Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RCS5C002

5th Semester Regular/Back Examination: 2023-24
SUBJECT: Database Management Systems
BRANCH(S): CSE,CSEAI,CSEAIME,CSIT,CST,IT
Time: 3 Hour
Max Marks: 100
Q.Code : N343

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What advantages can a DBMS provide when compared to a file system?
b) Find the number of candidate keys from the following FDs.
   (i) R (A, B, C, D) FD = {A → B, B → C, A → C}
   (ii) R (X, Y, Z, W, P) FD = {Y → Z, Z → Y, Z → W, Y → P}
c) In Relational model what do you mean by cardinality?
d) Let F be the following set of functional dependencies:
   {AB → CD, B → DE, C → F, E → G, A → B}.
   Show if the FD: {A → FG} is logically implied by F.
e) A primary key if combined with a foreign key creates what?
f) Explain the following terms associated with relational database design: Primary Key, Secondary key, Foreign Key?
g) What is ACID property?
h) Define Meta data with examples
i) What is nested query? How is it different from a correlated query?
j) List two reasons why we may choose to define a view?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) What do you understand by a data model? Explain the difference between conceptual data model and the internal model.
b) What are the basic operations for a relational language? How are basic operations represented in relational algebra and SQL?
c) Explain the entity integrity and referential integrity constraints. How they are use full in database Design?
d) Define and explain the integrity constraints in DBMS.
e) Does a relation in a 3rd Normal form satisfy the properties of Lossless decomposition and dependency preservation? Explain with an example
f) Given R (ABCDEFGH) with FDs F = {A → C, B → D, E → F, G → H, C → G}. How many number of candidate keys are there? Which normal form R is in?

g) What is the goal of query optimization? Why is optimization important?

h) Why do query optimizers consider only left-deep join trees? Give an example of a query and a plan that would not be considered because of this restriction.

i) What is normalization? Explain the first and second normal forms using appropriate example.

j) During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur.

k) What is an unsafe query? Give an example and explain why it is important to disallow such queries.

l) What is update anomalies? Explain with example.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 a) What is normalization? Explain the first and second normal forms using appropriate example. **(8x2)**

b) Define (i) primary key and (ii) foreign key. Suppose relation R (A, B, C, D, E) has functional dependencies:

AB → C
D → A
AE → B
CD → E
BE → D
Find all the candidate keys of R.

Q4 a) Explain various locking technique for concurrency control. **(8x2)**

b) When a transaction is rolled back under timestamp ordering, it is assigned a new timestamp. Why can it not simply keep its old timestamp?

Q5 What is serializability? Explain conflict serializability and view serializability. **(16)**
Test if the following schedule is conflict serializable or not
R1 (A), R2 (D), W1 (B), R2 (B), W3 (B), R4 (B), W2 (C), R5 (C), W4 (E), R5 (E), W5 (B).

Q6 What is lossy decomposition? Check whether the following decompositions are lossy or Lossless. **(16)**

(i) Let R = ABCD, R1 = AD, R2 = AB, R3 = BE, R4 = CDE, R5 = AE, F = {A → C, B → C, C → D, DE → C, CE → A}

(ii) R (XYZWQ), FD = {X → Z, Y → Z, Z → W, WQ → Z, ZQ → X, R1 (XW), R2 (XY), R3 (YQ), R4 (ZWQ), R5 (XQ)}

Eliminate redundant FDs from.

(i) F = {X → Y, Y → X, Y → Z, Z → Y, X → Z, Z → X}

(ii) F = {X → YZ, ZW → P, P → Z, W → XPQ, XYQ, YW, WQ → YZ}