

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL
(An Autonomous and Re-Accredited with 'A' Grade by NAAC)

Subject : M.C.A III Semester Final Examinations, January - 2016
Sub. Code : Design & Analysis of Algorithms
MCA 11303

Exam Time : 3 hrs
Max. Marks : 100

Answer the following Questions:

(5*20=100M)

UNIT-I

1. (a) Define an algorithm? Explain the specification of an algorithm in detail? **(5M)**
(b) What are stacks? Write an algorithm making use of a stack representation
With an example. **(15M)**
- (Or)
2. (a) What are Queues? Explain how queues are represented with necessary
algorithm. **(10M)**
(b) What are priority queues? Explain with an algorithm? **(10M)**

UNIT-II

3. (a) Explain quick sort? Write an example give its time complexity? **(10M)**
(b) Explain with an algorithm to solve "single source shortest paths" using
greedy method. **(10M)**
- (Or)
4. (a) Explain about "Tree Vertex Sputting" using greedy method. **(10M)**
(b) Explain in detail about "Minimum cost spanning Trees". **(10M)**

UNIT-III

5. (a) Explain about biconnected compounds & explain in detail about DFS. **(12M)**
(b) Explain in detail about "Multistage graphs". **(8M)**
- (Or)
6. (a) Explain the techniques for graphs with suitable examples? **(8M)**
(b) Explain in detail about "Breadth first search" with examples. **(12M)**

UNIT-IV

7. (a) Explain about "Graph colouring" with suitable examples. **(8M)**
(b) Explain in detail about "8-Queens problem" **(12M)**
- (Or)
8. (a) Discuss Hamiltonian Cycles giving an algorithm to find all Hamiltonian
Cycles. **(10M)**
(b) Explain 0/1 Kanpsack problem using "Branch one – bound techniques". **(10M)**

UNIT-V

9. (a) Explain in detail about "Hamiltonian Cycles". **(10M)**
(b) Explain about deterministic algorithm. Give examples? **(10M)**
- (Or)
10. (a) What is "cook's theorem". Explain in detail. **(10M)**
(b) Explain about "Decision problem" with suitable examples? **(10M)**

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL

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M.C.A III Semester Final Examinations, January - 2016

Subject : Operating System

Exam Time : 3 hrs

Sub. Code : MCA 11304

Max. Marks : 100

Answer the following Questions:

(5*20=100M)

UNIT-I

1. (a) List the three main purposes of an operating system ? Explain the concept of process management in detail ? (10 M)

(b) Explain the concept of operating system in detail ? (10 M)

(or)

2. (a) Explain multi threading models? (10 M)

(b) Explain multi level queue scheduling ? (10 M)

UNIT-II

3. Explain the following

(a) Dynamic loading (5 M)

(b) Swapping (5 M)

(c) Memory Allocation (5 M)

(d) Paging (5 M)

(or)

4. (a) Explain the difference between internal and external fragmentation? (10 M)

(b) Describe a mechanism by which one segment could belong to the address space of two different process ? (10 M)

UNIT-III

5. (a) Explain classic problems of synchronization in detail ? (10 M)

(b) Explain about Monitors in detail ? (10 M)

(or)

6. (a) Explain about dead lock and its necessary conditions ? (10 M)

(b) Explain the methods for handling dead locks? (10 M)

(P.T.O)

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL
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MCA (III semester) Examinations, January - 2016

Subject
Code

: Operation Research
: MCA14305

Exam Time : 3hrs
Max.Marks : 100

UNIT - I

1. a) Write about all the special cases of linear programming. (8M)
 b) Solve the following problem using graphical method (12M)

Maximize $Z = 7X_1 + 10X_2$

Subject to $X_1 + X_2 \leq 30000$

$X_2 \leq 12000$

$X_1 \geq 6000$

$X_1, X_2 \geq 0$

OR

2. a) Write about (i) Sensitivity analysis (ii) Duality (6M)
 b) Solve the following LPP using Simplex Method (14M)

Maximize $Z = 10X_1 + 5X_2$

Subjected to $4X_1 + 5X_2 \leq 100$

$5X_1 + 2X_2 \leq 80$

$X_1, X_2 \geq 0$

UNIT - II

3. a) Determine initial basic feasible solution to the following transportation problem using VAM method (16M)

