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M TECH

(SEM I) THEORY EXAMINATION 2017-18

FOUNDATION OF COMPUTER SCIENCE

Time: 3 Hours ***Total Marks: 70***

Notes: *Attempt all Sections. Assume any missing data.*

SECTION-A

1. Attempt all the parts. (7x2 =14)

a. What is overflow condition in Queue? Write overflow condition in circular queue.

b. Give recursive solution to the Tower of Hanoi problem.

c. Define the term ACID properties.

d. What do you mean by DDL and DML?

e. Design the DFA that accepts an even number of a's and even number of b's.

f. Differentiate between External and Internal Fragmentation.

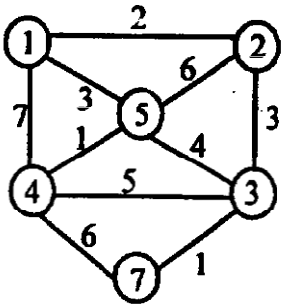
g. What is Critical Section?

SECTION-B

2. Attempt 5 parts. (5x7 = 35)

a. Show step by step procedure for sorting the following elements using MERGE SORT.
30, 12, 38,8,5,15,1,40,42

b. Use Prims algorithm to find the minimum spanning tree for the following graph:



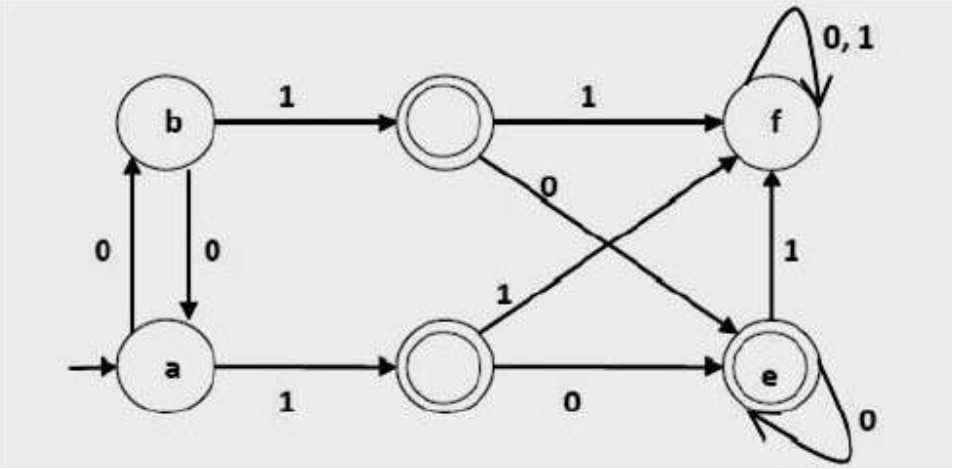
c. What is serializability? Explain view and conflict serializability.

d. Construct an ER Diagram for hospital with a set of patients and set of medical doctors.Associate with each patient a log of various tests examinations conducted.

e. Minimize the automata given below:

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f. Explain Chomsky Hierarchy of Languages. Design a CFG for the following language
L= $\{a^m b^n \mid m \neq n\}$

g. Explain the concept of Paging. On a simple paged system associative registers hold the most active page entries and the full page table is stored in the main memory. If references satisfied by the associative registers take 100ns and reference through the main memory page table takes 250ns, what is the effective access time if 60% of all the memory references find their entries in the associative registers.

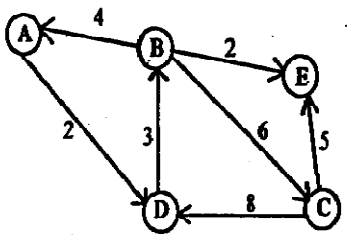
h. Explain Demand paging with advantages and disadvantages. What do you understand by pure demand paging?

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SECTION-C

Attempt any two questions: **(2x10.5 = 21)**

Q3. a. Write Warshall's algorithm for all pair shortest path and find all pair shortest path for the following graph



b. Write C function to insert element after a specific node in doubly linked list.

Q4. Consider the following schema for the student database of the institute:

Teacher (TeacherID, TName, Department)
Student (RollNo, SName, Branch)
Teaches (TeacherID, RollNo, Subject)

Write the following queries in SQL:

i. Write SQL statements to create the above database.
ii. Insert one record in each table. Data can suitably be assumed.
iii. List the names and the branch of the students registered for the subject 'DBMS'.
iv. List the name of the teachers and their concerned departments who are offering either 'DBMS' or 'Operating System'.
v. List the name of the students who are taught by the teachers of the 'CSE' Department.

Q5. Consider the set processes given in the table and following scheduling algorithm

i. Round Robin (Quantum=1)
ii. Round Robin (Quantum=2)
iii. Shortest Remaining Job First

P_id	Arrival Time	Execution Time
A	0	4
B	2	7
C	3	3
D	3.5	3
E	4	5

If there is a tie within processes and tie is broken in the favor of oldest process. Draw the Gantt chart and find average waiting time, response time and turnaround time for algorithms .Comment on your result which is better and why?

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