This question paper contains **4** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **778**

Unique Paper Code : **234305** **G**

Name of the Paper : **Database Systems (CSHT-307)**

Name of the Course : **B.Sc. (H) Computer Science**

Semester : **III**

Duration : **3 Hours** Maximum Marks : **75**

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

All questions from Section A are compulsory.

Attempt any *four* questions from Section B.

Section A

1. (*a*) Differentiate between database and database management system. 2

(*b*) List any *three* advantages of using database approach over traditional file processing system. 3

(*c*) What is the advantage of achieving logical data independence ? 3

(*d*) What is the usefulness of data models ? Name any High Level data model. 2+1=3

(*e*) Draw the ER diagram for the following description. Specify cardinality ratio and participation constraints clearly. Identify entities and relationship involved.

A bank_branch can have many accounts but an account belongs to only 1 bank_branch. 3

(*f*) Give an example for a specialization satisfying overlapping and total constraints. 3

P.T.O.

(*g*) Explain the following terms with the help of an example : 1/2×4=2

(*i*) Relation Schema

(*ii*) Relation state

(*iii*) Degree of a relation

(*iv*) Tuples of a relation.

(*h*) In the following relation SUPRSSN and DNO are foreign Keys. Write two sql statements to impose referential integrity constrint on SSN and DNO which should be written while creating the table in Create Table statement. 1½×2=3

EMPLOYEE(SSN, FName, LName, Address, DOB, Salary, Gender, SUPRSSN, DNO)

(*i*) Write a SQL statement to create a View WORKS_ON_1 on WORKS_ON(ESSN, PNO, Hours) which records total number of employee working on each project. 2

(*j*) Given the following functional dependencies on relation schema (A,B,C,D) with A, B as primary key. Is this relation in 3rd Normal form. If yes, explain how ? If not, explain why not ? 1+1=2

A,B .....> C,D and B .....> D

(*k*) Explain the need of concurrency control with the help of an example. 3

(*l*) Explain the main features of XML databases. 3

(*m*) What is data dictionary ? How is it useful for database management system ? 3

Section B

2. (*a*) State *three* Armstrong's inference rules for functional dependency. 3

(*b*) Find the Key of relation R(P,Q,R,S,T,U,V,W) and the following set of functional dependency F = {PQ .....> R, QS .....> TU, PS .....> V, V.....> W}. Show the complete working to reach your conclusion. 3

(*c*) Decompose the relation given in question 1(*j*) above to 3rd Normal form. 4

3. Consider the following relations (key of each relation is highlighted) :

Sales_Person (**S_No**, S_Name, Commission)

Product(**P_Id**, Description)

Sale(**Date**, **C_No**, **S_no**, P_Id, Qty)

Customer (**C_No**, C_Name, C_Address)

(*i*) Write SQL statements for the following queries : 1+1+1+2=5

(*a*) Get the name of the Sales Persons who sold product with P_Id = 71.

(*b*) Get the Names of Customers who bought "Table Fans".

(*c*) Get the total Number of products sold on "15-09-2009".

(*d*) Get the total number of products purchased by each customer.

(*ii*) Write the same queries above in relational algebra. 5

4. (*a*) Differentiate between : 2×4=8

(*i*) DDL and DML

(*ii*) Specialization Lattice and Specialization Hierarchy

(*iii*) Entity type and Entity Set

(*iv*) Database Administrator and Database Designer. Give example wherever necessary.

(*b*) What is the utility of imposing referential integrity constraint ? 2

5. (*a*) Explain with example the problems of : 6

(*i*) Lost Update and

(*ii*) Dirty Read.

(*b*) Explain ACID properties for transactions. 4

6. (*a*) Write suitable relation schemas for the example chosen by you in question 1(*f*) above for overlapping and total constraint (convert EER to Relational model). 5

(*b*) For the following relation states :

T1			T2		
P	Q	R	A	B	C
8	a	5	8	b	6
15	b	9	25	c	7
25	a	6	8	b	5

Show the results of the following operations : 5

(*i*) T1 Left Outer Join (T1.P = T2.A) T2

(*ii*) T1 Union T2

(*iii*) T1 Join (T1.P = T2.A and T1.R = T2.C).

7. (*a*) Explain any *two* categories of XML documents. 4

(*b*) Explain the term with the help of an example—Primary Key, Super Key and Candidate Key. 6