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| **1.**TCO E: Which type of lock still allows other transactions to have read–only access to the locked resource? (Points : 5)          Exclusive lock         **Shared lock**         Two–phased lock         Explicit lock         Implicit lock |

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| **2.**TCO E: Which of the following is true about making changes to the database structure? (Points : 5)          The DBA need not get input from users on the issue because it is a technical decision.         Formal policies and procedures for requesting a change are not used because they are too limiting.         **Documentation of when the change was made, how it was made, and why it was made must be created.**         Changes do not produce unexpected results because the DBA will have investigated the change thoroughly before implementing it.         If the database is properly designed, changes should not be necessary throughout the system's lifetime. |

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| **3.**TCO E: Which of the following cannot be enforced in the DBMS or application programs? (Points : 5)          Processing rights         Security         **Processing responsibilities**         Cursors         Transaction isolation |

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| **4.**TCO E: Requiring all application programs to lock resources in the same order is a technique for preventing what problem? (Points : 5)          Concurrent update         Lost update         **Deadlock**         Exclusive locks         Growing–phase locking |

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| **5.**TCO E: Which type of data repository is composed of metadata that is created automatically as the system components are created? (Points : 5)          Passive         Dynamic         **Active**         Automatic         Summary |

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| **6.**TCO E: Locks that are placed assuming that a conflict will not occur are called \_\_\_\_\_. (Points : 5)          dynamic         explicit         implicit        **optimistic**         pessimistic |

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| **7.**TCO G: We have obtained access to the company's operational data. We examine 50 records for customers with phone numbers that should use the current area code of 345. Of these 50 records, we find 10 that still use an older area code of 567. This is an example of \_\_\_\_\_. (Points : 5)          dirty data         **inconsistent data**         nonintegrated data         a wrong–format problem         a too–much–data problem |

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| **8.**TCO G: A report generated by a reporting system is delivered to the appropriate users via a printed report. This system uses which of the following report modes? (Points : 5)  **Push**         Pull         Query         OLAP         OLTP |

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| **9.**TCO G: The "R" in RFM analysis stands for \_\_\_\_\_. (Points : 5)          rank **recent**         relationship         readiness         random |

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| **10.**TCO A: Evaluate why database modeling is so difficult. (Points : 15)          Database modeling is difficult because one has to determine the proper structure of tables, the proper relationships among, tables, the appropriate data constraints, and other structural components. Database modeling has to also be designed in a way where it allows application developers to write somewhat simple queries. A poorly designed database forces bad coding. |

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| **11.**TCO A: Assess the advantages that relational database management programs have over file–processing systems. (Points : 15)   Well its quite simple. A relational database has relations. It stores data in tables. and each table has a relationships with other tables in some way. Thus it allows for searching for certain attributes easier. It creates data integrity and minimizes data redundancy.  File-processing systems dont have much of a relationship and if a file is deleted it may affect the whole system as a whole. |

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| **12.**TCO A: Why do we say that a database is "self–describing," and why is this an advantage?    (Points : 15)          Because it contains a description of itself. The database not only contains tables of user data, but also tables of data the describes the user data (meta data). The advantage is the meta data, because you can describe the data with the meta data. |

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| **13.**TCO B:  Evaluate the purpose of normalization. There are at least three reasons to perform normalization exercises. Explain at least two of them.(Points : 15)          The purpose of normalization is to reduce the chances for anomalies to occur in a database.  There are three anomalies, functional dependencies, multivalued dependencies and data constraints and oddities  Functional dependencies consists of of the Boyce-Codd Normal form which states that table design should be in such a way where every determinant i a candidate key.  The multivalued dependency states that each multi valued dependency should be moved to a table of its own. Thus we can't have many to many relationships. |

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| **14.**TCO B: Assess the difference between an entity class and an entity instance. (Points : 15)          An entity class is a collection of entities and is described by the structure of the entities in that class. An entity instance of an entity class is the occurrence of a particular entity, such as CUSTOMER 12345.  An entity class usually has many instances of an entity. |

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| **15.**TCO B: Assess the meaning of the cardinality of a relationship. Your answer needs to be thorough and specific. Be sure to include the two types of cardinality and also include the four possible primary relationship cardinalities. (Points : 15)   cardinality simply means count. So what are the minimum and maximum entity instances that a certain relationship can have.  In the ER model, there are two types of cardinality.  The maximum cardinality is the maximum number of entity instances that can participate in a relationship instance. There are three types of maximum cardinality one–to–one (1:1), one–to–many (1:N), and many–to–many (N:M).  The minimum cardinality is the minimum number of entity instances that must participate in a relationship instance. This number is generally zero (0), or one (1). If the number is zero, then participation by that entity instance is optional(O), it does not have to be in a relationship with an instance of the other entity. If the number is one, then participation by that entity instance is mandatory, (M) must participate in a relationship with an instance of the other entity. In a binary relationship there are four (4) possible sets of minimum cardinalities (O-O), (O-M), (M-O), and (M-M). |

