



Terminal Examination – Semester Spring 2015

Course Title:	Database Systems	Course Code:	CSC272	Credit Hours:	3(3,0)
Course Instructor/s:	Dr. Hamid Turab Mirza	Programme Name:	BS Computer Science		
Semester:	6 <sup>th</sup>	Batch:	FA12-BCS	Section:	A B C
Time Allowed:	180 Minutes		Maximum Marks:	100	
Student's Name:		Reg. No.	CIIT/DDP-	-BCS-	/LHR

**Important Instructions / Guidelines:**

- Write down your Name and Reg. Number on question paper
- Return your question paper along with your answer sheet as well

Q 1: [10 + 10 = 20 Marks]

- A: Explain the purpose and function of Data Replication. Also discuss its pros and cons.  
B: When should an Index be created? Give at least five rules for using Indexes.

Q 2: [05 + 10 = 15 Marks]

- A: Explain the purpose and goal of the Physical Database Design.  
B: Differentiate between Correlated and Non Correlated Subqueries, give one example each.

Q 3: [05 + 10 = 15 Marks]

- A: Explain the use of the Alias feature in SQL, and provide an example of its use.  
B: Explain the difference between %TYPE and %ROWTYPE, give one example each.

Q 4: [05 + 05 = 10 Marks]

- A: What must a DBMS guarantee with respect to a transaction?  
B: Why does DBMS interleave the actions of different transactions instead of executing transactions one after the other?

Q 5: [10 + 15 = 25 Marks]

- A: The table shown below is susceptible to anomalies. Identify and provide examples of insertion and deletion anomalies.  
B: Describe and illustrate the process of normalizing the below table to 3NF. State any assumptions you make about the data shown in this table.

staffNo	dentistName	patientNo	patientName	appointment date	time	surgeryNo
S1011	Tony Smith	P100	Gillian White	12-Aug-03	10:00	S10
S1011	Tony Smith	P105	Jill Bell	13-Aug-03	12:00	S15
S1024	Helen Pearson	P108	Ian MacKay	12-Sept-03	10:00	S10
S1024	Helen Pearson	P108	Ian MacKay	14-Sept-03	10:00	S10
S1032	Robin Plevin	P105	Jill Bell	14-Oct-03	16:30	S15
S1032	Robin Plevin	P110	John Walker	15-Oct-03	18:00	S15

Q 6: [15 Marks]

A General Hospital consists of a number of specialized wards (such as Maternity, Surgery, Oncology, etc). Each ward hosts a number of patients, who were admitted on the recommendation of their own family doctor and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading

Q2. Draw the Entity-Relationship Diagram (ERD) for the following scenario: [3.5+3.5+ 03 = 10]

A salesperson may manage many other salespeople. A salesperson is managed by only one sales people.  
 A salesperson can be an agent for many customers. A customer is managed by one sales people. A customer can place many orders.

An order can be placed by one customer. An order lists many inventory items. An inventory item may be listed on many orders. An inventory item is assembled from many parts. A part may be assembled into many inventory items. Many employees assemble an inventory item from many parts.  
 A supplier supplies many parts. A part may be supplied by many suppliers.

- > Draw appropriate entities
- > Mention relationship among these entities using appropriate ER symbols.
- > Clearly mention maximum and minimum cardinalities.

Q3. Carefully examine the Course and Student tables and provide the following [05+05 = 10]

- a. Output of "COURSE outer join STUDENT"
- b. Output of "COURSE right-outer join STUDENT"

Table: Course

Table: Student

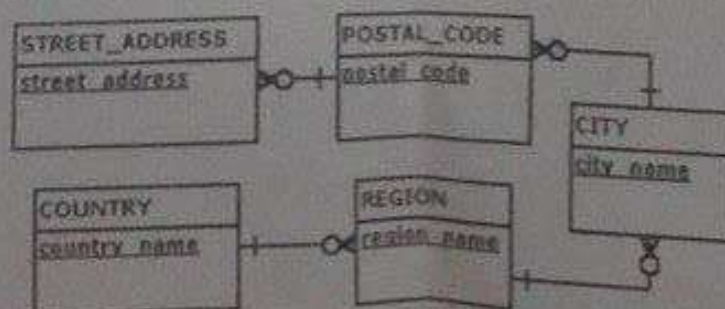
bkId	bkTitle	stId	stId	stName
B10001	Intro to Database Systems	S104	S101	Ali Tahir
B10002	Programming Fundamentals	S101	S103	Farhan Hasan
B10003	Intro to Data Structures	S101	S104	Farah Naz
B10004	Modern Operating Systems	S103	S106	Asmat Dar
B10005	Computer Architecture		S107	Liaqat Ali
B10006	Advance Networks	S104		

Q4. The table given below holds information about sales of a hardware store. In this case only the OrderId column is part of the primary key. [05 + 05 = 10]

- a. Rewrite the given table to achieve First Normal Form.
- b. Decompose the resultant table from part (a) and achieve Second Normal Form.

OrderId	CustomerId	OrderDate	Items
1	1	2006.10.22	Nt Nuts q=5, Bo Bolts q=10
2	1	2006.10.24	Sc Screw q=12
3	2	2006.09.15	Nt Nuts q=5, Sc Screw q=3
4	3	2006.10.22	Bo Bolts q=5

Q5. Why does a fully normalized database needs to be De-normalized? Below is an E-R diagram of "address book" in fully normalized form. De-normalize this to support your answer. [05 + 05 = 10]



consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward.

Draw an ER diagram to represent the data requirements as following:

- Identify the main entity types. [5]
- Identify the main relationship types between the entity types. [5]
- Identify attributes and associate them with entity or relationship types. [2.5]
- Determine candidate and primary key attributes for each (strong) entity type. [2.5]
- State any assumptions necessary to support your design.

composit key ? 55