RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, AUGUST 2021

SECOND YEAR [BATCH 2019-22]

Date : 13/08/2021 **COMPUTER SCIENCE (GENERAL)**

Time : 11.00 am - 1.00 pm **Paper : IV** Full Marks : 50

Group - A

Answer **any one** question of the following : [1×5]

1. Draw an Entity Relationship Diagram of Library Management System.
2. Discuss Relational data Model with their pros and cons.

Answer **any two** questions of the following : [2×10]

3. a) Briefly discuss about Generalization and aggregation in the context of DBMS.

   b) What do you mean by partial key? Discuss different types of mapping cardinality. [(2.5+2.5)+(2+3)]

4. a) Describe data independence in DBMS?

   b) Consider the database scheme given below and answer the queries in relational algebra:

   employee (*person-name, street, city*)

   works (*person-name, company-name, salary*)

   company (*company-name, city*)

   manages (*person-name, manager-name*)

   Write down the following SQL Queries:

   i) Find the company with the smallest payroll.

   ii) Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

   iii) Find the names of all employees who live in the same city and on the same street as do their managers.

   iv) Assume the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located. [2+(4×2)]

5. a) What do you mean by transitivity dependency and multivalued dependency?

   b) Write down the different Armstrong Axioms? [(2.5+2.5)+5]

6. a) Consider the Relation R(PQRSTU) and Functional Dependency set

   $F = \{P \rightarrow Q, Q \rightarrow R, R \rightarrow S, T \rightarrow U\}$ decomposed into

   $D = R_1(PQ), R_2(QRS), R_3(STU)$.

   Find whether D is Lossless or Lossy ?

   b) Let R(XYZW) be a relational schema with the following functional dependencies :

   $F = \{X \rightarrow Y, Y \rightarrow Z, Z \rightarrow W, W \rightarrow Y\}$. The decomposition of R into

   $D = \{XY, YZ, YW\}$

   Check whether the decomposition D is preserving dependency or not? (5+5)

Group - B

Answer **any one** question of the following : [1×5]

7. a) Define point-to-point and multipoint connection.
   b) What do you mean by network reliability?
   c) What are the three criteria necessary for an effective and efficient network? (2+1+2)
8. a) What is the difference between TCP/IP and OSI layered architecture?
   b) Define protocol. (3+2)

Answer **any two** questions of the following : [2×10]

9. a) What is the task of NVT in TELNET?
   b) Which layer in layered architecture of network model encompasses encryption and data compression?
   c) How HTTP related to WWW?
   d) Explain the advantage of DNS over host file in network services.
   e) Briefly explain step-by-step the remote log-in using one application layer service.
   f) What is default mask? (2+1+1.5+1.5+3+1)
10. a) What is the key task of HTTP?
   b) Find the class of IP address 252.5.15.111.
   c) In a block of addresses, we know the IP address of one host is 182.44.82.16/26. What are the first address and last address in this block?
   d) Which networks are required to form virtual circuit network?
   e) "Datagrams networks are sometimes referred to as connectionless network"– Justify it.
   f) What do you mean by "port number"? (1+1+1+3+2+2)

11. a) Explain the architecture of WWW with a suitable diagram.
   b) What are the different types of web documents? State the characteristics each of them.
   c) What is the task of DNS client?
   d) What are the different types of DNS message?
   e) What do you mean by multicast address? (4+3+1+1+1)
12. a) What are the different types of file transfer?
   b) What are the three FTP transmission modes?
   c) What is the function of interfaces between layers in layered architecture?
   d) What do you mean by peer-to-peer process?
   e) State the disadvantages of Bus and Ring topology. (1.5+1.5+2.5+2+2.5)

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