*U.S.N*

# P.E.S. College of Engineering, Mandya - 571 401
### *(An Autonomous Institution affiliated to VTU, Belagavi)*
### Fifth Semester, B.E. – Information Science and Engineering
### Semester End Examination; Dec - 2017/Jan - 2018
### Data Base Applications

*Time: 3 hrs*                                                    *Max. Marks: 100*

***Note****: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

## UNIT - I

1 a. What is a database and database management system? Discuss the characteristics of the database approach. — 10

b. What is meant by data independence? Explain briefly different types of it. — 6

c. What is an attribute and entity? Explain the different types of entities. Give example. — 4

2 a. Construct an ER diagram for university office. The office maintains data about each class, including the instructor, the enrollment and the time and place of the meetings. For each student class pair a grade is recorded. Determine the entities and relationships. — 10

b. What is a relationship type? Explain the differences among a relationship instance, a relationship type and a relationship set. — 8

c. What is a partition role? — 2

## UNIT - II

3 a. Discuss the entity integrity and referential integrity constrains. Why each is considered important? — 9

b. Suppose that each of the following update operations is applied directly to the database state shown in Fig 3.b. Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints.

   i) Insert<'Robert', 'F' 'Scott', 0143775543, '1972-06-21'2365 Newcastle Rd, Bellaire, TX, M, 58000, '888665555', 1> into Employee.

   ii) Insert <'Product', 4, 'Bellaire', 2> into PROJECT.

   iii) Insert <'Production', '943775543', '2007-10-01'> into Department.

   iv) Insert <'677678989', NULL, '40.0'> into WORKS- ON

   v) Insert < '453453453', 'John', 'M', '1990-12-12', 'Spouse'> into DEPARTMENT

   vi) Delete the works-on tuple with ESSN = '333445555'.

   vii) Delete the employee tuple with SSN = '987654321'

   viii) Delete the Project tuple with Pname = 'Product X'.

   ix) Modify the Mgr-SSn and Mgr-Start- date of the department tuple with Dnumber = 5 to '12345679' and '2007-10-01', respectively.

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x) Modify the super-ssn attribute of the employee tuple with SSN = '99988777' to '943775543'.

xi) Modify the hours attribute of the works-on tuple with ESSN = '999887777' and Pno = 10 to '5.0'.

**EMPLOYEE**

| Fname | Minit | Lname | Ssn | Bdate | Address | Sex | Salary | Super_ssn | Dno |
|-------|-------|-------|-----|-------|---------|-----|--------|-----------|-----|
| John | B | Smith | 123456789 | 1965-01-09 | 731 Fondren, Houston, TX | M | 30000 | 333445555 | 5 |
| Franklin | T | Wong | 333445555 | 1955-12-08 | 638 Voss, Houston, TX | M | 40000 | 888665555 | 5 |
| Alicia | J | Zelaya | 999887777 | 1968-01-19 | 3321 Castle, Spring, TX | F | 25000 | 987654321 | 4 |
| Jennifer | S | Wallace | 987654321 | 1941-06-20 | 291 Berry, Bellaire, TX | F | 43000 | 888665555 | 4 |
| Ramesh | K | Narayan | 666884444 | 1962-09-15 | 975 Fire Oak, Humble, TX | M | 38000 | 333445555 | 5 |
| Joyce | A | English | 453453453 | 1972-07-31 | 5631 Rice, Houston, TX | F | 25000 | 333445555 | 5 |
| Ahmad | V | Jabbar | 987987987 | 1969-03-29 | 980 Dallas, Houston, TX | M | 25000 | 987654321 | 4 |
| James | E | Borg | 888665555 | 1937-11-10 | 450 Stone, Houston, TX | M | 55000 | NULL | 1 |

**DEPARTMENT**

| Dname | Dnumber | Mgr_ssn | Mgr_start_date |
|-------|---------|---------|----------------|
| Research | 5 | 333445555 | 1988-05-22 |
| Administration | 4 | 987654321 | 1995-01-01 |
| Headquarters | 1 | 888665555 | 1981-06-19 |

