

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE  
(UGC-AUTONOMOUS)

Direct 2<sup>nd</sup> Year MCA- I Year I Semester (R14) Supplementary  
End Semester Examinations Aug- 2015

ADVANCED DATABASE MANAGEMENT SYSTEM

Time: 3Hrs

Max Marks: 60

- Attempt all the questions.
- In Q.no 1 to 5 answer either I or II only.

1(I)	a. What is referential integrity? How to preserve the referential integrity when database modified?	6M +
	b. Explain the basic cursor definition and usage	6M
<b>OR</b>		
1(II)	a. Explain about structure of relational database	6M +
	b. i. Explain Embedded SQL	6M
	ii. What is Dynamic SQL	
2(I)	a. What is long-duration transaction? Write the key properties of it	6M +
	b. Explain about lock based concurrency controls	6M
<b>OR</b>		
2(II)	a. What are the Transaction-Processing monitors? Explain TP-Monitor architecture	6M +
	b. Explain about time stamp based concurrency controls	6M
3(I)	a. How to create the values of complex type	6M +
	b. Explain the structure of XML.	6M
<b>OR</b>		
3(II)	a. Write about structure and collection types	6M +
	b. Explain about XML document schema	6M
4(I)	a. Write the database security issues	6M +
	b. Write a short note on explicit locking	6M
<b>OR</b>		
4(II)	a. How granting and revoking of privilege control discretionary access in database system?	6M +
	b. Write a short note on implicit locking	6M
5(I)	a. Write the theoretical foundations of deductive database management.	6M +
	b. Explain Native XML database (NXD).	6M
<b>OR</b>		
5(II)	a. Write about temporal database management	6M +
	b. Write SOAP XML related specifications	6M

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DESIGN AND ANALYSIS OF ALGORITHMS

Time: 3Hrs

Max Marks: 60

- Attempt all the questions.
- In Q.no 1 to 5 answer either I or II only.

- Q.1(I) a) Define the asymptotic notations big-oh, big-omega and theta. Give an example for each of the notations. (6+6)  
b) Let  $f_1(n)=O(g_1(n))$  and  $f_2(n)=O(g_2(n))$ . Use the definitions of asymptotic notations to show that:  $f_1(n)+f_2(n)=O(\max\{g_1(n), g_2(n)\})$ .

OR

- Q.1(II) a) Let h be the height of a max (binary) heap T. What are the minimum and the maximum number of elements T contains? (4+8)  
b) Briefly explain UNION - FIND data structure.

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- Q.2(I) What is Minimum Spanning Tree (MST) of a graph? Explain Kruskal's algorithm for finding an MST of an undirected and weighted graph with suitable example. 12M  
What is the running time of Kruskal's algorithm?

OR

- Q.2(II) Devise a divide and conquer algorithm for determining the minimum and maximum elements of a list. Also analyze the algorithm for correctness as well as time complexity. 12M

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- Q.3(I) a) What is the advantage of dynamic programming method over divide and conquer method. (4+8)  
b) What are connected components of a graph? Give an algorithm to find connected components of a graph.

OR

- Q.3(II) a) Show that the shortest path problem has *optimal substructure* property. (4+8)  
b) Give dynamic programming solution to solve all pairs shortest path problem.

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- Q.4(I) Define *n-queens* problem. Give backtracking algorithm for solving n-queens problem and show the solution for 8-queens problem. 12M

OR

- Q.4(II) Write short notes on the following: (6+6)  
a) Branch and bound method  
b) Lower bound theory

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- Q.5(I) a) State Cook's theorem. (3+9)  
b) What is *polynomial time reduction*? Distinguish between NP-Hard and NP-complete problems. Give an example for problem, which is NP-hard but not NP-complete.

OR

- Q.5(II) Define Node Cover Decision Problem (NCDP). Show that NCDP is NP-complete by reducing it from Clique Decision Problem. 12M

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PROGRAMMING TO PYTHON

Time: 3Hrs

Max Marks: 60

- Attempt all the questions.
- In Q.no 1 to 5 answer either I or II only.

Q.1(I) a) Compare the top down and bottom up approaches of problem solving techniques. 6M+  
6M  
b) Solve for X in the following examples: i)  $1234_{10}=2322_X$  ii)  $4CD5_{16}=X_8$   
iii)  $3405_6=X_3$

OR

Q.1(II) a) Draw a flowchart for reading an array of numbers and then sorting and printing the numbers. 6M+  
6M  
b) Solve for X in the following examples: i)  $1234_{16}=X_2$  ii)  $4CD5_{16}=X_8$  iii)  $3405_8=X_4$

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Q.2(I) a) Write a function slope(x1, y1, x2, y2) in Python that returns the slope of the line through the points (x1,y1) and (x2, y2). 6M+  
6M  
b) Write a function num\_digits(n) in Python that returns the number of digits in n.

OR

Q.2(II) a) Write a function, is\_prime, which takes a single integer argument and returns **True** when the argument is a prime number and **False** otherwise. 6M+  
6M  
b) Write briefly on String operations and control structures in Python.

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Q.3(I) Write in detail on Strings, Dictionaries, Lists and Tuples. 12M

OR

Q.3(II) a) Write a function that removes all occurrences of a string from another string. 6M+  
6M  
b) Write a Python program to reverse copy a file onto another file by copying the first byte to the last and the last to the first.

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Q.4(I) Write a Python program to implement a simple calculator. 12M

OR

Q.4(II) Write in detail on event handling, key and mouse events with an example Python program. 12M

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Q.5(I) Write a Python class to implement a stack using Python lists. 12M

OR

Q.5(II) Write a Python class to implement a priority queue using Python lists. 12M

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