Total No. of Questions—**5**] [Total No. of Printed Pages—**5**

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F.Y. B.Sc. (Computer Science) EXAMINATION, 2018

COMPUTER SCIENCE

Paper-II

CS-102 : File Organization and Fundamentals of Databases)

(2013 PATTERN)

Time : Three Hours **Maximum Marks : 80**

N.B. **:—** (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Assume suitable data if necessary.

1. Attempt *all* of the following : [10×1=10]

(*a*) Define attributes with example.

(*b*) What is Cartesian product operation in relational algebra ?

(*c*) What is functional dependency ?

(*d*) Give syntax and example of select operator.

(*e*) Define BCNF.

(*f*) State any *two* types of indices.

(*g*) List any *two* advantages of DBMS.

(*h*) Modification in table is a part of DDL statement. Justify true or false.

(*i*) State different types of users of DBMS.

(*j*) What is referential integrity ?

P.T.O.

2. Answer any *four* of the following : [4×5=20]

(*a*) Write a short note on data independence.

(*b*) Define entity set. Explain strong and weak entity.

(*c*) Explain B+ tree file organization.

(*d*) Compare primary key, candidate key and super key.

(*e*) Explain any *two* relational algebra operations with suitable examples.

3. Answer any *four* of the following : [4×5=20]

(*a*) What is a foreign key constraint ? Why are such constraints important ? What is referential integrity ?

(*b*) Let R = (A, B, C, D, E) is a relational schema with the following functional dependencies :

$$F = \{A \rightarrow BC,\ CD \rightarrow E,\ B \rightarrow D,\ E \rightarrow A\}$$

List the candidate keys for R.

(*c*) Explain Armstrong axioms any *five.*

(*d*) What is existance dependency of entity set ? Explain it with suitable example.

(*e*) Give a set of functional dependencies for the relation at schema R (A, B, C, D) with primary key AB under which R is in 1NF but not in 2NF.

4. (A) Answer any *three* of the following : [3×5=15]

(*a*) Consider the following relations :

Supplier (sid, sname, address)

Parts (pid, pname, color, cost)

Supplier and parts are related with many to many relationship. Create a relational database in 3NF and solve the following queries in SQL :

(*i*) List all the suppliers who is supplying some red parts.

(*ii*) Find the number of parts supplied by each supplier.

(*iii*) Find the supplier names of parts whose cost is more than Rs. 250/-

(*b*) Consider the following relations :

Branch (bno, bname, street, area, city, pincode, officeno);
Staff (sno, frame, iname, address, position, salary)
Branch and staff are related with one to many relationship.
Create a relational database in 3NF and solve the following queries in SQL :

(*i*) List the staff who works in the branch at "Tilak Road".

(*ii*) Find staff whose salary is larger than the salary of all staff members at branch "S1".

(*iii*) Give names of all branch managers in Kolhapur.

(*c*) Consider the following relations :

Country (contrycode, name, capital)
Population (pcode, pcount)
Country and population are related with one to one relationship.
Create a relational database in 3NF and solve the following queries in SQL :

(*i*) Find the country name having lowest population.

(*ii*) Find the name and population of a country whose capital name starting with a.

(*iii*) List the names of all countries whose population is within the range 1,00,000 to 4,00,000.

(*d*) Consider the following relations :

Person (pno, name, address)
Car (cno, year, model)
Person and car are related with one to many relationship.
Create a relational database in 3NF and solve the following queries in SQL :

(*i*) List all the names of people from Kharadi and have Maruti 800

(*ii*) Change address of Mr. Korth to Pune.

(*iii*) List the name of people having car before 2010.

(B) Attempt any *one* of the following : [1×5=5]

(*a*) Consider the following relations :

Player (pno, pname, city)

Game (gno, gname, city)

Player-Game (pno, gno, date)

(*i*) Find all players playing "Football".

(*ii*) List all games details played on 28/3/2018

(*iii*) List all games details played in Jaipur.

(*iv*) List all players playing both football and basketball.

(*v*) List all players who are playing in the same city where they live.

(*b*) Consider the following relations :

Item (icode, name, price);

Order (ocode, cust-name, date)

Item-order (icode, ocode, quantity)

Solve the following queries in relational algebra :

(*i*) Find all items that are oredered by Amit Kumar.

(*ii*) Find order details of each item.

(*iii*) List all items ordered between 25 January 2018 to 28 January 2018

(*iv*) Find item names with lowest cost.

(*v*) List all the items with their price having ordered quantity more than 100.

5. (A) Savitribai Phule Pune University offers choice based credit system to all P.G. Course. For P.G. science courses students have to complete 100 credits to get their certificate. These courses have semesters two, three ..... Each semester has set of subjects. The subject may be core (compulsory) or elective (optional).

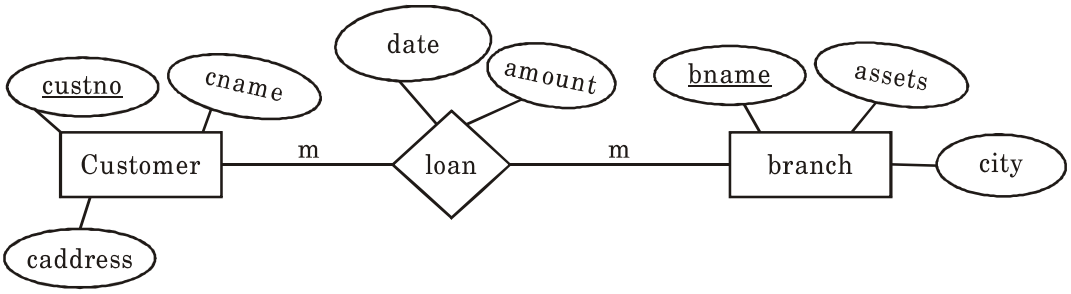
(*i*) Design an E-R diagram for above scenario, assume, attributes if necessary.

(*ii*) Convert the E-R diagram into a relational database in 3NF. [7]

(B) What is DDL ? Write any *two* examples of DDL. [3]

Or

Consider the following E-R diagram :



Convert the above E-R diagram into relational model. [3]