		Destination				
		1	2	3	4	Supply
Origin	A	9	9	4	0	80
	B	11	9	5	3	120
	C	9	11	8	9	150
	D	11	5	1	1	70
	E	7	7	8	6	90
Demand		100	200	120	80	

- b) Write about mathematical model for transportation problem (4M)

OR

4. a) write about transshipment model

(4M)

b) Solve the following transshipment problem

(16 M)

Origin	Destinations				Capacity
	1	2	3	4	
A	8	13	4	-	80
B	15	12	5	3	120
C	-	11	8	9	150
D	6	5	1	1	70
Requirements	350	350	130	130	

UNIT – III

5. Certain equipment needs 5 repair jobs which have to be assigned to 5 machines. The estimated time (in hours) that each mechanic requires to complete the repair job is given in the following table. Solve the following assignment problem using Hungarian method

(20M)

		Jobs				
		J ₁	J ₂	J ₃	J ₄	J ₅
M1		7	5	9	8	11
M2		9	12	7	11	10
Machine M3		8	5	4	6	9
M4		7	3	6	9	5
M5		4	6	7	5	11

OR

6. a) Write about integer programming problems

(10M)

b) Write about branch and bound technique with example

(10M)

UNIT – IV

7. a) Define Dynamic Programming. What are the applications of Dynamic programming

(12M)

b) Differentiate between Pert and CPM

(8M)

OR

8. Given the following information draw the network diagram, Find Earliest and Latest occurrence Time and find the critical Path and its duration (20M)

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Immediate predecessor	-	-	-	B,C	A	C	E	E	D,F,H	E	I,J	G
Duration(days)	9	4	7	8	7	5	10	8	6	9	10	2

UNIT – V

9. a) Define (i) Saddle point (ii) Pure strategies (iii) Mixed strategies (6M)
b) Solve the following problem optimally for the players A and B. (14M)

		Player B		
		1	2	3
Player A	1	55	40	35
	2	70	70	55
	3	75	55	65

OR

10. a) Explain the graphical method for $2 \times n$ or $m \times 2$ games (4M)
b) A soft drink company calculates the market share of its two products against its major competitor having three products and found out the impact of additional advertisement in any one of its products against the other. (16M)

		Competitor B		
		1	2	3
Company A	1	6	7	15
	2	20	12	10

What is the best strategy for the company as well as the competitor? What is the pay-off obtained by the company and the competitor in the long run? Use graphical method to obtain the solution.

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M.C.A III Semester Final Examinations, January - 2016

Subject : Data Base Management System

Exam Time : 3 hrs

Sub. Code : MCA 11302

Max. Marks : 100

Answer the following Questions:

(5*20=100M)

UNIT-I

1. (a) Discuss about file system Versus DBMS. (10)
(b) Explain aggregation and generalization with example. (10)

(Or)

2. (a) Explain about loseless join decomposition. (10)
(b) Explain integrity constraints over relations. (10)

UNIT-II

3. (a) Explain about Triggers & Active data bases in detail . (10)
(b) Define relational calculus. Explain Tuple relational calculus. (10)

(Or)

4. (a) Explain about Cursors. (10)
(b) Explain the following: (2*5=10)
(i) Set operators (ii) Nested queries.

UNIT-III

5. (a) Discuss in detail about various file organizations. (10)
(b) Explain B+ trees. (10)

(Or)

6. (a) Explain about ISAM . (10)
(b) Explain about Extendible Hashing. (10)

UNIT-IV

7. Explain the following: (4*5=20)
(i) 2 PL (ii) Phantom Problem (iii) Granularity of locking
(iv) Recoverability

(Or)

8. (a) Define lock management . Explain concurrency control without locking. (10)
(b) What is deadlock? Explain deadlock avoidance and deadlock prevention. (10)

UNIT-V

9. (a) What are the 3 phases of ARIES algorithm? Explain the functionality of each of them . (10)
(b) Explain about media recovery. (10)

(Or)

- 10 Explain the following terms. (4*5=20)
(i) Database Security
(ii) Discretionary Access Control
(iii) WAL Protocol
(iv) Fuzzy Checkpoint.

