|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SURNAME OF STUDENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Lecturer: Amlan Mukherjee**  **Sophie Bhebe**  **STUDENT NUMBER: Group:**  PT  A  E  D  C  B   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  | |

|  |  |  |
| --- | --- | --- |
| **SUBJECT**  **INFORMATION SYSTEMS III (Databases) Full Time** | **DATE**  18th MARCH 2015  **TIME**  9:00 AM | **TIME**  2 Hours  **FULL MARKS**  **100** |



|  |
| --- |
| **FACULTY OF INFORMATICS & DESIGN** |

|  |
| --- |
| **COURSE(S):** ND: INFORMATION TECHNOLOGY |

|  |
| --- |
| **EXAMINER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MODERATOR:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **(**MR A Mukherjee)  **(**MS. SOPHIE BHEBE) |
| **REQUIREMENT**   * **NONE**   **SPECIAL INSTRUCTIONS:**     * **Answer all the questions.** * **All answers must be written in the space provided in the Question Paper.** * **Answers should be brief and to the point.** |

**Question 1 [21]**

Consider the following:

The ER diagram of the scenario is as follows:

Check the ER Diagram and convert it into a database schema (List of Tables corresponding to the ERD)

|  |  |  |  |
| --- | --- | --- | --- |
| **Table Name** | **Number of Attribute** | **Primary Key** | **Foreign Key(s)** |
| **(½ X 6=3)** | **(½ X 6=3)** | **(½ X 6=3)** | **(12)** |

**Question 2 [22]**

Critically comment on the following statements:

(You may agree or disagree with the statement provided. Please provide **the reasons** for your opinion within the space provided. You can use an example to justify your answer. **Please don’t** just write the definition of the terms used in the statement.)

|  |
| --- |
| **4.1. “”** |
| **(4)** |
| **4.2. “”** |
| **(4)** |
| **4.3. “”** |
| **(4)** |
| **4.4. “”** |
| **(5)** |
| **4.5. “”** |
| **(5)** |

**Question 3 [33]**

|  |
| --- |
| **3.1**. What do you mean by -----------? Explain…………….. (**2+3 = 5**) |
|  |
| **3.2.** Define………... Give two examples where this concept is useful. (**2\*3=6**) |
|  |
| **3.3.** Consider the following two transactions  T1 :  T2 :  Add lock and unlock instructions so that the transaction T1 and T2 observe two-phase locking protocol. Is it deadlock free**? (4 + 5 = 9 )** |
|  |
| **3.4.** Concurrency control is important because the simultaneous execution of transactions over a shared database can create several data integrity and consistency problems. The three main problems are lost updates, uncommitted data, and inconsistent retrievals.  Consider the following schedule for two transaction T1 and T2:  **T1 T2**   * + 1. Which category will the problem fall into of the above mentioned 3 main problems of simultaneous execution of transaction? **(2)**     2. Fill in the table…………………………………………………….. **(4)** |
| **3.4.1>**  **3.4.2>**   |  |  |  |  | | --- | --- | --- | --- | | **Time** | **Transaction** | **Step** | **Stored Value** | | 1 | T1 |  |  | | 2 | T2 |  |  | | 3 | T1 |  |  | | 4 | T2 |  |  | | 5 | T1 |  |  | | 6 | T2 |  |  | |
| * 1. Describe briefly……………………….. Compare it with the approach of   **(3+4 = 7)** |
|  |
| **3.6** There are two transactions in the system namely T1 and T2 having Timestamps … and….. Cross (X) the appropriate box given below. **(4)** |
| |  |  |  |  | | --- | --- | --- | --- | | Transaction Requesting Lock | Transaction Owning Lock | Wait / Die Scheme | Wound / Wait scheme | | T1 | T2 | |  |  | | --- | --- | |  | T1 Wait | |  | T2 Wait | |  | T1 Die | |  | T2 Die | | |  |  | | --- | --- | |  | T1 Wounds T2 | |  | T2 Wounds T1 | |  | T1 Wait | |  | T2 Wait | | | T2 | T1 | |  |  | | --- | --- | |  | T1 Wait | |  | T2 Wait | |  | T1 Die | |  | T2 Die | | |  |  | | --- | --- | |  | T1 Wounds T2 | |  | T2 Wounds T1 | |  | T1 Wait | |  | T2 Wait | | |

**Question 4 [10]**

***Indicate whether the sentence or statement is true or false.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1.1** | **1.2** | **1.3** | **1.4** | **1.5** |
| **1.6** | **1.7** | **1.8** | **1.9** | **1.10** |

**Question 5 Multiple Choice [10]**

*(Fill in the blanks using the options given below. Please answer in the space provided not in the questions)*

Answer:

**1 🡪**

**2 🡪**

**3 🡪**

**4 🡪**

**5 🡪**

**6 🡪**

**7 🡪**

**8 🡪**

**9 🡪**

**10 🡪**

1. Durability
2. Transaction Logs
3. Isolation
4. Monotonicity
5. The Scheduler
6. Deadlock Avoidance
7. Write log ahead protocol
8. Deadlock
9. Aggregation
10. The Lock Manager
11. Deadlock prevention
12. Read Lock
13. Write Lock
14. A Database Buffer
15. **A** CheckPoint
16. The Shrinking Phase
17. The Growing Phase
18. Serializability
19. Deferred modification
20. Immediate modification
21. Inheritance
22. Generalization
23. Specialization
24. And lots more…………………………….

IF YOU DON’T TICK YOUR LECTURERS NAME YOU ARE IN **TROUBLE**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***END OF SCOPE**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*