

**DATA BASE 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 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.
- (ii) The level of data abstraction which describes how the data is actually stored is
 (a) physical level (b) storage level
 (c) conceptual level (d) view level.
- (iii) Which of the following is an application layer service?
 (a) FTP (b) Remote login
 (c) Mail services (d) All of these.
- (iv) A candidate key is
 (a) partial key (b) foreign key
 (c) minimal super key (d) all of these.
- (v) 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.
- (vi) Which of the following is/are network topologies?
 (a) Bus (b) Star
 (c) Both (a) and (b) (d) None of these.
- (vii) The _____ layer handles the creation of data frames.
 (a) data link (b) network
 (c) transport (d) physical.

- (viii) Wait-die scheme for preventing deadlock is a
 (a) pre-emptive scheme based on time-stamp
 (b) non-pre-emptive scheme
 (c) pre-emptive scheme
 (d) non-preemptive scheme based on timestamp.
- (ix) A _____ is a device that forwards packets between networks by processing the routing information included in the packet.
 (a) bridge (b) firewall
 (c) router (d) all of the mentioned.
- (x) TCP and UDP belongs to which layer of OSI model?
 (a) Physical (b) Data link
 (c) Transport (d) Application.

Group - B

2. (a) Discuss the advantage of Database System over File processing system. Explain physical and logical independence with respect to RDBMS.
 (b) What is a composite and derived attribute. Design a generalization, specialization hierarchy for a motor vehicle sales company. The company sales motor cycles, passenger cars, vans, buses. Justify your placement of attributes at each level of hierarchy.
- (3 + 3) + 6 = 12**
3. (a) Explain the Division operation in relational algebra with example.
 (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 New Delhi
 (ii) List the train number and price of all "2 A/C" (type) coaches with price below Rs.5456/-.
 (iii) List the price and type of all coaches of "Purva Express" train.

5 + 7 = 12

Group - C

4. (a) Explain what is deletion and updation data anomaly with proper examples.

- (b) Let us assume a table User_Personal (UserID, U_email, Fname, Lname, City, State, Zip) with following FDs:
 UserID → U_email, Fname, Lname, City, State, Zip
 Zip → City, State
 Is this table in 2NF? Explain.
 Is this table in 3NF? If yes, explain why it is in 3NF. If not, then normalize it to Third Normal Form.

$$(3 + 3) + (2 + 4) = 12$$

5. (a) Explain with examples, The Lost Update problem and Dirty Read problem.
 (b) 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).

$$(3 + 3) + 6 = 12$$

Group - D

6. (a) What are the main functions of Data link, Network and Transport layer of OSI model?
 (b) What are the basic differences between Amplifier and Repeater?
 (c) Compare half duplex and full duplex operation.
7. (a) What is a network topology? Explain briefly Star, Bus and Ring topologies.
 (b) What are the differences between a Bridge and a Router?

$$6 + 3 + 3 = 12$$

$$1 + 6 + 5 = 12$$

Group - E

8. (a) The website address of our college is www.heritageit.edu. Explain briefly each and every component of the web address.
 (b) You are sending an e-mail to your friend over the Internet. Explain step by step, with the help of a diagram how your mail will be received by your friend.

$$3 + 9 = 12$$

9. (a) Name some protocols of Application layer and of transport layer of OSI model.
 (b) Write short notes on
 (i) Telnet and IP.
 (ii) Packet Switching and Circuit switching
 (iii) TCP/IP vs. OSI model

$$3 + (3 + 3 + 3) = 12$$