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| |  | | --- | | **1.**TCO C: During the logical design phase of a database, denormalization is often recommended to improve performance in a database. Yet doing so can cause significant issues in the physical implementation of the database. Provide arguments as to why denormalization is a bad practice, and state the problems that will occur in a denormalized database.  (Points : 15)          denormalization usually speeds up data retrieval but can slow down data modification. It constantly needs to be re-evaluated as the application changes. It can increase size of the tables. In some areas it makes coding more complete. The chances of having dirty data or inconsistent data are higher. Denormalization should only be done if its proven to improve performance . |  |  | | --- | | **2.**TCO C: Develop a structurally sound relational database schema showing the minimum number of fields, tables, and relationships between the tables. Do not identify any properties of any of the fields other than the field names and whether or not the field is a key field. (An Access-like relationship diagram would be fine.)  You need to track the following information:       Pilot Name and Address      Aircraft Description and Tail Number      Flight Assignments to each pilot (assume that only one flight can be assigned to a pilot in each transaction)  (Points : 15)   PILOT(pk[pilot\_name],address)  AIRCRAFT(description,pk[tail\_number])  FLIGHTASSIGNMENT(flight\_number, fk[tail\_number],fk[pilot\_name]) |  |  | | --- | | **3.**TCO D: Developers have noticed that the EMP table does not have an assigned primary key. The EMP\_ID column has been selected to be the primary key. The table already has data in the table. When trying to assign the primary key, the operation fails. What are the probable causes for the inability to make the EMP\_ID the primary key?  (Points : 15)  First a primary key can never be null. There is a chance that emp\_id column has null values. So when trying to retreive data with a null primary key, the users will get erros. Also some tables my be id dependent of each other so if emp\_id is a primary key then it needs to be reflected a s foreign key in other areas.  A possible solution to this problem is before making emp\_id a primary key, the users should insert UNIQUE values in each row of the emp\_id column. once EVERY row is populated, then they can make the emp\_id a primary key and make sure that the ddl is no null. |  |  | | --- | | **4.**TCO D: Explain the physical database representation of a many-to-many strong entity relationship in a relational database design.  (Points : 15)    Trick question! many to many relationships can't be directly represented in a relational database design. M:M relationships are essentially broken into two one-to-many relationships by creating an intersection table that represents the relationship. The intersection table takes its key as a combinations of the keys of the two original (parent) entities. Each of the parent entities has a one-to-many relationship with the intersection table that is represented by placing the keys of the parents into the intersection table. |  |  | | --- | | **5.**TCO D: The DBA has just implemented a referential integrity constraint on a relationship between the Purchase Order table and the related Purchase Order Item table. The primary key for Purchase Order is the Purchase Order number. The purchase order number in the purchase order table is used as a composite primary key in the Purchase Order Item table. What new restrictions have been placed when updating the purchase order number in the Purchase Order table?  (Points : 15)          purchase order number can not be null. it can not be removed or deleted unless all other constraints from other tables are removed. You cant just truncate the table. other tables now have a reference to the purchase order table and the purchase order number is a fk constraint on the other tables. |  |  | | --- | | **6.**TCO G: Assess the capabilities of a data warehouse. Your answer should be complete and concise.  (Points : 15)          Data warehouses are capable to run large amounts of data and large transactions. Also, queries that would be very complex in normalized databases could be easier to build and maintain in data warehouses, which decreases the workload on transactions systems. A data warehouse also is an efficient way to manage and report on data that is from a variety of sources, non uniform and scattered through a company. A Data ware house provides the capability to analyze large amounts of historical data that can provide organizations with competitive advantage. |  |  | | --- | | **7.**TCO F: Which are more commonly used implicit or explicit locks? Explain why. (Points : 15)          Implicit locks are more commonly used than explicit locks. Here is why. Concurrency control involves many complex factors that influence the performance of the system. The impact of some of these factors can only be determined through trial and error. Changing explicit locks to tune system performance can require making changes throughout the program code to obtain and release locks at various places in the transactions. Moreover, implicit locks are much easier to change since a locking strategy can be specified in a system parameter or lock declaration area and then the DBMS will place the locks implicitly wherever they are needed to implement that strategy. |  |  | | --- | | **8.**TCO F: Explain the purpose of transaction logs and checkpoints. (Points : 15)          Transaction logs are created to facilitate the recovery of the database. All transactions that make changes to the database are recorded in the transaction log before they are applied to the database. In the event that the database fails, the transactions in the log can be used to undo changes made by transactions that were not committed, and to redo changes that were committed since the database was last saved. Checkpoints are used along side with transaction logs. A checkpoint is a marker for when the last time the database and the transaction log were synchronized. If the database must be restored, only after-images for transactions that began after the last checkpoint have to be applied. |  |  | | --- | | **9.**TCO C: Given the assumptions about functional dependencies and domains, transform the following relation into DK/NF.  Assumptions:       EmployeeName determines EmployeePhone, EmployeeAddress, City, State, Zip       Zip determines City, State       (Company, Position, EmployeeName) determines HireDate  EMPLOYER (Company, Position, HireDate, EmployeeName, EmployeePhone, EmployeeAddress, City, State, ZIP)  (Points : 15)          EMPLOYER (Company, Position, HireDate, fk[EmployeeName])  EMPLOYEE(pk[EmployeeName], EmployeePhone, EmployeeAddress, City, State, fk[Zip])  LOCATION(pf[Zip],City,State) |  |  | | --- | | **10.**TCO C: Briefly describe the process of converting an extended E-R model into a relational database design.  (Points : 15)          To convert an extended E-R model into a relational database design,  first tables and columns must be defined for each entity attribute.  The attributes of the entity are represented as the columns of the table.  Primary keys are then selected for each table, after which the relationships between the entities are represented through the creation of foreign keys.  constraints are specified.  the normalization criteria is re-examined, and, if appropriate, the relations are normalized to achieve a proper data design |  |  | | --- | | **11.**TCO C: What is a functional dependency? Give an example not used in the text.    (Points : 15)          functional dependency is when the value of one or more attribute determines the value of another attribute. A functional dependency does not necessary need to be an equation.  For example let say we have a database of MMA fighters with their names, and win and loss records. If a friend randomly pics the name of a fighter, you are able to tell them their win and loss record. | |