

*This question paper contains 4 printed pages.*

*Your Roll No. ....*

Sl. No. of Ques. Paper : 6605  
Unique Paper Code : 42341202  
Name of Paper : Database Management Systems  
Name of Course : B.Sc. Prog. / B.Sc. Mathematical Science  
Semester : II  
Duration : 3 hours  
Maximum Marks : 75

FC-2

*(Write your Roll No. on the top immediately on receipt of this question paper.)*

*Section A is compulsory. Attempt any five questions from Section B.*

### Section A

- Q1. Answer the following: (25)
- a. With an example explain the concept of one to many relationship. (2)
  - b. What is a Database catalog? (2)
  - c. Explain the total Specialization constraint. (2)
  - d. What is the domain constraint in relational data model. (2)
  - e. What is a functional dependency? (2)
  - f. When is it necessary to use role names in the description of relationship types?  
Explain with an example. (3)
  - g. Justify the following statements: (3)
    - i. Database table must have a key
    - ii. Null values are unavoidable
  - h. Discuss the main categories of data models. (3)
  - i. Explain the concept of a weak entity, its partial key and its identifying relationship. (3)
  - j. Differentiate between select and project operations in relational algebra. (3)

P.T.O



## Section B

Q2 Draw the ER diagram for a BANK database. (10)

Each bank can have multiple branches and each branch can have multiple accounts and loans. BANK has a code(unique), name and address. Each BRANCH of the bank has a branch no and address. Each ACCOUNT has account no(unique), balance and type. Similarly LOAN associated with loan no(unique), amount and type. Each CUSTOMER can have multiple accounts and loans in the bank. Customer has a Cno(unique), name, address, multiple phone numbers and Date of birth. Age of the customer can be derived from the date of birth attribute.

Specify structural constraints for all relationships.

Q3(a) What is the difference between logical and physical data independence (5)

(b) Consider the following relational database(attributes have their usual meaning):

Supplier (S#, Sname, Status, City)

Part (P#, Pname, Color, Weight, City)

Project (J#, Jname, City)

Shipment (S#, P#, J#, Qty)

Write relational algebra queries to express each of the following:

(i) List supplier number and status of all 'Delli' suppliers.

(ii) List Pname and color for all the parts.

(iii) List all the shipments having quantity above 500.

(iv) Rename the attribute J# and Jname as project\_id and project\_name respectively.

Q4(a) Explain any five advantages of using a DBMS. (5)

(b) Consider the universal relation  $R = \{A, B, C, D, E, F, G, H, I, J\}$  and the following set of functional dependencies: (5)

$AB \rightarrow C$

$BD \rightarrow EF$

$AD \rightarrow GH$

$A \rightarrow I$

$H \rightarrow J$

What is the key for R? Decompose R into 2NF relations.

Q5(a) Consider the following relations for a Student database(Attributes have their usual meanings) (5)

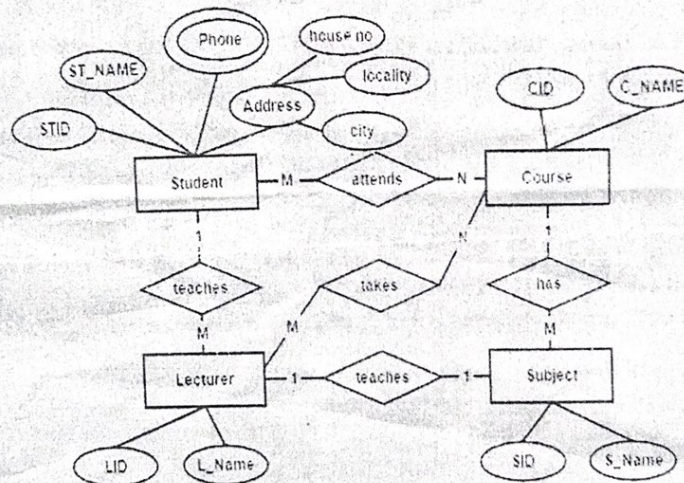


STUDENT(sno, name, course, dob)  
 COURSE(course#, coursename, deptname)  
 ENROLL(sno, course#, grade)  
 BOOK(bno, title, publisher, author)  
 TEXT\_BOOK(course#, bno)

Specify the Primary keys and foreign keys for this schema.  
 State any assumptions that you make in identifying the keys.

(b) What is the purpose of normalizing data in a database? Differentiate between 2NF and 3NF? (5)

Q6(a) Map the following ER diagram into corresponding database tables : (7)



(b) Describe briefly degree of a relationship. Give examples. (3)

Q7 Consider the following database (Attributes have their usual meaning): (10)

Student (sid:integer, sname:string, major:string, age:integer)  
 Course (cname:string, time:string, room:integer, fid:integer)  
 Enrolled (sid:integer, cname:string)  
 Faculty (fid:integer, fname:string, deptid:integer)



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Write down SQL queries for the following.

- i. Create the Faculty table so that every faculty is guaranteed to have a corresponding department.
- ii. Insert a tuple into the student table. Assume your own data.
- iii. Find out the name of all Computer Science students who are enrolled in a course taught by 'Narayan'.
- iv. For all majors, print the major and the average age of students for that major
- v. For all Bsc classes taking place in room no 101 update it to room no 222.

Q8 Differentiate the following:

(10)

- a. Stored and derived attributes
- b. DDL and DML
- c. Primary key and a foreign key
- d. Having clause and where clause
- e. View and Relation

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