



Higher National Diploma in Information Technology

Second Year, First Semester Examination - 2012

IT3201: Advanced Database Management System

Instructions to Candidates:

Answer five (05) questions only.

All Questions carry equal marks

Time: Three Hours (03)

No. of Pages 04

No of Question 06

Question 1

[Total 20 marks]

1. Define the term Database Management system. (2 marks)
2. State four advantages of Database approach (4 marks)
3. Briefly explain the Components of DBMS Environment (8 marks)
4. Discuss the differences between DDL and DML. What operations you would generally expect to be available in each language? (6 marks)

Question 2

[Total 20 marks]

1. Filling the blanks with equivalent relational terms (6 marks)

Informal Terms	Relational Terms
Table	a.
Column	b.
Row	c.
Values in a column	d.
Table Definition	e.
Populated Table	f.

2. Consider the following relations and calculate (4 marks)
 - a. Degree of the Relation
 - b. Cardinality of the Relation

Student		ContactNo	Address	Gender	Age	GPA
Reg. No	Name					
1111	C.D. Perera	0372228222	Kurunegala	M	20	3.9
1112	C. Basnayake	0362255222	Awissawella	M	21	3.5
1114	N.S. Bandara	0812234567	Kandy	F	20	3.8
1115	K. Peris	0112876655	Colombo	M	21	3.0
1116	S. Menike	0253456654	Anuradhapura	F	21	2.6

(6 marks)

3. Briefly explain the three phases of database design
4. Define the terms entity integrity and referential integrity constraints in relational model. (4 marks)

[Total 20 marks]

[Total 20 marks]

Question 3

Consider the following information about an Engineering enterprise.

- Each engineer works on a number of projects. For every engineer a record is kept of his/her number, name, title and salary. The number is used to identify an engineer uniquely.
 - For every project a record is kept of its unique number, name, budget and location. Additionally, the responsibility that each engineer has on a particular project and the amount of time spent on the project is noted. Each project has number of engineers working on it.
 - Clients contract these projects. The client's name, address and phone number must be recorded. A client is identified using the unique client number.
 - The contract date, i.e. the date at which the client signs the contract for a specific project is also noted. A client can contract multiple projects and a given project can be contracted by only one client.
 - A record is also kept of the machinery being used for a particular project. The name, model and machine number is recorded and the machine number is used to identify a machine uniquely..
 - A project can use many number of machineries and given machinery can be used in multiple projects.
1. Draw an Entity Relationship (ER) diagram to capture the above information. Indicate primary keys and key constraints. (12 marks)

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2. Royal Company uses the following table to record details of its departments.

DNAME	<u>DNUMBER</u>	DMGRSSN	DLOCATION
Research	5	333445555	{Mathara, Kandy, Metro}
Administrati	4	987654321	{Jaffna}
Headquarter	1	888665555	{Metro}

Is this Department relation in 1NF? If not convert the table above into 1 NF (4 marks)

Question 4

[Total 20 marks]

Reader

RNo	RName	Address	Phone
10	Janani	Wellawatte	0798654321
12	Methmi	Nugegoda	0778458217
13	Ruwan	Colpetty	0712345678

Borrows

Reader	ISBN	BorrowedDate	ReturnedDate	ReturnedStatus
12	234567	12/2/2011	12/3/2011	Yes
13	234567	23/5/2011		
12	123234	4/9/2011		

Books

ISBN	Title	authorID	publisher
234567	Database Management Systems	A1	McGraw Hill
123234	Introduction to Java	A2	McGraw Hill

Write SQL statements

1. To create the above tables including all primary and foreign key constraints. (14 marks)
2. List all the books written by author A1. (2 marks)
3. Select the names of the readers, addresses and phone numbers of those who have not returned the books on time. (4 marks)

Question 5

1. Define the term transaction in a database
2. Briefly explain ACID Property of transaction
3. What are the states in a transaction? Explain them briefly.

[Total 20 marks]

(2 marks)

(8 marks)

(10 marks)

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[Total 20 marks]**Question 6**

1. State the difference between Object-relational database systems and Object-oriented database systems. (4 marks)
2. Define the term Mandatory Access Control (MAC) in database system. (4 marks)
3. Briefly explain the term Encryption? (2 marks)
4. What do you mean by well-formed XML document? (2 marks)
5. Draw the XML tree structure for the following DTD document. (8 marks)

<!ELEMENT VisitinCard (Person+)> //1 mark

<!ELEMENT Person (Name,Designation,Qualification?,Company,Contact)> //2 mark

<!ELEMENT Name (#PCDATA)>

<!ELEMENT Designation (#PCDATA)> // 1 mark

<!ELEMENT Qualification (#PCDATA)>

<!ELEMENT CompanyName (#PCDATA)>

<!ELEMENT Contact (Address,Telephone,Fax?)> // 2 marks

<!ELEMENT Address (Company,Residence?)> //1 mark

<!ELEMENT Company (#PCDATA)>

<!ELEMENT Residence (#PCDATA)>

<!ELEMENT Telephone (General*,Direct?,Mobil*)> // 1 mark

<!ELEMENT General (#PCDATA)>

<!ELEMENT Direct (#PCDATA)>

<!ELEMENT Mobil (#PCDATA)>

<!ELEMENT Fax (#PCDATA)>

