MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA I Year II Semester (R16) Regular & Supplementary End Semester Examinations – June2018

(Regulations: R16)

DATA BASE MANAGEMENT SYSTEMS

Time: 3Hrs   Max Marks: 50

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 DBMS? Explain the complete architecture of DBMS.   10M

OR

Q.1(B)   i. Define Instance, schema, Entity.   10M
             ii. Write various types of users.

Q.2(A)   Explain the fundamental operations of Relational Algebra with an example.   10M

OR

Q.2(B)   Explain various types of commands in DBMS, With Example.   10M

Q.3(A)   Write the notes on the following.   10M
             i. Functional dependency.
             ii. Multi valued dependency

OR

Q.3(B)   i. What is Join dependency?   10M
         ii. Explain 4NF with example.

Q.4(A)   What is mean by concurrency control? Explain about Lock based concurrency control   10M
         mechanism.

OR

Q.4(B)   Write about ACID properties of a transaction   10M

Q.5(A)   i. What is a cursor?   10M
         ii. Explain the cursors in PL/SQL with example.

OR

Q.5(B)   Write about character functions in SQL with example.   10M

*** END***

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DATA STRUCTURES THROUGH C++

Time: 3Hrs   Max Marks: 50

> 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 a constructor? Write the syntax of declaring the constructor? ii. What are the special characteristics of constructor function?	10M
	OR	
Q.1(B)	i. What are the different unformatted I/O operations? Explain. ii. Differentiate between dynamic binding and message passing.	10M
Q.2(A)	What is a operator member function. Write the syntax of private member function	10M
	OR	
Q.2(B)	i. Differentiate between multilevel inheritance and multiple inheritances with an example. ii. Differentiate between hierarchical inheritance and hybrid inheritance with an example	10M
Q.3(A)	i. Efficiently implement a stack class using a singly linked list, with no header or tail nodes. ii. What are the applications of stack? Explain.	10M
	OR	
Q.3(B)	Write a C++ Program to count the number of elements present in a Single linked list?	10M
Q.4(A)	i. What is a circularly linked list? Explain with a diagram. ii. Write an algorithm for reversing a doubly linked list.	10M
	OR	
Q.4(B)	How to implement queue using stack. Explain with example and neat diagram.	10M
Q.5(A)	Explain the algorithm for QUICK sort (partition exchange sort) and give a suitable example.	10M
	OR	
Q.5(B)	How can we make an unbalanced tree as a balanced one? Explain various rotations that are involved in it. Give examples for each rotation.	10M

*** END***

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OPERATING SYSTEMS

Time: 3Hrs   Max Marks: 50

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 System call? Explain about the roles of System calls in OS.   10M

OR

Q.1(B)   Explain the following:
  i.   Operating system services   5M
  ii. Operating system objectives and functions   5M

Q.2(A)   Explain the process utilities in Unix environment   10M

OR

Q.2(B)   Explain the following in UNIX:
  i.   Input redirection   5M
  ii. Output redirection   5M

Q.3(A)   Explain the following in UNIX:
  i.   File handling utilities   5M
  ii. Security by file permissions   5M

OR

Q.3(B)   Explain the technique of Pipes and filters in UNIX.   10M

Q.4(A)   Explain the control structures in UNIX.   10M

OR

Q.4(B)   Explain briefly about scheduling algorithms.   10M

Q.5(A)   Explain about segmentation and paging with an example.   10M

OR

Q.5(B)   What is disk scheduling? Explain various disk scheduling algorithms with an example.   10M

*** END***

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DISCRETE MATHEMATICS
Time: 3Hrs   Max Marks: 50

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). Let "p: A circle is conic", "q: $\sqrt{5}$ is an irrational number" and "r : Exponential   3M
series is convergent" . Express the following compound proposition
$\neg p \leftrightarrow \{q \wedge (\neg r)\}$ in words.

(ii). Using the laws of logic, prove the following sequences
$(p \rightarrow q) \wedge \{\neg q \wedge (r \vee \neg q)\} \Leftrightarrow \neg(q \vee p)$ 7M

OR

Q.1(B) (i). Consider the following argument: 7M
I will get grade A in this course or I will not graduate. If I do not graduate, I
will join the army. I got grade A. Therefore, I will not join army. Is this a valid
argument?