**DEPT_LOCATIONS**

| Dnumber | Dlocation |
|---------|-----------|
| 1 | Houston |
| 4 | Stafford |
| 5 | Bellaire |
| 5 | Sugarland |
| 5 | Houston |

**WORKS_ON**

| Essn | Pno | Hours |
|------|-----|-------|
| 123456789 | 1 | 32.5 |
| 123456789 | 2 | 7.5 |
| 666884444 | 3 | 40.0 |
| 453453453 | 1 | 20.0 |
| 453453453 | 2 | 20.0 |
| 333445555 | 2 | 10.0 |
| 333445555 | 3 | 10.0 |
| 333445555 | 10 | 10.0 |
| 333445555 | 20 | 10.0 |
| 999887777 | 30 | 30.0 |
| 999887777 | 10 | 10.0 |
| 987987987 | 10 | 35.0 |
| 987987987 | 30 | 5.0 |
| 987654321 | 30 | 20.0 |
| 987654321 | 20 | 15.0 |
| 888665555 | 20 | NULL |

**PROJECT**

| Pname | Pnumber | Plocation | Dnum |
|-------|---------|-----------|------|
| ProductX | 1 | Bellaire | 5 |
| ProductY | 2 | Sugarland | 5 |
| ProductZ | 3 | Houston | 5 |
| Computerization | 10 | Stafford | 4 |
| Reorganization | 20 | Houston | 1 |
| Newbenefits | 30 | Stafford | 4 |

**DEPENDENT**

| Essn | Dependent_name | Sex | Bdate | Relationship |
|------|----------------|-----|-------|--------------|
| 333445555 | Alice | F | 1986-04-05 | Daughter |
| 333445555 | Theodore | M | 1983-10-25 | Son |
| 333445555 | Joy | F | 1958-05-03 | Spouse |
| 987654321 | Abner | M | 1942-02-28 | Spouse |
| 123456789 | Michael | M | 1988-01-04 | Son |
| 123456789 | Alice | F | 1988-12-30 | Daughter |
| 123456789 | Elizabeth | F | 1967-05-05 | Spouse |

4  a. Explain ON DELETE CASCADE and ON DELETE UPDATE operations with example.    6

   b. Which command is available for removing a table from database? Explain with an example.    4

c.   Consider the following schema:

SUPPLIERS (<u>Sid</u>, Sname, Saddress, Sphone)

Parts ( <u>Pid</u>, Pname, Pcolor, Price)

Supplies (Sid, Pid, Qty)

i) Find the names of suppliers who Supply part 214.                                          10

ii) Find the names and address of suppliers who supply 'NUTS'.

iii) Find the names and phone numbers of supplier who supply some blue parts.

iv) Find the names of suppliers who supply every red part.

v) Find the supplier ids of suppliers who supply every part.

## UNIT - III

5 a.   What is functional dependency? Explain it briefly.                                         4

b.   Why normalization required in DBMS? Explain the first, second and third normal forms with example.                                                                                             16

6 a.   Define BCNF. How does it differ from 3NF? Why is it considered a stronger from of a 3NF?   8

b.   Explain the concepts of join dependency and lossless decomposition with respect to 5NF.    12

## UNIT - IV

7 a.   Discuss the action taken by the read_item and write_item operations on a database.         6

b.   Draw a state diagram and discuss the typical states that a transaction goes through during execution                                                                                          8

c.   Discuss the atomicity, durability, isolation and consistency preservation properties of a database transaction.                                                                               6

8 a.   What is concurrency control? Why concurrency control needed for database transition?       8

b.   Compare and contrast the deferred update and immediate update recovery protocols.           8

c.   Discuss how the log file is a fundamental feature in any recovery mechanism?                 4

## UNIT - V

9 a.   Why is not straight forward to integrate SQL queries with a host programming language? How do we declare variables in embedded SQL?                                                      8

b.   What is JDBC? What are the components of the JDBC architecture? Describe four different architectural alternatives for JDBC drivers.                                                        12

10 a.  Write am HTML form. Describe all the components of an HTML form.                            6

b.   What is the role of domain specific DTDs?                                                    2

c.   What are short comings of HTML and how does XML address them?                                6

d.   Distinguish between Servlet and JSP. When should we use Servlet and when should we use JSP?  6

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