Data management & warehousing
MPBA G506
Total marks : 140
Time : 2:00 pm - 5:00 pm
Attempt all 13 questions

Instructions:
- Question number 1 to 12 are short answer type questions for which the word limit is 10, only write the answer not the steps required to reach the solution. There are no marks for writing the process only. Maximum marks for each question is 10.
- Question no. 13 is descriptive for which the maximum marks is 20.

1. R_1(A,B,C,D,E,F,G,H,I,J)
   F.D. = {A → B, B → C, C → D, D → E, E → F, F → G, G → H, H → I, I → J, J → A}
   Write the normal form for relation R1

2. R_2(P,R,A,T,E,W,N,C)
   F.D. = {P → A, R → T, E → N, W → C}
   Write the normal form for Relation R2

3. R_3(W,I,F,R,T,P)
   F.D. = {W → P, F → R, T → I}
   Write the normal form for relation R3

4. R_4(A,B,C,D,H,I,J)
   F.D. = {A → BC, CD → E, GH → IJ}
   Write the normal form for relation R4

5. $R_5(K,J,R,Z,X)$

   F.D. = $\{K \rightarrow JR, X \rightarrow K, J \rightarrow Z, RZ \rightarrow X\}$

   Write the normal form for relation R5

6. $R_6(L,T,Z,P)$

   F.D. = $\{L \rightarrow T, T \rightarrow Z, P \rightarrow L, Z \rightarrow P\}$

   Write the normal form for relation R6

7. $R_7(P,Q,R,S)$

   F.D = $\{R \rightarrow P, Q \rightarrow R, P \rightarrow Q\}$

   Write the normal form for relation R7

8. $R_8(R,B,C,Z,N)$

   F.D = $\{BN \rightarrow R, RBC \rightarrow ZN\}$

   Write the normal form for relation R8

9. $R_9(Z,T,Y,E)$

   F.D = $\{ZE \rightarrow T, T \rightarrow Y\}$

   Write the normal form for relation R9

10. $R_{10}(Z,Y,X,T,P,Q,R,S,U,W,V,N)$

    F.D = $\{X \rightarrow T, Z \rightarrow P, Z \rightarrow Y, W \rightarrow U, Q \rightarrow Z, ZP \rightarrow T, P \rightarrow YT, S \rightarrow R, V \rightarrow N, N \rightarrow V, W \rightarrow U, P \rightarrow XY, U \rightarrow W, N \rightarrow V, P \rightarrow Y, Q \rightarrow SY, Q \rightarrow YX\}$

    Write the number of functional dependencies in the minimal cover and write these functional dependencies.

11. In the customers table there are following entries

| Customers |
|---|
| nipun |
| Rajesh |
| niranjan |
| Prateek |
| ramesh |
| Dheeraj |
| neeraj |

Write the output of following SQL queries

```
SELECT count(name) FROM Customers WHERE name LIKE '%ra%';
SELECT count(name) FROM Customers WHERE name LIKE 'ra%';
SELECT count(name) FROM Customers WHERE name LIKE '%ra';
SELECT count(name) FROM Customers WHERE name LIKE '_ra_';
SELECT count(name) FROM Customers WHERE name LIKE '%ra_';
```

12. Write True/False as your answers

SELECT * FROM Table1 **AS** R1, Table2 **AS** R2 **WHERE** R1.country <> R2.country **AND** R1.Language_id = R2.Language_id;

1. Above SQL query is an example of Self join
2. Inner join can be used to obtain the tuples which are present in T1 and T2 tables.
3. Cross join between two tables will always add spurious tuples.
4. Write down the purpose of the **'DESC'** keyword in MySQL.
5. **'AS'** keyword is strictly mandatory to use to create an alias of a table for operations like self joins.

13. For the below graph database model calculate following properties
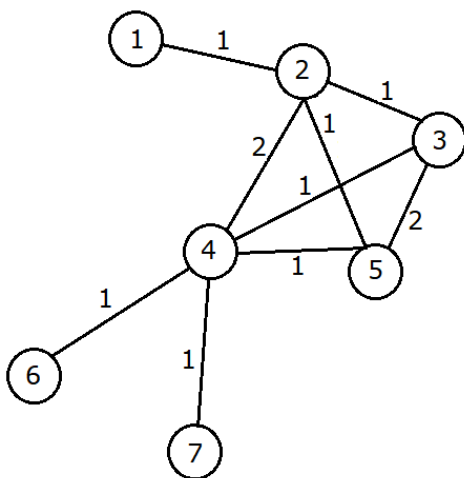
The graph is weighted and undirected.
- Clustering coefficient of each node
- Shortest path between all pairs of nodes
- Closeness centrality of all the nodes
- Betweenness centrality of all the nodes
- Degree centrality of all the nodes