(ii). State and prove De-Morgan's' law.   3M

Q.2(A) (i). Use Mathematical Induction to show that $1 + 2 + 2^2 + ... + 2^n = 2^{n+1} - 1$ for all   5M
Non-negative integer n.

(ii). Give a recursive algorithm to find power of a number.   5M

OR

Q.2(B) (i). Find the decimal expansion of the number with hexadecimal expansion $(2AE0B)_{16}$.   4M

(ii). Express gcd (252,198) =18 as a linear combination of 252 and 198.   6M
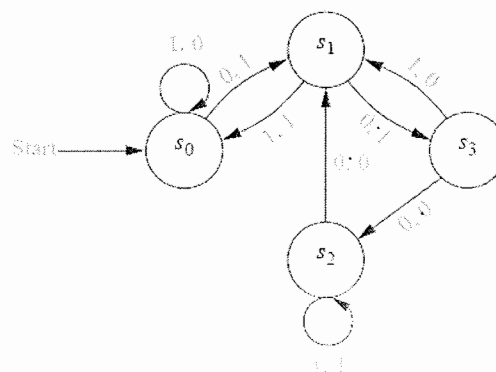
Q.3(A) (i). Find the coefficient of $x^9 y^3$ in the expansion $(2x - 3y)^{12}$.   6M

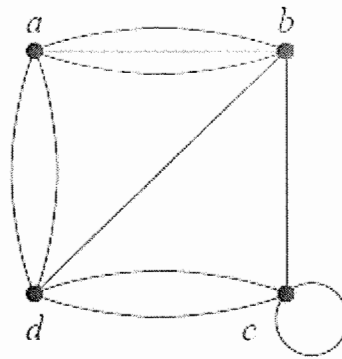(ii). Find the sequence generated by the following function $(1 + 3x)^{-1/3}$.   4M

OR

Q.3(B) (i). Find the composition of R and S where $R = \{(1,1),(1,4),(2,3),(3,1),(3,4)\}$ and   5M
$S = \{(1,0),(2,0),(3,1),(3,2),(4,1)\}$. Also find its respective Matrices.
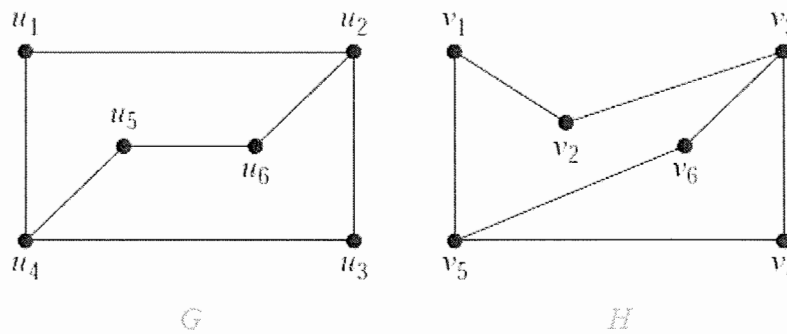
(ii). Construct a state table for the finite-state machine with the state diagram.   5M

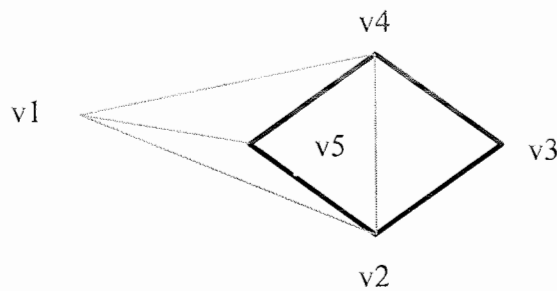Q.4(A)   (i). Define adjacency matrix and draw the same for the following graph.   5M

(ii). Check whether the following graphs are isomorphic.   5M

OR

Q.4(B)   (i). What is chromatic number? Find the chromatic number of the graph.   5M

                                                                                          5M
(ii). Define Euler and Hamiltonian paths with examples.

Q.5(A)   Using generating functions, solve the recurrence relation   10M

$$a_n - 3a_{n-1} = n^2, n \geq 1 \ where \ a_0 = 1.$$

OR

Q.5(B)   Solve the recurrence relation $F_n = 5F_{n-1} - 6F_{n-2}$, $F_0 = 1$ and $F_1 = 4$ using characteristic   10M
root method.

*** END***