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Department of Technical Education and Training

NVQ Level 05 Written Examination – December 2021 (April/May 2022) (Semester I)

National Diploma in Information & Communication Technology

Database Systems I	5S1NVQ001	Three Hours

Instructions: **Answer questions – 1 and 3 (three) other questions.**

(This paper consists of 02 pages.)

1. (i) What do you mean by "Degree of a relationship" in database design? (05 Marks)

   (ii) Point out 3 kinds of specific concepts which are not in ER modelling but in **the EER Modelling.** (05 Marks)

   (iii) Suppose you are given the following requirements for a database for a Preschool

   - "Princes Playschool" is a preschool. A parent registers their child or children at the school and a parent can register many children.
   - Each room in the school is allocated for a class such as LKG, UKG, etc…
   - A child is assigned to a teacher and a room based on their age and availability of space.
   - A room may be assigned one or more teachers but a teacher can only be assigned to one room.
   - The school has two types of employees namely Teachers and Supervisors.
   - Each class is supervised by a Supervisor and a Supervisor can supervise only one class.

   Construct a clean and concise ER diagram for the Preschool as the guidelines given below.

   - Clearly indicate the cardinality mappings.
   - Include relevant attributes for each entity.
   - List your assumptions (15 Marks)

2. (i) Point out the main stages in Database Development Life Cycle. (05 Marks)

   (ii) Specify **necessary inputs and deliverable outcomes** of each stages mentioned above. (10 Marks)

   (iii) Briefly explain the three schema architecture of a database. (10 Marks)

3. (i) Clarify the difference between Partial Functional Dependency and Transitive Dependency using suitable examples. (05 Marks)

   (ii) Consider the following relation that keeps the details of a dental hospital.

EmpNo	DentistnAME	PatientID	PatientName	App Date	App Time
S1011	S T Perera	P100	A Menike	2021-10-04	10.00
S1011	S T Perera	P105	JayaniPeris	2021-10-04	12.00
S1024	J Senadeera	P108	Aruna Silva	2021-10-04	10.00
S1024	J Senadeera	P108	Aruna Silva	2021-11-19	10.00
S1032	R Kalpage	P105	JayaniPeris	2021-12-08	16.30
S1032	R Kalpage	P110	Ajith Kumara	2021-12-09	18.00

(a) At which normal form that the above relation remains? Clarify your answer. (05 Marks)

(b) Normalize it into all possible normal forms. (15 Marks)

4. (i) State 3 kinds of constraints in **the Relational Model.** (05 Marks)

(ii) " A foreign key can be a part of a primary key ". Do you agree with this statement? Justify your answer. (05 Marks)

(iii) Use theER diagram you have constructed in the Question-1 and map(Convert) it intorelational model(Relational Schema). Be sure to indicate all the keys clearly. (15 marks)

5. Consider the relational schema given below

Teacher (**EmpID**, Name, Phone, Address)

Module (**ModuleNo**, ModuleName, Hours)

Teaching(**EmpID, ModuleNo**, StDate, EndDate)

Write SQL statements for the followings to,

(i) Create 2 tables of Teacher and Module given above
(Choose suitable data types for each field.)

(ii) Create the Teaching table and be sure to indicate all the keys properly.

(iii) Modify the Teaching table by adding a new column name called "Hours per week".

(iv) Add a record to the Module table as given below.

ModuleNo = M01 **ModuleName** = Database Systems-1 **Hours** = 125

(v) Display all the names, Telephone Numbers and the module name of Teachers who are teaching the module "Database Systems-1". (05×05 = 25 Marks)
(Assume that many records are available in all tables for (v) part of the question)