Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech. / M. Tech. / Ph.D.

Branch	**: CSE**	**Semester**	**: III**
Title of the Course	**: Database Management System**	**Course Code**	**: CSB202**

Time: 2 Hours **Maximum Marks: 25**

Note: Attempt all the questions.
Assume any data, if necessary.
Marks of every question is different and given on its right side.

Q 1) a) Let E1 and E2 be two entities in an E/R diagram with simple single-values attributes. R1 and R2 are two relationships between E1 and E2 where R1 is one-to-many and R2 is many-to-many. R1 and R2 do not have any attributes of their own. What is the minimum number of tables required to represent this situation in relational model? Answer by drawing its E/R model. [1.5]

b) Define attributes. List the various types of attributes that can occur in an E/R model. [1.5]

c) Define weak entity types. How they are represented in an E/R model? [1]

Q 2) Given a set of 2 relations student and enrolled with the following list of attributes. [1]

Student(Sid, Sname) with 200 tuples

Enrolled(Sid, Cid) with 100 tuples

How many maximum and minimum tuples results by (Student⋈Enrolled) with foreign key constraint between the tables?

Q 3) a) Given a relational schema R(ABCDE) with functional dependencies as { A-> BC, CD->E, B->D, E->A}. Find the set of all candidate keys? [2]

b) Consider the following relational schemas for a library database.

BOOK(Title, Author, C_No, Publisher, Year, Price)

COLLECTION(Title, Author, C_No)

With the following functional dependencies:

Title,Author-> C_No

C_No-> Title, Author,Publisher,Year

Publisher,Title,Year-> Price

Assume {Author,Title} is the key for both the schemas, What is the highest normal form for both the relations? [3]

Q 4) a) How multiple views of data supported in RDBMS? [1]

b) Draw a neat diagram and explain 3-schema architecture in detail. Does all DBMS support this architecture? [3]

Q 5) a) Let R(A,B,C,D) be a relational schema with the following functional dependencies:

{A-> B, B->C, C->D and D->B}. Does the decomposition of R into (AB), (BC) and (BD) gives a lossless and dependency preserving join? [2]

b) Let R(ABCDEPG) be a relational schema in which the following functional dependencies are known to hold: AB->CD, DE->P, C->E, P->C, B->G. State the highest normal form for the relational schema R. [2]

c) List and explain advantages of DBMS over File processing systems. [2]

Q 6) Define the following terms: [2]

a) Entity integrity constraints
b) Domain integrity constraints
c) Referential integrity constraints

Q 7) State whether the following decomposition is loss-less or not? [3]

R(ABCDEG) with F.D set as {AB->C, BC->A, AC->B, B->D, AD->E, E->G}

a) D1(AB,BC,ABDE,EG)
b) D2(ABC,ACDE,EG)