

PURBANCHAL UNIVERSITY
2023

Master of Computer Application (M.C.A.)/Third Semester/Final
Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

MCA201/MCA211: Optimization Techniques (New/Old Course)

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×16=32

1. ✓ What is degeneracy in transportation problems? Explain how to resolve degeneracy in a transportation problem. Obtain the initial basic feasible solution of a transportation problem by Vogel's Approximation Method.

2+6+8

	D_1	D_2	D_3	D_4	supply
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
demand	20	40	30	10	

2. What is an integer linear programming? Solve the following all-integer programming problem using Gomory's Cutting Plane method:

$$\text{Max } Z = 6x_1 + 5x_2$$

Subject to the constraints

$$2x_1 + 4x_2 \leq 8$$

$$4 + \frac{x_2}{2} \leq 3$$

$x_1, x_2 \geq 0$, and are integers.

3. ✓ What is the importance of Critical Path Analysis? Explain the forward-pass and backward-pass method for doing critical path analysis.

4+12

Contd. ...

Group B

Answer SIX questions.

6×8=48

4. A firm makes two products X and Y, and has a total production capacity of 9 tonnes per day, X and Y requiring the same production capacity. The firm has a permanent contract to supply at least 2 tonnes of X and at least 3 tonnes of Y per day to another company. Each tonne of X requires 20 machine hours of production time and each tonne of Y requires 50 machine hours of production time. The daily maximum possible number of machine hours is 360. All the firm output can be sold and the profit made is Rs. 80 per tonne of X and Rs. 120 per tonne of Y. It is required to determine the production schedule for maximum profit and to calculate this profit (Use graphical method)

5. Solve by dual simplex method.

$$\text{Minimize } Z = 3x_1 + x_2$$

Subject to the constraints

$$x_1 + x_2 \geq 5$$

$$2x_1 + 3x_2 \geq 2$$

$$x_1, x_2 \geq 0$$

6. Explain duality theory of linear programming. Convert the following primal problem into its dual:

$$\text{Min. } Z = 2x_1 + 3x_2 + 4x_3$$

Subject to the constraints

$$2x_1 + 3x_2 + 5x_3 \geq 2$$

$$3x_1 + x_2 + 7x_3 = 3$$

$$x_1 + 4x_2 + 6x_3 \leq 5$$

$$x_1, x_2, x_3 \geq 0$$

7. Solve the following LPP using Graphical Method.

$$\text{Max. } Z = 2x_1 + x_2$$

Subject to the constraints

$$3x_1 + 5x_2 \leq 15$$

$$6x_1 + 2x_2 \leq 24$$

$$x_1, x_2 \geq 0$$

Contd. ...

(3)

8. Consider a problem of assigning four clerks to four tasks. The time (hours) required to complete the task is given below.

		tasks			
		A	B	C	D
clerks	1	4	7	5	6
	2	-	8	7	4
	3	3	-	5	3
	4	6	6	4	2

Find the optimal assignment schedule.

9. A self-service store employs one cashier at its counter nine customers arrive on an average of every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find:
- (a) Average number of customers in the system.
 - (b) Average time a customer spends in system.
 - (c) Probability of having more than 10 customers in the system.
 - (d) Probability that a customer has to queue for more than 2 minutes.
10. Write short notes on any TWO:
- (a) CPM Vs. PERT
 - (b) Finite Population Model
 - (c) Unbalanced Assignment Problem



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Master of Computer Application (M. C. A.)/Third Semester/Final

Time: 03:00 hrs.

Full Marks: 60 /Pass Marks: 24

MCA203: Digital Marketing and Marketing Management

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

- 1/ Elaborate the concept of Search Engine Marketing and explain the tools used for Search Engine Marketing (SEM).
- 2/ What is product life cycle? Describe the marketing strategies undertaken in the various stages of product life cycle.
3. Explain different pricing strategies in marketing management.

Group B

Answer SIX questions.

6×6=36

- 4/ Differentiate and discuss traditional versus digital marketing.
- 5/ What is Social Media Marketing (SMM)? Explain the benefits of Social Media Marketing.
6. What is marketing mix? Explain the components of marketing mix.
- 7/ Define database marketing. Why is database marketing important?
8. What is market segmentation? Briefly explain the segmentation variables of consumer market.
- 9/ Explain the consumer buying decision process.
10. Write short notes on any TWO:

- (a) Market size
- (b) Price adjustment strategies
- (c) Marketing channel decisions

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Time: 03:00 hrs.

Full Marks: 60 /Pass Marks: 24

MCA202: Data Mining and Data Warehousing

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

- 1/ What is Association rule? Explain Apriori algorithm with example.
- 2, Discuss cluster analysis and partitioning. Explain any two partitioning methods with example.
- 3/ Define data preprocessing. Explain the different activities carried out during data preprocessing.

Group B

Answer SIX questions.

6×6=36

- 4/ How data warehouse can be explained with its benefits and applications?
- 5/ Define data mining and explain how it differs from traditional data analysis.
6. Discuss data warehouse architecture and its implementation.
- 7/ What do you mean by multimedia database? Explain how mining of spatial database is done.
- 8/ What is data cube technology? Discuss different types of OLAP server.
- 9/ Explain the social impact and trends of data mining.
- 10/ Write short notes on any TWO:
 - ✓(a) Aspects of security and privacy in data mining
 - (b) Mining WWW
 - ✓(c) Data mining query language

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MCA242: Supply Chain Analysis (Specialization-3) (New Course)

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. What do you mean by inventory management? Why inventory management is important in supply chain? Explain.
2. "Supplier selection is very crucial and important aspect in supply chain management for its smooth operation". In the light of this statement, explain the criteria and evaluation of supplier selecting and risk associated with it.
3. Explain the different aspects of data preprocessing in detail, including data loading and writing, data indexing and selection, data merging and combination, data cleaning and preparation, and data computation and aggregation.

Group B

Answer SIX questions.

6×6=36

4. What is cohort analysis? How cohort analysis helps to analyze the customer? Explain.
5. Describe data and its value in supply chain.
6. What is warehouse management? Explain different principles of warehouse management.
7. Describe supply chain management. Also explain the supply chain process.
8. What are different logistics management functions? Explain.
9. Explain the different data sources that can be used in supply chain management.
10. Explain the process of creating and formatting a figure in Python for data visualization.
11. Explain the process of geographic mapping with Basemap in Python.



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MCA244: Internet and Social Media Marketing (Specialization-4) (New Course)

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×16=32

1. People have outreached to show their presence through countless digital channels. What are those latest digital channels? Describe the features of any four trending digital channels. 4+12
- 2/ Write down the principles of digital leadership. Define online PR and explain how it works. 8+8
- 3/ Discuss about the reasons that are driving the organizations shift from traditional platforms to digital platforms for marketing practices. Discuss about the latest digital marketing strategies. 8+8

Group B

Answer SIX questions.

6×8=48

- 4/ Define mobile marketing. Explain how mobile commerce differs from e-commerce.
- 5/ How do you think content is related to branding? Explain how branding makes impact on sales.
- 6/ What blogging? What does a blog contain? Explain with example.
- 7/ What do you mean by search engine marketing? How does SEO work?
- 8/ What are marketing analytic tools and how do they enable a business to achieve its marketing objectives?
9. Define ROI. How to evaluate cost effectiveness of digital marketing strategies?
10. Write short notes on any TWO:
 - (a) Marketing gamification
 - (b) Security issues in social marketing
 - (c) Digital innovation

