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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR THREE**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF PURE AND APPLIED SCIENCES**

**FOR THE DEGREE OF BACHELOR OF INFORMATION SCIENCE**

**COURSE CODE: COM 318**

**COURSE TITLE: DATA BASE SYSTEM**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 18/11/2020 TIME: 3.00-5.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Define the following terms; **[6 marks]**
   * 1. Database Management systems
     2. Data normalization
     3. Database Security
2. In terms of databases differentiate between; **[6 marks]**
   * 1. Logical backup and Physical backup
     2. Modification anomaly and insertion anomaly
     3. Physical database design and Logical database design
3. Explain three advantage of using electronic database  **[6 marks]**
4. ABC Company would like to develop a relational database management system. Advice the management on the stages of developing a database system **[6 marks]**
5. Explain the following SQL commands **[6 marks]**
6. DDL
7. DML
8. DCL

**QUESTION 2**

Examine the table shown below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *staffNo* | *branchNo* | *branchAddress* | *name* | *position* | *hoursPerWeek* |
| S4555 | B002 | City Center Plaza, Seattle, WA 98122 | Ellen Layman | Assistant | 16 |
| S4555 | B004 | 16 – 14th Avenue, Seattle, WA 98128 | Ellen Layman | Assistant | 9 |
| S4612 | B002 | City Center Plaza, Seattle, WA 98122 | Dave Sinclair | Assistant | 14 |
| S4612 | B004 | 16 – 14th Avenue, Seattle, WA 98128 | Dave Sinclair | Assistant | 10 |

1. Why is this table not in 2NF? **[5 marks]**
2. Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF). **[10 marks]**
3. Identify the primary, (alternate) and foreign keys in your 3NF relations **[5 marks]**

**QUESTION 3**

1. Explain three objectives of database security **[6 marks]**
2. iTechom LTD has been experiencing some security breaches on their database, as the Database manager
   1. Explain the threats and attacks in data base **[6 marks]**
   2. Discuss some of the key mitigation steps you would take to avert the situation. **[8 marks]**

**QUESTION 4**

1. Explain THREE advantages of using a computerized database system **[6 marks]**
2. Explain the following terms
   1. Entity Relation Diagram **[2 marks]**
   2. cardinality **[2 marks]**
3. ABC bus company operates fleet of buses and would like to design the system. The following information shows entities involved in the system.
   1. Each passenger is booked in one bus.
   2. A driver can drive more than one bus.
   3. Buses travel to different destinations.
   4. The buses can be services in any garage owned by the company.
   5. Identify entities in the bus company fleet system **[4 marks]**
   6. Use an Entity Relation Diagram (ERD) to show relationship among the entities. **[6 marks]**

**QUESTION 5**

**COURSE TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **CourseID** | **Day** | **MaxHrs** | **CourseWeight** |
| DC201 | Mondays | 50 | 5 |
| DC205 | Fridays | 60 | 4 |
| DC208 | Mondays | 30 | 4.5 |
| DC202 | Wednesdays | 80 | 5 |

1. Using the above relation, answer the following;
   * 1. Write the SQL statement that would realize the table. **[4 marks]**
     2. Write the SQL statement that would populate the table. **[6 marks]**
     3. Write SQL query to obtain information on courses taught on Mondays and have a weight above 4.5 **[4 marks]**
     4. Write SQL statement that corrects the MaxHrs for DC202 to 70. **[4 marks]**
     5. Write SQL statement that would add the total number of hours of all the courses **[2 marks]**