



NATIONAL SCHOOL OF BUSINESS MANAGEMENT

BSc in Management Information Systems (Special) (NSBM)–21.1

BSc (Honours) in Software Engineering (NSBM)– 21.1

BSc in (Honours) in Computer Networks (NSBM)–21.1

BSc (Honours) in Computer Science (NSBM)– 21.1

**BSc (Honours) Software Engineering/Computer Science/Computer Networks/ Computer Security
(Plymouth)– 21.1**

Year 01 Semester 01 Examination

30th October 2021

CS105.3 - Database Management Systems

Instructions to Candidates

- 1) **Answer all questions.**
- 2) **Time allocated for the examination is five (05) hours (Including downloading and uploading time) . (Note: No email submissions are accepted under any condition.)**
- 3) Weightage of Examination: 60% out of final grade
- 4) Provide answers to the selected questions in the given format under the question.
- 5) Please upload the document with answers (Answer Script) to the submission link before the submission link expires
- 6) Answer script should be uploaded in PDF Format
- 7) Under any circumstances E-mail submissions would not be taken into consideration for marking. Incomplete attempt would be counted as a MISSED ATTEMPT.
- 8) The Naming convention of the answer script – Module Code_Subject name_Index No
- 9) You must adhere to the online examination guidelines when submitting the answer script to N-Learn.
- 10) Your answers will be subjected to Turnitin similarity check, hence, direct copying and pasting from internet sources, friend's answers etc. will be penalized.

Question 1: This question covers fundamental concepts of databases and normalization (30 Marks)

- “Database is always a mandatory component in a business organization”. Do you agree? Justify your answer. **(5 marks)**
- “It is always mandatory to have a DBMS (Database Management System). Do you agree? Justify your answer. **(5 marks)**
- Refer to the below table structure and answer the below questions.

C_NAME	C_PHONE	C_ADDRESS	C_ZIP	A_NAME	A_PHONE	TP	AMT	REN
Alfred A. Ramas	615-844-2573	218 Fork Rd., Babs, TN	36123	Leah F. Hahn	615-882-1244	T1	100.00	05-Apr-2010
Leona K. Dunne	713-894-1238	Box 12A, Fox, KY	25246	Alex B. Alby	713-228-1249	T1	250.00	16-Jun-2010
Kathy W. Smith	615-894-2285	125 Oak Ln, Babs, TN	36123	Leah F. Hahn	615-882-2144	S2	150.00	29-Jan-2011
Paul F. Olowski	615-894-2180	217 Lee Ln., Babs, TN	36123	Leah F. Hahn	615-882-1244	S1	300.00	14-Oct-2010
Myron Orlando	615-222-1672	Box 111, New, TN	36155	Alex B. Alby	713-228-1249	T1	100.00	28-Dec-2010
Amy B. O'Brian	713-442-3381	387 Troll Dr., Fox, KY	25246	John T. Okon	615-123-5589	T2	850.00	22-Sep-2010
James G. Brown	615-297-1228	21 Tye Rd., Nash, TN	37118	Leah F. Hahn	615-882-1244	S1	120.00	25-Mar-2011
George Williams	615-290-2556	155 Maple, Nash, TN	37119	John T. Okon	615-123-5589	S1	250.00	17-Jul-2010
Anne G. Farriss	713-382-7185	2119 Elm, Crew, KY	25432	Alex B. Alby	713-228-1249	T2	100.00	03-Dec-2010
Olette K. Smith	615-297-3809	2782 Main, Nash, TN	37118	John T. Okon	615-123-5589	S2	500.00	14-Mar-2011

C_NAME	= Customer name	A_NAME	= Agent name
C_PHONE	= Customer phone	A_PHONE	= Agent phone
C_ADDRESS	= Customer address	TP	= Insurance type
C_ZIP	= Customer zip code	AMT	= Insurance policy amount, in thousands of \$
		REN	= Insurance renewal date

- How many records does the file contain? How many fields are there per record? **(2 marks)**
 - What problem would you encounter if you wanted to produce a listing by city? How would you solve this problem by altering the file structure? **(3 marks)**
- d. Consider the following table structure and answer the below question.

