processing time**

**11. What is the sequential model primarily concerned with?**

- a) Optimizing production processes
- b) Scheduling tasks sequentially
- c) Analyzing decision trees
- d) None of the above

**Answer: b) Scheduling tasks sequentially**

**12. Which technique is commonly used to solve processing n jobs through m machines problems?**

- a) Simplex method
- b) Monte Carlo simulation
- c) Dynamic programming
- d) Markov chains

**Answer: c) Dynamic programming**

**13. What is the critical path in a PERT network?**

- a) The path with the most activities
- b) The shortest path in the network
- c) The longest path in the network
- d) The path with zero slack

**Answer: c) The longest path in the network**

**14. What does the Forward Pass Computation in PERT/CPM calculate?**

- a) Earliest start and finish times for each activity
- b) Latest start and finish times for each activity
- c) Total float for each activity
- d) Critical path duration

**Answer: a) Earliest start and finish times for each activity**

**15. Which tool is commonly used for project management and incorporates PERT/CPM techniques?**

- a) Microsoft Excel
- b) MATLAB

c) MS Project

d) Python

**Answer: c) MS Project**

**16. What does a zero-sum game imply?**

a) The sum of payoffs is zero

b) One player's gain is another player's loss

c) Players have no strategies

d) None of the above

**Answer: b) One player's gain is another player's loss**

**17. How are zero-sum games typically represented?**

a) Payoff matrix

b) Decision tree

c) Probability distribution

d) None of the above

**Answer: a) Payoff matrix**

**18. Which strategy might be used to solve zero-sum games with dominance?**

a) Algebraic method

b) Graphical method

c) Simulation

d) All of the above

**Answer: a) Algebraic method**

**19. Decision Tree is a tool used primarily for:**

a) Modeling sequential decisions

- b) Modeling simultaneous decisions
- c) Estimating probabilities
- d) None of the above

**Answer: a) Modeling sequential decisions**

**20. What is the primary difference between decision-making under uncertainty and under risk?**

- a) The availability of information
- b) The level of ambiguity in outcomes
- c) The presence of probabilities
- d) None of the above

**Answer: b) The level of ambiguity in outcomes**