



UNIVOTEC

**UNIVERSITY OF VOCATIONAL TECHNOLOGY  
Faculty of Training Technology**

**Bachelor of Technology in Information & Communication Technology  
(Multimedia & Web, Software, Network) 2015 / 2016 (B1)**

**Year I – Semester- I Examination - September -2015**

**Database Analysis and Design IT10305**

**Instructions : Answer 05 Questions.**

**Duration : 03 Hours**

- (01). (i). Describe the meaning of each of the following terms:  
a) Data Sharing      b) Data Integrity      c) Data Security      (06 marks)
- (ii). Describe the Basic Components of the DBMS environment and explain how they relate to each other      (08 marks)
- (iii) Discuss the advantages and disadvantages of DBMSs      (06 marks)
- (02). (i). Describe the meaning of each of the following terms:  
a) Entity      b) Attribute      c) Relationship      (06 marks)
- (ii). Discuss the differences between strong and weak entity? Give examples to illustrate your answer.      (06 marks)
- (iii) What does mean null value?      (04 marks)
- (iv) When would you use 'char' versus 'varchar'?      (04 marks)
- (03). Rising Star's is a private nursery organization which takes in children from the age of one year old up to the age of five years. Rising Star's has 5 branches in the Island. The Nursery previously had a paper based system for all of its administration and would now like to part-computerize the administrative and personnel side of the business. (For the moment the payroll (holidays, absences and salaries) for staff will not be dealt with).
- Each nursery can employ up to 50 staff and will need to have a minimum of 10 staff at each nursery:- these are either Manager, Nursery Room Teachers, administrative staff or auxiliary staff (e.g. cleaners and caretakers). At any one time each member of staff will only work at one branch.
- Children enroll on sessions at the nursery. Most children will be enrolled for a whole term at a time. (They may attend either morning or afternoon sessions or both. Also if a child is enrolled in all the morning sessions they may occasionally stay for afternoon sessions.) A register has to be kept for each session listing the children attending the session and the nursery room teachers taking the session.
- Only the nursery room teachers will take sessions with the children. There may be more than one nursery room teacher in each session. There are different numbers of children in each session as some children come for a few mornings or afternoons per week and other children are full-time.

(Please note that there is no time-tabling system detailing the activities; children arrive for sessions and are then taken for various activities by the nursery room teachers)

For the purposes of the database one of the child's parents will be regarded as having enrolled the child and will be responsible for the payment of fees. The fees for the nursery are calculated at a session rate. A session is regarded as a morning or an afternoon. Children can attend for any number of sessions in a week, with the maximum being 10 sessions (the nursery is not open on Saturdays and Sundays). At the moment the rate for each session for each child is Rs.200. There are no reductions for having two children from the same family enrolled. Parents pay monthly.

The staff and children will need to have the names, addresses and phone numbers of up to two emergency contact people.

- (i) Determine possible entity-sets (04 marks)
- (ii) Define attributes for a given entity-set and define primary keys (08 marks)
- (iii) Draw an ER diagram (08 marks)

(04). (i) Define or describe the term Normalization, When is the table in 1NF, 2NF and 3NF. (06 marks)

The following table illustrates Product and Sales Relation:

<u>Invoice No.</u>	<u>Product No.</u>	<u>Sale Date</u>	<u>Prod Desc</u>	<u>Vend Code</u>	<u>Vend Name</u>	<u>Qty Sold</u>	<u>Prod Price</u>
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- (ii). Why is the above table not in 1NF? (02 marks)
- (iii). Describe the process of normalizing the data shown in the table above to First normal form (1NF). (04 marks)
- (iv). Describe the process of normalizing the data shown in the table above to second normal form (2NF) (04 marks)
- (v). Describe the process of normalizing the data shown in the table above to third normal form (3NF) (04 marks)

(05). The Gill Art Gallery wishes to maintain data on their customers, artists and paintings. They may have several paintings by each artist in the gallery at one time. Paintings may be bought and sold several times. In other words, the gallery may sell a painting, then buy it back at a later date and sell it to another customer.

The following Form illustrates ONF **Gallery Customer History**

Gallery Customer History Form			
Customer Name			
Jackson, Elizabeth			
123 – 4 <sup>th</sup> Avenue			
Fonthill, ON			
L3J 4S4		Phone (206) 284-6783	
Purchases Made			
Artist	Title	Purchase Date	Sales Price
03 - Carol Channing	Laugh with Teeth	09/17/2000	7000.00
15 - Dennis Frings	South toward Emerald Sea	05/11/2000	1800.00
03 - Carol Channing	At the Movies	02/14/2002	5550.00
15 - Dennis Frings	South toward Emerald Sea	07/15/2003	2200.00

- (i) Convert ONF relation into 1NF relation. (03 marks)
- (ii) Identify the Primary Key of the relation. (03 marks)
- (iii) Identify functional dependencies and draw the dependency diagram. (06 marks)
- (iv) Convert the above relation to 2NF relations (04 marks)
- (v) Convert it to 3NF relations. (04 marks)

(06). Consider the following relations:

SalePerson (S\_ID, S\_Name, Age, Salary)

Customer (C\_ID, C\_Name, City, IndustryType)

Order (Ord\_No, Ord\_Date, C\_ID, S\_ID, Amount)

Write the SQL statements for the following:

- (i) The names of all salespeople that have an order with Samsonic customer. (05 marks)
- (ii) The names of salespeople that have 2 or more orders. (05 marks)
- (iii) Calculate total amount of each customer the Ord\_Date from 01.08.2015 to 01.09.2015 (05 marks)
- (iv) The names of salespeople that have more than average salary. (05 marks)

- (07). (i). Describe the purpose of creating a mission statement and mission objectives for the required database during the database planning stage (6 marks)
- (ii). Compare and contrast the centralized and decentralized design. (4 marks)
- (iii). Briefly describe the stages of the database system development lifecycle. (10 marks)