nepal college of information technology

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| Level: Bachelor | Semester – Spring | Year : 2013 | |
| Programme: BE\_CE | | Full Marks : 100 | |
| Pass Mark : 45 | |
| Course: Database Management Systems | | Time : 3 hrs | |
| *Candidates are required to give their answers in their own words as far as practicable.* | | |
| *The figures in the margin indicate full marks.* | | |
| Attempt all the questions. | | |

Q 1

1. What is Database Management System? Explain the organization of Database with appropriate block diagram.(1+4)
2. What do you mean by Data Model in DBMS? Differentiate among the types of Data Models.(1+4)
3. Explain briefly about Physical and Logical Data Independence? Discuss advantages of DBMS over conventional Data processing file system (2+3)

Q 2.

1. Define key attributes with its importance in DBMS? Defining integrity constraints in DBMS is a good practice. Why? Differentiate between Entity Integrity and Referential Integrity with appropriate example.(1+1+5)
2. Construct an ER diagram for an Airlines Company to keep the flight information. The airlines keeps the information of all flights as flight number, flight name, flight capacity and so on. The Airline has many flights. The same flight may have many destinations and keeps information of which flight has which destination at which time. The airline also keeps the information of Crew Members of each flight and crew member may be many in each flight. The airline should able to track which customer has made reservation to which destination on which date and time. The ER diagram should explain Entity name, some appropriate attributes of the entity, relationship among the entity, association and directivity among the entities.(If attributes not given, the examinee can assume related attributes for more clarification).(8)

Q 3.

1. For which purposes the following relational operations are performed: Cartesian product, Join, Union, Intersection and Difference. Explain with their appropriate example and contrast on their result.(5)
2. What is Relation and Relationship in DBMS? Discuss about the different types of relationships used in DBMS according to their degree of association and their degree of cardinality mapping.(1+4)
3. Explain about the steps used in query processing and query optimization techniques.(5)

Q 4.

1. What do you mean by Functional Dependency, Multivalued Dependency and Transitive Dependency in Normalization process of Database? Why normalization is needed during database design? Assume the un-normalized relation as given below and find the final normalized logical ER diagram normalizing the un-normalized relation up to 3NF explaining what you are going to check at each normal step .(3+1+6)

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| --- | --- | --- | --- | --- |
| **RollNo** | **Name** | **SubID** | **SubName** | **FeePaid** |
| 4 | Pavitra Thapa | DC | Data Communication | 40000 |
| 5 | Surendra Bhusal | DC | Data Communication | 40000 |
| 9 | Sarmila Yadav | MATH | Mathematics | 30000 |
| 10 | Isha Sthapit | DBMS | Database Management System | 30000 |
| 1 | Hari Man Dangol | DBMS | Database Management System | 20000 |
| 2 | Mohan Prasad Sah | DBMS | Database Management System | 20000 |
| 3 | Indira Rimal | DBMS | Database Management System | 30000 |
| 1 | Hari Man Dangol | CPROG | C Programming | 20000 |
| 2 | Mohan Prasad Sah | CPROG | C Programming | 15000 |
| 3 | Indira Rimal | MATH | Mathematics | 30000 |

1. How you can say that data security concern plays a key factor in DBMS? Discuss about cryptography with it types in brief? List the different Types of Database failures?(1+2+2)

Q 5.

1. For the given table schema below, Write SQL Statement to display(2\*4=8)

**Employees**(employee\_id,first\_name,last\_name,email,phone\_number,hire\_date,job\_id,salary, commission\_pct,manager\_id,department\_id)

**Departments**(department\_id, department\_name, manager\_id, location\_id)

**Locations**(location\_id. street\_address, postal\_code, city, state\_province, country\_id)

1. Last\_name, salary and their department\_id whose salary is between 5000 and 8000
2. The records of those employees whose name starts with letter ‘S’ and works in department 100;
3. The record in given format

|  |
| --- |
| **MYDETAILS** |
| My Name is **Hari Man** and I used to work in department\_id **100** having salary **9000**. |
| My Name is **Punam Kafle** and I used to work in department\_id **101** having salary **8500**. |
| My Name is **Manohar Sharma** and I used to work in department\_id **88** having salary **7500**. |
| ….. |
| …… |

1. The record in given format

|  |  |  |
| --- | --- | --- |
| **MyName** | **My Manager Name** | **My Salary** |
| Kalpana Pandey | Hari Man | 10000 |
| Rajesh Maharjan | Santosh Ghimire | 9000 |
| Surendra Basnet | Kalpana Pandey | 9600 |
| …… |  |  |
| ……. |  |  |

1. How you can say that data security concern plays a key factor in DBMS? Discuss about cryptography with it types in brief? List also the different Types of Database failures?(1+4+2)

Q 6.

1. Consider the schema given below and write the relational algebra for the given scenarios(1.5\*4=6)

**Employees**(employee\_id,first\_name,last\_name,email,phone\_number,hire\_date,job\_id,salary, commission\_pct,manager\_id,department\_id)

**Departments**(department\_id, department\_name, manager\_id, location\_id)

**Locations**(location\_id. street\_address, postal\_code, city, state\_province, country\_id)

Write RA to

1. Display name, address and their department\_id whose salary is greater than 6000.
2. Fetch the records of employees name, department name and their department location\_name
3. List all departments’ records whose country\_id is ‘NEP’.
4. List employees email, phone number whose department’s postal\_code is ‘KTM9901’.
5. What is transaction? Why concurrency control is needed in Transaction Management? Describe Two Phase Locking Protocol (2PL) over single phase locking mechanism with necessary example explaining its advantages and disadvantages.(1+3+5)

Q 7. Write Short Notes on(Any two):(2\*5=10)

1. Granularity
2. DDL and DML
3. ACID
4. Access Control
5. Generalization and Specialization
6. Weak and Strong Entity