S: Student M: Module D: Department

S_ID	M_ID	S_Name	M_Name	Grade	D_ID	D_name	D_Phone
1023	CS105	Mapa	DB	A	1	IS	5445012
1023	CS102	Mapa	C Lang	B	2	CSSE	5445011
1024	CS105	Perera	DB	A	1	IS	5445012
1025	CS105	Herath	DB	B	1	IS	5445012
1026	CS102	Aqeel	C Lang	A	2	CSSE	5445011
1026	CS105	Aqeel	DB	B	1	IS	5445012

- Identify the primary key of this table **(3 marks)**
- Identify the current Normal Form (NF) **(2 marks)**
- Identify the functional dependencies you could observe **(5 marks)**
- Normalize the table to its highest NF **(5 marks)**

Question 2: This question covers ER diagrams and Relational Schema**(40 Marks)**

"The Garage Management System keeps details of several garages, which have garage code (code), garage name (name) and the main branch address (baddress). The code can be used to identify a garage uniquely. A garage can have many branches with their own branch address (address) and a branch number (BranchNo). However, to identify a branch uniquely, BranchNo is not sufficient. Once a garage code is known a branch can be identified uniquely. A branch can provide a variety of repairs. Each repair is described by repair id (rid), repair type (rtype), repair cost (cost), and the chief technician (ctech) of the repair. The rid attribute can be used to identify a repair uniquely. A branch also provides a variety of services. Each service is described by service id (Sid), service type (stype), and the cost (cost) of the service. The Sid attribute can be used to identify a service uniquely. Many branches can provide a particular repair or a particular service. On the other hand, a branch can have many repair types and many service types. Each vehicle has a registration number (regno), model and fuel type (ftype). Registration number (rno) can be used to identify a vehicle uniquely. Customers have customer name, address, phone number (phone), and national identity card number (NIC), unique for a customer. A customer can have more than one phone number. A vehicle can be serviced and/or repaired. A vehicle can have many repairs and/or many services. Also, many vehicles can be repaired and/or service. Once serviced or repaired, the date of service (sdate) or the date of repair (rdate) should be stored. A customer can own many vehicles, but each vehicle can have one customer only."

- a. Derive the ER diagram and complete the following table based on the ER diagram you have derived. State any assumptions you made during the process. Trace the table into your answer script.

(25 Marks)

No of. Entities identified	
No.of 1:1 relationships	
No.of 1:M /M:1 relationships	
No.of N: M relationships	

- b. Map the ER diagram into a relational schema (RS) and complete the following table based on the RS you derived. Trace the table to your answer script and may add rows where necessary. **(15 Marks)**

Relation Name	No.of Attributes	Primary Key	Foreign Key

Question 3: This question covers your knowledge on MySQL**(30 Marks)**

Consider the following tables.

Employee

StaffID	fName	lName	Position	Gender	DOB	MonthlySalary	DepID
101	Manoj	Herath	Senior Lecturer	F	1-Oct-86	50000.00	C001
102	John	Iman	Lecturer	M	3-Sep-96	40000.00	C002
201	Amanda	Perera	Registrar	F	12-Jan-75	30000.00	C001
103	Amanda	Dias	Lecturer	F	25-Feb-98	20000.00	C002

Department

DepID	DName	DPhone	DLocation
C001	Information Systems	5445012	Homagama
C002	Computer Sciences	5445011	Nugegoda
C003	Data Science	5445013	Homagama

Write SQL statements to perform followings using given two tables.

- Create the above two tables identifying relevant primary and foreign keys. **(5 Marks)**
- Enter at least two records per table. **(4 Marks)**
- Assume that you are trying to add the following record into the employee table. Do you think you'll be able to add this record? Justify your answer. **(3 Marks)**

104	Vindi	Madly	Junior Lecturer	F	25-Feb-99	22000.00	C004
-----	-------	-------	-----------------	---	-----------	----------	------

- Produce a list of salaries for all employees, showing only the staff id, the first and last names, and the salary details. **(2 Marks)**
- Produce a list of annual salaries for all staff, showing the staff number and the salary details. **(2 Marks)**
- List down all the unique positions assigned to employees. **(2 Marks)**
- List all staff with a monthly salary greater than 22,000. **(2 Marks)**
- List the department ID and phone number of all departments in Homagama or Galle. **(2 Marks)**
- List all employees with a salary between 22,000 and 35,000. **(2 Marks)**
- List all senior lecturers and lecturers details. **(2 Marks)**
- Find department ID with the string 'Nugegoda' in their location. **(2 Marks)**
- Produce a list of monthly salaries for all staff, arranged in ascending order of salary. **(2 Marks)**

END OF THE PAPER