5th SEMESTER Regular / Back 2022-23
SUBJECT : Database Management Systems
BRANCH(S): CSE,CSEAIME,CSIT,CST,IT,
Time : 3 Hour
Max Marks : 100
Q.Code : L242
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)   In Relational model what do you mean by cardinality?
b)   How can you map a conceptual model to a relational model?
c)   What is the use of DML in DBMS?
d)   List two reasons why we may choose to define a view?
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)   What is Phantom Phenomenon?
i)   What is the possible violation if an application program use isolation level "Repeatable Read"
j)   Which protocol always ensures recoverable schedule?

Part-II

Q2   Only Focused-Short Answer Type Questions- (Answer Any Eight out of   (6 × 8)
Twelve)
a)   What do you understand by a data model? Explain the difference between conceptual data model and the internal model.
b)   What are the main steps of database design? Explain them in brief.
c)   Explain the entity integrity and referential integrity constraints. How they are use full in database Design?
d)   Explain with the help of examples, the concept of insertion anomalies and deletion anomalies
e)   Given R with FD set F ={A→B, BC→D, D→BC, DE→Ø }Find the number of redundant FDs in F.
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) Explain the difference between relational algebra and relational calculus.
l) Discuss 4 basic features of ODBMS. What are the advantages?

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

Q3
a. What is lossy decomposition? Check whether the following decompositions are lossy or lossless.   (8x2)

(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)
b. 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}

Q4
a. A database is being constructed to keep track of the teams and games of a sports league. A term has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game, and the result of the game. Try to design an ER schema diagram for this application, stating any assumptions you make, Choose your favourite sport (soccer, football, baseball.....)   (8x2)
b. What are the basic operations for a relational language? How are basic operations represented in relational algebra, TRC, DRC, and SQL?

Q5
a. what is serializability ? Explain conflict serializabilityand view serializability.   (8x2)
b. 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
a. Explain various locking technique for concurrency control.   (8x2)
b. Describe optimistic concurrency control techniques?