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL

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M.C.A III Semester Final Examinations, January - 2016

Subject : Software Engineering

Exam Time : 3 hrs

Sub. Code : MCA 11301

Max. Marks : 100

Answer the following Questions:

(5*20=100M)

UNIT-I

1. (a) Explain about the software quality attributes? (8M)
(b) Describe in detail about waterfall model? (12M)
- (Or)
2. (a) Write short notes on XP & agile processes ? (10M)
(b) Describe about Rational unified process? (10M)

UNIT-II

3. (a) Explain about the components of an SRS? (8M)
(b) Write short notes on DFD? (12M)
- (Or)
4. (a) Give a brief explanation of different architectural styles? (12M)
(b) Explain the role of software architecture? (8M)

UNIT-III

5. (a) Explain about Top-down estimation approach? (12M)
(b) Write about the major risk items and risk management Techniques? (8M)
- (Or)
6. (a) What is coupling ? Explain different types of coupling that exist between modules? (10M)
(b) Explain about function – oriented design with structure charts? (10M)

UNIT-IV

7. (a) Describe about unit-testing? (10M)
(b) Explain incremental coding with the help of a flow chart? (10M)
- (Or)
8. (a) Differentiate between white – box & black – box testing ? (12M)
(b) Define the terms error, fault & failure? (8M)

UNIT-V

9. (a) Write short notes on reverse engineering? (12M)
(b) Explain about software maintenance? (8M)
- (Or)
10. (a) Describe the SPI process? (8M)
(b) Write short notes on CMMI frame work? (12M)

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL
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MCA (III semester) Supply Examination, July 2016

Subject : DAA
Code : MCA 11303

Exam Time : 3hrs
Max. Marks : 100

Answer the following questions

5×20=100M

UNIT-I

1. (a) Write the non-recursive algorithm for finding the Fibonacci sequence and derive its Time Complexity 10
(b) Define Time complexity. Describe different notations used to represent their complexities? 10

OR

2. (a) Define Tree. Explain Spanning Tree with an Example. 10
(b) What is stack? Explain Stack concept with an Algorithm and example. 10

UNIT-II

3. (a) Define Quick sort. Analyze the Average case time complexity of quick sort with an example? 10
(b) Define Binary Search Tree. Write deletion algorithm of Binary Search Tree. 10

OR

4. (a) Write Prim's algorithm and also analyze its time complexity. 10
(b) Write an algorithm to solve Knapsack problem using Greedy method. 10

UNIT-III

5. (a) Discuss Dynamic programming solutions for the problems of reliability design. 10
(b) Write an algorithm for All Pairs Shortest Path problem 10

OR

6. (a) Write an Algorithm to find Bi connected components. 10
(b) Define Graph? Explain various techniques for Graphs. 10

UNIT-IV

7. (a) Write a backtracking algorithm for 8-queens problem. 10
(b) Explain the applications of backtracking. 10

OR

8. (a) Explain general method of Branch and Bound? 10
(b) Write an algorithm for LC Branch and Bound solution for 0/1 knapsack problem. 10

UNIT-V

9. (a) Differentiate between NP-Complete and NP-hard 10
(b) State and Explain Cook's Theorem. 10

OR

10. (a) Define NP Hard. Explain NP Hard code generation. 10
(b) What is non-deterministic algorithm? Give Example 10

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL
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MCA (III semester) Supply Examination, July 2016

Subject : Operating System
Code : MCA 11304

Exam Time : 3hrs
Max. Marks : 100

Answer the following questions

5×20M=100M

UNIT-I

1. (a) Define operating System? Explain briefly the Strategies of operating system? 10
(b) Define Thread? What are Benefits of threads and explain briefly multithread programming? 10

OR

2. (a) Explain in Detail FCFS Scheduling Algorithm with an example? Calculate the Average Turnaround time and Average Waiting time for following Example? 12

Process	Arrival time	Burst time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

- (b) Define Scheduling Criteria? And Explain Scheduling Criteria? 8

UNIT-II

3. Write a Short note on 20
(1) Paging (2) Segmentation (3) Swapping (4) Structure of page table (5) Demand Paging

OR

4. (a) Define Access Method? Different types of access method? 10
(b) What is Directory structure? Explain Different Types of Directory structures? 10

UNIT-III

5. (a) Define Semaphores? Give the solution for readers/ writers problem using Semaphore? 10
(b) Define Monitors? Explain Characteristics of a monitor and features and Drawbacks of Monitors? 10

