MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
MCA I Year II Semester (R14) Regular& Supplementary End Semester Examinations –May/June 2016
(Regulations: R14)

DATABASE MANAGEMENT SYSTEMS

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 1 to 5 answer either Part-A or B only

Q.1(A)	Describe advantages of database system over file system.	12M
	OR	
Q.1(B)	What is ER diagram? Describe ER design for hospital system with neat diagram.	12M
Q.2(A)	Describe logical database design.	12M
	OR	
Q.2(B)	Describe selection and projection operations with suitable examples.	12M
Q.3(A)	What is Schema? Describe schema refinement in database design.	12M
	OR	
Q.3(B)	Describe functional dependency and multi valued dependency.	12M
Q.4(A)	Describe concurrent execution of transactions.	12M
	OR	
Q.4(B)	i)Define recoverability & crash recovery. ii)Describe ARIES recovery algorithm.	12M
Q.5(A)	What are character functions in SQL? Write their syntax and examples.	12M
	OR	
Q.5(B)	What is trigger? Explain triggers in PL/SQL.	12M

*** END***

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DATA STRUCTURES THROUGH C++

Time: 3Hrs
Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part-A or B only

Q.1(A)	What is (i) Function Overloading.	12M
	(ii) Operator Overloading and explain with example.	
	OR	
Q.1(B)	What is Exception? and explain Exception Handling mechanism with Example.	12M
Q.2(A)	What is ADT? Write an ADT for varying length string.	12M
	OR	
Q.2(B)	What is Inheritance? Explain Types of Inheritance.	12M
Q.3(A)	What is Stack? Explain their Primitive operations on stacks.	12M
	OR	
Q.3(B)	Explain Array implementation of a Priority Queue with Example.	12M
Q.4(A)	Implement the Operations like (i) Insertion (ii) Deletion (iii) Searching on Linked List.	12M
	OR	
Q.4(B)	Explain Doubly Linked List and Applications of Linked List.	12M
Q.5(A)	Explain Bubble sort and Quick sort with examples.	12M
	OR	
Q.5(B)	Define AVL Tree and Perform operations on AVL Tree with Example.	12M

*** END***

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DISCRETE MATHEMATICS

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part-A or B only

Q.1(A) i) Show that $(p \to q) \to (r \to s)$ and $(p \to r) \to (q \to s)$ are not logically   12M
equivalent.
ii) Obtain the principal disjunctive normal form of $\neg P \vee Q$.

OR

Q.1(B) i) State the converse, contrapositive, and inverse of each of these conditional   12M
statements.
a) If it snows today, I will ski tomorrow.
b) A positive integer is a prime only if it has no divisors other than 1 and itself.
ii) Prove that $\sqrt{2}$ is irrational by giving a proof by contradiction.

Q.2(A) i) Find the octal expansion of $(12345)_{10}$.   12M

ii) Find the decimal expansion of the number with hexadecimal expansion
$(2AE0B)_{16}$

OR

Q.2(B) Using mathematical Induction, Prove that $(n^2 + n)$ is divisible by 2 whenever n is a   12M
positive integer

Q.3(A) i) State and prove the pigeonhole principle.   12M

ii) Find the coefficient of $x^5 y^8$ in $(x+y)^{13}$

iii) Find is the solution of the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$ with $a_0 = 2$ and
$a_1 = 7$?

OR

Q.3(B)   12M

State	f		g	
	Input		Input	
	0	1	0	1
S_0	S_1	S_3	1	0
S_1	S_1	S_2	1	1
S_2	S_3	S_4	0	0
S_3	S_1	S_0	0	0
S_4	S_3	S_4	0	0

Construct the state diagram for the finite-state machine with the following state
table

Q.4(A)   Define Connected graph, directed graph, isomorphic simple graphs, Hamilton path,   12M
graph coloring and chromatic number with examples

OR

Q.4(B)   Determine the number of vertices and edges and find the in-degree and out-   12M
degree of each vertex for the given directed multigraph
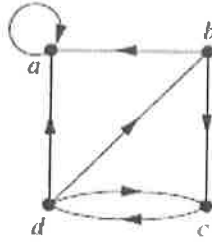
Q.5(A)   Find the solution to the recurrence relation $a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$ with the   12M
initial conditions $a_0 = 2$, $a_1 = 5$ and $a_2 = 15$.

OR

Q.5(B)   i) Find all solutions of nonhomogeneous linear recurrence relation $a_n = 3a_{n-1} + 2n$.   12M
ii) Use generating functions to solve the recurrence relation $a_k = 5a_{k-1} - 6a_k - 2$
with initial conditions $a_0 = 6$ and $a_1 = 30$.

*** END***

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OPERATING SYSTEMS

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **In Q.no 1 to 5 answer either Part-A or B only**

Q.1(A)	(i)What is an operating system? Explain the major functionalities of operating system?	6M
	(ii)Explain about multiprogrammed systems?	6M
	OR	
Q.1(B)	What is a system call? In detail explain various types of system calls?	12M
Q.2(A)	Explain the structure of UNIX operating system? Define various UNIX commands?	12M
	OR	
Q.2(B)	Explain the directory structure of LINUX? Write a script to print the file?	12M
Q.3(A)	Explain the structure of BASH Shell? Write about debugging shell script?	12M
	OR	
Q.3(B)	i. Write about the controls structures of BASH Shell?	6M
	Ii.Explain the functions of BASH Shell?	6M
Q.4(A)	What is paging? Explain page table with examples?	12M
	OR	
Q.4(B)	What is a Deadlock? Explain the process of Deadlock Recovery process?	12M
Q.5(A)	What is segmentation? Explain the process of segmentation?	12M
	OR	
Q.5(B)	i. Explain any two page replacement algorithms?	6M
	Ii.What is thrashing? Explain In detail?	6M

*** END***