Total No. of printed pages = 4

CSE 181501

Roll No. of candidate | | | | | | | | | |

2021

B.Tech. 5th Semester End-Term Examination

DATABASE MANAGEMENT SYSTEM

(New Regulation)

(w.e.f. 2017-18)

(New Syllabus)

(w.e.f. 2018-19)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following: (10 × 1 = 10)

(i) A relational database consists of a collection of

(a) Tables (b) Fields

(c) Records (d) Keys

(ii) Which of the following is used to include integrity constraint in an existing relation?

(a) Create table (b) Modify table

(c) After table (d) Drop table

(iii) Given the basic ER and relational models, which of the following is INCORRECT?

(a) An attributes of an entity can have more than one value

(b) An attribute of an entity can be composite

(c) In a row of a relational table, an attribute can have more than one value

(d) In a row of a relational table, an attribute can have exactly one value or a NULL value

[Turn over

(iv) Given the following relation instance:

x	y	z
1	4	2
1	5	3
1	6	3
3	2	2

Which of the following functional dependencies are satisfied by the instance?

(a) XY->Z and Z->Y (b) YZ->X and Y->Z

(c) YZ->X and X->Z (d) XY->Y and Y->X

(v) Which of the following is not a database model?

(a) Network Database Model

(b) Relational Database Model

(c) Object Oriented Database Model

(d) None

(vi) Which of the following is TRUE?

(a) A relation is in BCNF is always in 3NF

(b) A relation in 3NF is always in BCNF

(c) BCNF and 3NF are same

(d) A relation in BCNE is not in 3NF

(vii) Which of the following concurrency control protocols ensure both conflict serialzability and freedom from deadlock?

(I) 2-phase locking

(II) Time-stamp ordering

(a) (I) only (b) (II) only

(c) Both (I) and (II) (d) Neither (I) nor (II)

(viii) Relational algebra is a

(a) Procedural language (b) Non-Procedural language

(c) Data definition language (d) High level language

(ix) Which of the following is not an Armstrong's Axiom?

(a) Reflexivity rule (b) Transitivity rule

(c) Pseudo-transitivity rule (d) Augmentation ode

(x) Which of the following makes the transaction permanent in the database?

(a) View (b) Commit

(c) Rollback (d) Flash back

2. (a) Define logical and physical data independence. (4)

(b) Differentiate between: (4+4=8)

(i) Weak entity and Strong entity.

(ii) Total and Partial relationship

(c) How generalization and specialization is represented in ER diagram? Give example. (3)

3. (a) Define primary key and foreign key with example. (4)

(b) What is meant by query processing? Describe the steps in query processing. (2+5=7)

(c) Let the following relation schemas be given: $r = (A,B,C)\ s = (D,E,F)$ Give an expression in SQL that is equivalent to each of the following queries: (2+2=4)

(i) $\prod_D (s)$

(ii) $\sigma_{A=D}(rxs)$

4. (a) What is the difference between a primary index and a secondary index? (4)

(b) What is hashing? Write the advantages of dynamic hashing over static hashing. (2+3=5)

(c) Construct a B tree of order 3 for the following set of key values: (4)

(2, 5, 11, 19, 23, 28)

(d) What is a serial schedule? (2)

5. (a) Compute the attribute closure of AG for the following set F of of FDs of the relation Schema R=(A,B,C,G,H,I). Is AG a super key? (4)

A->B

A->C

CG->H

CG->I

B->H

(b) What is lossless and lossy join? (4)

(c) What are the anomalies that can occur when the database is not normalized? (3)

(d) Find the highest normal form a relation $R(A,B,C,D,E)$ with FD set {A->D, B->A, BC->D, AC->BE) (4)

6. (a) Consider the transactions T1, T2, and T2 and the schedules S1 and S2 given below: (5)

T1 : r1(X) ; r1(z) ; w1(X):w1(z)

T2 : r2(Y) ; r2(z) ; w2(z)

T3 : r3(Y) ; r3(X) ; w3(Y)

S1 : r1(X) ; r3(Y) ; r3(X) ; r2(Z) ; r2(Z) ; w3(Y) ; w2(Z) ; r1(Z) ; w1(X);w1(Z)

S2 : r1(X) ; r3(Y) ; r2(Y) ; r3(X) ; r1(Z) ; r2(Z) ; w3(Y) ;w1(X) ; w2(Z); w1(Z)

Which one of the schedule is conflict serializable?

(b) Describe Lock-Based Protocol in concurrency control. Is this protocol deadlock free? (4+2=6)

(c) Explain Undo and Redo Operation in database recovery. (4)

7. Write short notes on (any *five*) : (5 × 3 = 15)

(a) Transaction states

(b) Check point

(c) Dirty read problem

(d) Intrusion Detection System

(e) Distributed databases

(f) Thomas Write rule

(g) Join operation