OR

6. (a) Define Deadlock? What are necessary conditions need for Dead lock? 10
(b) What is the protection Domain? Explain the goals of protection system? 10

UNIT-IV

7. (a) What is disk structure? 20
Write short note on (1) SSTF (2) FCFS (3) SCAN (4) c-SCAN (5) LOCK
8. Define Kernel I? Explain briefly Kernel I/O Subsystem? 20

UNIT-V

9. (a) Define inter process communication? Explain briefly inter process communications? 10
(b) What is Security? Write short note on 10
(1) Trojan Horse (2) Worm (3) Virus (4) Authentication
10. (a) Explain Design Principles of windows XP? 10
(b) Explain System Components? 10

LOYOLA ACADEMY DEGREE & PG COLLEGE, OLD ALWAL

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MCA (III semester) Prefinal Examination, November- 2016

Subject : Operations Research

Exam Time: 3 hrs

Sub Code : MCA 11305

Max. Marks: 80

Answer the following Questions:

(5*16=80M)

UNIT-I

1. a) Define (i) Alternate optimum solution (4M)

(ii) Unbounded solution

b) Solve using simplex method (12M)

$$\text{Max } z = 3x + 2y$$

STC

$$2x + y \leq 40$$

$$x + y \leq 24$$

$$2x + 3y \leq 60$$

$$x, y \geq 0.$$

(Or)

2. a) Define degeneracy in simplex method and give steps to resolve it. (4M)

b) Using Big-M method solve (12M)

$$\text{Min } z = 5x + 3y$$

STC

$$2x + 4y \leq 12$$

$$2x + 2y = 10$$

$$5x + 2y \geq 10$$

NNC

$$x, y \geq 0.$$

UNIT-II

3. a) Difference between transportation & transshipment problems. (3M)

b) Find the optimal transportation cost, such that the total cost is minimized (13M)

		Destination					Supply
		A1	B1	C1	D1	E1	
Origin	A	2	11	10	3	7	4 8 9
	B	1	4	7	2	1	
	C	3	9	4	8	12	
Demand		3	3	4	5	6	

(Or)

(P.T.O.)

(16M)

4. Find optimal shipping plan such that the total cost is minimized

	S1	S2	D1	D2	D3
S1	0	3	12	4	12
S2	5	0	3	6	10
D1	8	10	0	4	20
D2	20	12	5	0	15
D3	8	10	30	8	0

Supply Values for S1, S2 sources re 800 & 700 respectively . Demand values for destinations D₁, D₂, D₃ are 500, 400, 600 respectively.

UNIT-III

5. Solve the following Assignment problem.

(16M)

	A	B	C	D	E
1	7	5	9	8	11
2	9	12	7	11	10
3	8	5	4	6	9
4	7	3	6	9	5
5	4	6	7	5	11

(Or)

6. Solve the following IPP using Gomorian cutting plane algorithm

(16M)

$$\text{Max } z = 10x_1 + 20x_2$$

STC

$$6x_1 + 8x_2 \leq 48$$

$$x_1 + 3x_2 \leq 12$$

NNC

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

UNIT-IV

7. a) Explain dynamic programming? (4M)
 b) Using dynamic programming solve the following LPP? (12M)

$$\begin{aligned} \text{Max } z &= x+9y \\ \text{STC} \\ 2x+y &\leq 25 \\ y &\leq 11 \\ x,y &\geq 0 \end{aligned}$$

(Or)

8. a) Write difference between PERT & CPM. (4M)
 b) Construct the network and determine the critical path for the following data (12M)

Activity	A	B	C	D	E	F	G	H	I
Pre Activity	-	-	B,D	A	A	C	F	C	G,E
Durations	8	6	3	4	2	7	3	2	4

UNIT-V

9. a) Define: i) Value of the game ii) Dominance property (4M)
 b) Solve 3x5 game using Dominance property (12M)

		Player B				
		1	2	3	4	5
Player A	1	2	5	10	7	2
	2	3	3	6	6	4
	3	4	4	8	12	1

(Or)

10. Solve using graphical method find optimal strategies & value of the game. (16M)

	1	2	3	4	5
1	3	0	6	-1	7
2	-1	5	-2	2	1