

PURBANCHAL UNIVERSITY

2018

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

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

MCA212: Design & Analysis of Algorithm (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. ✓ What is greedy method? Discuss minimum cost spanning tree with example in detail.
2. Explain dynamic programming with travelling salesman problem in detail.
3. ✓ Discuss divide and conquer method with merge sort.

Group B

Answer SIX questions.

6×8=48

4. ✓ What is an algorithm? Explain characteristics of an algorithm with asymptotic notations.
5. What is stack and queue? Explain linked list representation of graph with example.
6. ✓ Explain knapsack problem with example.
7. ✓ Discuss 8-queen problem with example.
8. What is tree? Explain different types of tree with example.
9. ✓ Explain Chinese remainder theorem with example.
10. ✓ Write short notes on any TWO:
(a) Graph coloring (b) RAM model
(c) Class P and NP



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MCA215: E-Governance (Elective-II) (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×16=32

1. What are the issues to e-governance implementation? Discuss in detail.
2. If you are hired as e-Governance Advisor in Nepal, discuss your e-governance plan and implementation strategies for the development of Nepal.
3. Discuss components of design for designing new e-governance system.

Group B

Answer SIX questions.

6×8=48

4. Describe maturity phases of e-Governance.
5. What are the challenges of e-government security? Discuss benefits of e-governance.
6. What are widely used models of e-governance? Describe any one in detail.
7. What is analysis of current reality? Discuss the roles of ICT in e-government.
8. What are forms of interaction in foundation of e-Governance deployment?
9. What is Public Private Partnership (PPP) in e-Governance? Discuss its importance.
10. "E-governance is SMART governance". Justify
11. Write short notes on any TWO:
(a) GIDC Nepal
(b) Interoperability
(c) Digital signature

2×4=8

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MCA214: Marketing Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

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Group A

Answer TWO questions.

2×16=32

1. Critically analyze various concept of marketing. Which concept do you think is more appropriate in rural areas of Nepal? Justify answer with appropriate logics.
- 2/ How do you segment and develop position the market of following products?
(a) T-shirt (b) Kia Rio car (c) Organic food.
3. You are working as a marketing manager in a noodles company for last five years. You have recently noticed that sale of noodles has significantly decreased in the eastern region, so you need to carry out a research to identify the reasons and develop promotional program. How do you conduct a marketing research to meet objectives?

Group B

Answer SIX questions.

6×8=48

- 4./ What do you mean by consumer buyer behavior? Explain the buyer decision process.
- 5./ Explain the sound formulation of marketing mix for software Development Company.
- 6./ A company's marketing communications mix-also called its promotion mix-blends five different tools. Name and define these tools.
- 7./ Identify and explain several situations in which price cuts or price increases might be necessary.

(2)

8. ✓ Explain the various stages of Product Life Cycle. Suggest appropriate marketing strategies for each stage with examples
9. ✓ What is competitor's analysis? How do you analyze competitors for electronic products? Explain with suitable examples.
10. Develop a comprehensive marketing plan for the newly introduced airline services of Buddha Air between Nepalgunj and Delhi.



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MCA211: Optimization Techniques (New Course)

Candidates are required to give their answers in their own words as far as practicable.

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Group A**Answer TWO questions.****2×16=32**

1. What is degeneracy in transportation problems? Explain how to resolve degeneracy in a transportation problem.

A steel company has four open hearth furnaces and four rolling mills. Transportation costs for shipping steel from furnaces to rolling mills are shown in the following table:

	M_1	M_2	M_3	M_4	supply
F_1	4	6	8	13	50
F_2	13	11	10	8	70
F_3	14	4	10	13	30
F_4	9	11	13	8	50
demand	25	35	105	20	

What is the optimal shipping schedule?

