Name of the Examinations: B.E. PRINTING ENGINEERING THIRD YEAR FIRST
SEMESTER - 2019

Subject : DATABASE MANAGEMENT SYSTEM

Time: Three hours

Full Marks: 100

Group A

(Answer all questions from this group)

1. Choose the correct option: 10×1=10

   a. Consider the relation scheme R = {E, F, G, H, I, J, K, L, M, M} and the
   set of functional dependencies {{E, F} -> {G}, {F} -> {I, J}, {E, H} -> {K,
   L}, K -> {M}, L -> {N} on R. What is the key for R?
   A. {E, F}
   B. {E, F, H}
   C. {E, F, H, K, L}
   D. {E}

   b. Question: In a schema with attributes A, B, C, D and E following set of
   functional dependencies are given
   {A -> B, A -> C, CD -> E, B -> D, E -> A}
   Which of the following functional dependencies is NOT implied by the
   above set?
   A. CD -> AC
   B. BD -> CD
   C. BC -> CD
   D. AC -> BC

   c. Consider a relation scheme R = (A, B, C, D, E, H) on which the following
   functional dependencies hold: {A->B, BC-> D, E->C, D->A}. What are
   the candidate keys of R?
   A. AE, BE
   B. AE, BE, DE
   C. AEH, BEH, BCH
   D. AEH, BEH, DEH

   d. A table has fields F1, F2, F3, F4, F5 with the following functional
   dependencies
   F1 → F3   F2→ F4   (F1 . F2) → F5
   In terms of Normalization, this table is in.
   A.1 NF
   B. 2 NF
   C. 3 NF
   D. none

e. Consider the following schedule for transactions T1, T2 and T3: Which one of the schedules below is the correct serialization of the above?

T1	T2	T3
Read (X)		
	Read (Y)	
		Read (Y)
	Write (Y)	
Write (X)		
		Write (X)
	Read (X)	
	Write (X)	

   A. T1->>T3->>T2
   B. T2->>T1->>T3
   C. T2->>T3->>T1
   D. T3->>T1->>T2

f. What is the output of following program?

```
# include <stdio.h>
void fun(int x)
{
    x = 30;
}

int main()
{
    int y = 20;
    fun(y);
    printf("%d", y);
    return 0;
}
```

   A. 30
   B. 20
   C. Compiler error
   D. Runtime error

g. Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?
A. Deleting a node whose location in given
B. Searching of an unsorted list for a given item
C. Inverting a node after the node with given location
D. Traversing a list to process each node

h. Which of the following applications may use a stack?
A. A parentheses balancing program
B. Tracking of local variables at run time
C. Compiler Syntax Analyzer
D. All of the mentioned

i. How many stacks are needed to implement a queue. Consider the situation where no other data structure like arrays, linked list is available to you.
   A. 1
   B. 2
   C. 3
   D. 4

j. Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
   A. 7 5 1 0 3 2 4 6 8 9
   B. 0 2 4 3 1 6 5 9 8 7
   C. 0 1 2 3 4 5 6 7 8 9
   D. 9 8 6 4 2 3 0 1 5 7

2. Write down the Master's theorem and describe with examples how we can derive the complexities using Master's theorem.   10

Group B

Answer any two questions

3.   (3+7)+10=20

a. Consider the following relation for published books :
   Book (Book_title, Author_name, Book_type,
   Listprice, Author_affil, Publisher)
   Author_affil refers to the affiliation of the
   author. Suppose the following
   dependencies exist :
   Book_title —> Publisher, Book_type
   Book_type —> Listprice
   Author_name --> Author_affil
         (i) What Normal Form is the above relation in ? Justify.
         (ii) Normalize the above relation till 3NF.

b. Consider the following Tables :

   Works (Pname, Cname, salary)
   LIVES (Pname, street, city)
   LOCATED (Cname, city)
   MANAGER (Pname, Mname)

   Write queries in SQL for the following
   (i) List the names of the people who work for the company Wipro along with the cities they live in.
   (ii) Find the people who work for the company 'Infosys' having salary greater than Rs 50000/-
   (iii) List the names of the people, along with the street and city addresses.
   (iv) Find the persons whose salaries are more than that of all of the 'Oracle employees.
   (v) And the name of the persons who do not work in 'Infosys'.

8. What is a directed graph? What is a weighted graph? What is a sub graph? Define spanning tree of a graph. What is minimum spanning tree. Find the minimum spanning tree of the graph given below using Kruskal's algorithm. Calculate the minimum cost. Show the intermediate steps also.   2+2+2+3+2+8+1=20