

**Group - E**

8. (a) What is Distributed database? What is the advantage of distributed database over centralized database?  
 (b) You are sending an e-mail to your friend. Explain step by step, with the help of a diagram how your mail will be received by your friend.  
**(2 + 3) + 7 = 12**
9. (a) While we surf the WWW, what roles do DNS server and Proxy server play?  
 (b) Explain, with diagram, step by step, how a Search engine works. Why Google is so special among all the Search engines?  
**(2 + 2) + (6 + 2) = 12**

**DATABASE MANAGEMENT SYSTEM AND COMPUTER NETWORKING  
(CSEN 3205)****Time Allotted : 3 hrs****Full Marks : 70***Figures out of the right margin indicate full marks.**Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.**Candidates are required to give answer in their own words as far as practicable.***Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) The \_\_\_\_\_ layer handles the creation of data frames  
 (a) data link (b) network (c) transport (d) physical.
- (ii) A functional dependency  $X \rightarrow Y$  means that association from the domain of X to domain of Y is  
 (a) many to many (b) one to many  
 (c) many to one (d) one to one.
- (iii) In an ER diagram rectangle represents  
 (a) attribute (b) entity (c) relationship (d) key.
- (iv) If a schedule S can be transformed into a schedule S' by a series of swaps of non-conflicting instructions, we say that S and S' are:  
 (a) Conflict Serializable (b) View equivalent  
 (c) Conflict Equivalent (d) View Serializable.
- (v) Which topology requires a central controller or hub?  
 (a) Mesh (b) Star (c) Bus (d) Ring.
- (vi) A telephone network is an example of \_\_\_\_\_ network  
 (a) Packet Switched (b) Circuit Switched  
 (c) Message Switched (d) None.
- (vii) The overall design of a database is called  
 (a) schema of the database (b) structure of the database  
 (c) the screen of the database (d) view of the database.

- (viii) Relation R = (A, B, C, D) with AB as primary key. Choose one functional dependency such that R should be in 1NF but not in 2NF.
  - (a) AB -> C                      (b) AB -> D                      (c) A -> D                      (d) AB-> CD.
- (ix) If a relation is in 2NF, then it can be in 3NF by removing
  - (a) repeating groups                      (b) partial dependencies
  - (c) transitive dependencies                      (d) overlapping dependencies.
- (x) Flow control is the responsibility of
  - (a) Data Link layer                      (b) Network layer
  - (c) Application layer                      (d) Transport layer.

**Group - B**

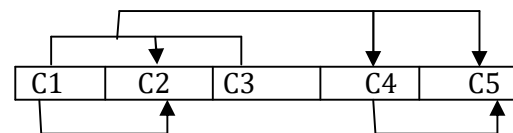
2. (a) The tourism department wishes to computerize its data. The information consists of monuments of tourist interest, their location and history. Monuments are classified according to historical, religious and architectural importance. The list of facilities available at each spot is (i) living accommodation in terms of hotels, their names, category and the number of rooms available and (ii) local transport facilities in terms of service provider name, tours with their tariff and timing. Draw an ER diagram by identifying entities, relationships, attributes, primary keys.
  - (b) Consider the schema:-  
 Airport (code, name, city, country)  
 Flight (number, airline, from\_airport\_code, to\_airport\_code)  
 Reservation(flight\_number, seat\_number, date, passenger\_name)  
 Answer the following using relational algebra  
 (i) All the flight information for Indian Airlines and Jet Airways  
 (ii) List the passenger who are on flight number 'SA 747'  

**8 + (2 + 2) = 12**
3. (a) Site an example of Weak Entity Set and its identifying relationship with a strong entity set by using ER-notation.
  - (b) Consider a relational database as given below:  
 Train (train-no, train\_name, start\_station)  
 Coach(coach-no, train-no, type, price) where the underlined attributes are the primary keys. Write down the expressions in SQL and in relational algebra for the following queries:  
 i) List all the train names starting from station XYZ.  
 ii) List the train number and price of all "3 A/C" (type) coaches with price below ₹ 3025/-.  
 iii) List the price and type of all coaches of "Duranta Express" train.  

**4 + 8 = 12**

**Group - C**

4. (a) Define 3 NF with example. What is the difference between 3 NF and BCNF.
  - (b) Given the dependency diagram shown in the following figure, (the primary key attributes are underlined)



Create a database whose tables are at least in 3NF, showing dependency diagram for each table.

- (c) What is a transaction? Write ACID properties of Transaction.  

**(2 + 2) + 4 + (1 + 3) = 12**
  5. (a) Which of the following schedule is conflict serializable? Explain your answer.  
 For each serializable schedule, determine the equivalent serial schedule.  
 (i) r1(x); r3(x); w1(x); r2(x); w3(x);  
 (ii) r3(x); r2(x); w3(x); r1(x); w1(x);
    - (b) Explain with example what do you understand by insertion data anomaly?
    - (c) "A candidate key is minimal superkey". Explain with example.  

**6 + 3 + 3 = 12**
- Group - D**
6. (a) What are the differences between OSI and TCP/IP model?
    - (b) What is switching? Differentiate between Packet Switching and Circuit switching.  

**5 + (2 + 5) = 12**
  7. (a) Differentiate between Star and Mesh topologies.
    - (b) What are the functions of Session layer in the OSI model?
    - (c) Explain with appropriate diagrams the different modes of data transmission.  

**3 + 4 + 5 = 12**