2. What are the benefits and limitation of linear programming problems? Solve the following linear programming problem using graphical method

$$\text{Max } Z = 6x_1 + 4x_2$$

Subject to the constraints

$$2x_1 + 3x_2 \leq 30$$

$$3x_1 + 2x_2 \leq 24$$

$$x_1 + x_2 \geq 30$$

$$x_1, x_2 \geq 0$$

Contd

3. What is an integer linear programming problem? Solve the following all-integer programming problem using the Gomory's cutting plane method.

$$\text{Minimize } Z = 3x_1 + 2.5x_2$$

Subject to the constraints

$$x_1 + 2x_2 \geq 20$$

$$3x_1 + 2x_2 \geq 50$$

$$x_1, x_2 \geq 0 \text{ and integers.}$$

Group B

Answer SIX questions.

6×8=48

4. A manufacturer produces two different models X and Y of the same product. Model X makes a contribution of Rs 50 per unit and model Y, Rs 30 per unit towards total profit. Raw materials r_1 and r_2 are required for production. At least 18 kg of r_1 and 12 kg of r_2 must be used daily. Also at most 34 hours of labour are to be utilized. A quantity of 2 kg of r_1 is needed for model X and 1 kg of r_1 for model Y. For each of X and Y, 1 kg of r_2 is required. It takes 3 hours to manufacture model X and 2 hours to manufacture model Y. How many units of each model should be produced to maximize the profit?
5. A construction company has four large bulldozers located at four different garages. The bulldozers are to be moved to four different construction site. The distance in miles between the bulldozers and the construction site are given below:

Bulldozers/site	A	B	C	D
1	90	75	75	80
2	35	85	55	65
3	125	95	90	105
4	45	110	95	115

How should the bulldozers be moved to the construction sites in order to minimize the total distance travelled.

(3)

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

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

Subject to the constraints

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

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

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

$x_1, x_2 \geq 0$, x_3 is unrestricted.

7. A project schedule has the following characteristics.

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time (days)	4	1	1	1	6	5	4	8	1	2	5	7

- Draw an arrow diagram representing the project.
 - Find the total float for each activity
 - Find the critical path and the total projection duration.
8. What do you mean by Queueing system. Explain the various elements of Queueing system.

9. Solve by dual simplex method.

$$\text{Max } Z = -2x_1 - x_3$$

Subject to the constraints

$$x_1 + x_2 - x_3 \geq 5$$

$$x_1 - 2x_2 + 4x_3 \geq 8$$

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

10. What is transportation problem? Determine an initial basic feasible solution for following transportation problem by using Vogel's approximation method.

	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	

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MCA213: Software Project Management (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. Discuss how PERT differs from CPM. A project consisting of six independent activities is to be analyzed by using PERT. The following information is given below:

Activity	A	B	C	D	E	F
Predecessor activity	-	-	A	B,C	D	A
Optimistic time (t_o)	3	2	1	0	1	2
Pessimistic time (t_p)	5	2	5	14	3	10
Most likely time (t_m)	4	2	3	4	2	9

- (a) Draw network diagram and indicate its critical path.
(b) What is the expected time to complete the project?
(c) What is the probability that the project will be completed in 12 weeks?
(d) What is the probability that the project will be completed in 20 weeks or less?
2. Calculate net profit, payback period, Return on Investment and Net present Value (using 10% discount rate) for the following three projects and decide which, on the basis of each is the most beneficial to pursue.

Year	Project A	Project B	Project C
0	-5,00,000	-4,00,000	-1,00,000
1	2,75,000	1,00,000	25,000
2	1,65,000	1,20,000	75,000
3	1,30,000	1,50,000	70,000
4	50,000	1,00,000	15,000

3. ✓ What is risk? Explain the various types of risks involved in software project. Also mention the strategies for mitigation of such risks.

Group B

Answer SIX questions.

6×8=48

4. If you were a software project manager, explain how you would organize teams and manage team members?
5. ✓ What is Software Quality Management? How does it differ from software configuration management? Explain.
6. ✓ What do you mean by earned value analysis? Explain the ways of visualizing progress.
7. How do you identify the requirement of resources in software project? How do you balance in the case of shortage of required resources?
8. ✓ Explain the qualities of good leader. What are the leadership styles?
9. ✓ What is difference between feasibility study and planning? Explain steps wise project planning.
10. ✓ Write short notes on any TWO:
 (a) Baseline
 (b) ISO 9000
 (c) Project control