

CENTRAL UNIVERSITY

SCHOOL OF ARCHITECTURE AND SCIENCE

END OF FIRST SEMESTER EXAMINATION - 2017/18

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

COURSE CODE: ITEC 204

DATABASE MANAGEMENT SYSTEMS

B. Sc. INFORMATION TECHNOLOGY

2 Hours

STUDENT INDEX No

INSTRUCTIONS

* Answer all Questions. (1 mark each)

**DO NOT TURN OVER THIS PAGE UNTIL YOU HAVE BEEN TOLD TO DO
SO BY THE INVIGILATOR**

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SECTION A: MULTIPLE CHOICE (1 mark each)

The multiple choices are labelled A to D. Encircle clearly ONLY ONE label which corresponds to the correct response to each question. You will not receive any partial credit for any question for which more than one response is provided.

Answer ALL questions from this section. Encircle the correct answer.

1. In a relational model, cardinality is termed as the ...
 - A. number of tuples.
 - B. number of attributes.
 - C. number of tables.
 - D. number of constraints.

2. What is a relation in a relational model?
 - A. Tuples.
 - B. Attributes
 - C. Tables.
 - D. Rows.

3. In the architecture of a database system, external level is the ...
 - A. physical level.
 - B. logical level.
 - C. conceptual level
 - D. view level.

4. The language used in database programs to request data from the DBMS is referred to as the ...
 - A. Data Manipulation Language
 - B. Data Definition Language
 - C. View Definition Language
 - D. Specification and Description Language

5. Whenever a foreign key has a value, which does not exist in the primary key table, there is ...
 - A. absolute integrity violation
 - B. referential integrity violation
 - C. naming integrity violation
 - D. database integrity violation

6. Conceptual design ...
 - A. is a documentation technique.
 - B. needs processing frequencies to determine the size of the database.
 - C. involves modelling that is independent of the DBMS.
 - D. is designing the view of a relational model

7. An advantage of the database management approach is ...
 - A. data is dependent on programs.
 - B. there is data redundancy.
 - C. data is not integrated and cannot be accessed by multiple programs.
 - D. none of the above.

8. If the value of an attribute is specified as NOT NULL in Microsoft Access, it means ...
 - A. it is an optional attribute.
 - B. it is a multivalued attribute.
 - C. it is a required attribute.
 - D. none of the above.

9. A row in a database table represents a ...
 - A. record
 - B. unit
 - C. cell
 - D. field

10. A type of database structure in which data elements are stored in different tables, each of which consists of rows and columns is known as ...
 - A. relational database.
 - B. object oriented-database.
 - C. multi-dimensional database.
 - D. hierarchical database.

11. Which of the following is not a type of the relationship in a database?
 - A. One-to-one.
 - B. One-to-many.
 - C. One-to-few.
 - D. Many-to-many.

12. Which of the following is true about a primary key field in one table and the same field being used as a foreign key in another table? They must ...
 - A. have the same data type.
 - B. both have text data only.
 - C. have the same name.
 - D. be in the same column.

13. For which of the following data types in Microsoft Access would one expect the data to be generated automatically?
 - A. short.
 - B. Text.
 - C. Date.
 - D. Auto number.

14. A field that refers to a primary key in a related table is known as ...
 - A. primary key.
 - B. foreign key.
 - C. composite key.
 - D. candidate key.

15. What does *field size* mean?
 - A. Long text usually several characters entered in the same field.
 - B. The length of characters of data that a field is defined to accept.
 - C. The number of Integer data that a field is defined to accept.
 - D. Auto data that is generated automatically.

15. Assuming you were designing a database for employees of a government ministry, which of the following is likely to be used as a primary key field?
- Name.
 - Date of Birth.
 - SSNIT Number.
 - License Number.
16. Which of the following terms is the most suitable description for: *Whenever you change a value in a primary key field of a table, it is also automatically changed in the foreign key field?*
- Cascade change related field.
 - Cascade delete related field.
 - Cascade update related field.
 - Cascade record related field.
17. What does **Persons.*** mean in a query window?
- All the records from the persons table.
 - All the fields without any record from the persons table.
 - All the fields and records from the all tables.
 - None of the above.
18. Which of the following SQL key word(s) are the most appropriate to precede the statements below?
(Car_Id Text (8) UNIQUE NOT NULL PRIMARY KEY,
Car_Vin Text (17),
Car_YearMade Number,
Car_Make TEXT(50) NOT NULL,
Car_Model TEXT(50);
- INSERT INTO VALUES.
 - CREATE TABLE *table_name*.
 - SELECT.
 - UPDATE.
19. A type of query in which the user is prompted to enter some criteria before the result is generated is known as
- parameter query.
 - criteria query.
 - prompt query.
 - none of the above.
20. Which SQL key word(s) precede(s) the specification of a query criteria?
- RUN.
 - CREATE QUERY.
 - WHERE.
 - INSERT.

21. Which of the following data types will it be impossible to perform comparison operations on?
- Text data.
 - Date/Time data.
 - Currency.
 - None of the above.
22. How best would you describe the query below? (Note the bold text part).
*SELECT Persons.Person_LastName, Persons.Person_FirstName,
 Employees.Employee_Rank, Employees.Employee_Salary,
 Employees.Employee_Salary*12 AS AnnualSalary
 FROM Persons, Employees
 WHERE Employees.Person_Id=Persons.Person_Id;*
- Arithmetic query
 - Computed query
 - Multiplication query
 - Calculation query
23. The commonest type of relationship one will encounter between tables in relational database is a ...
- one-to-one relationship.
 - many-to-one relationship.
 - one-to-many relationship.
 - none of the above.
24. When two (2) or more fields are combined to form a primary key field, it is known as...
- candidate key.
 - composite key.
 - derived key.
 - calculated key.
25. What is the best description to give an attribute such as address?
- Multivalued attribute.
 - Simple attribute.
 - Long attribute.
 - Composite attribute.
26. In Database Management Systems, the process of storing the same fact at various locations in the database is known as ...
- multiple storage of data.
 - data redundancy.
 - excess storage of data.
 - data normalization.
27. A collection of data files is known as a
- field.
 - database.
 - record.
 - character.

28. Which is the smallest unit of data when using the logical view of data?
- A. Data File.
 - B. Character.
 - C. Field.
 - D. Record.
29. What is the term used to describe “*a structured collection of related data*”?
- A. Data entry.
 - B. Database.
 - C. Forms.
 - D. Tables.
30. A data type in Microsoft Access that one can use to specify True or False as options for its value is defined as ...
- A. Yes/No.
 - B. On/Of.
 - C. True/False.
 - D. Positive/negative.
31. If you want retrieve data whose values you are not sure of (that is not an exact match of the value), you must use ...
- A. comparison operator in the query
 - B. if/then operator in the query
 - C. revision in the query
 - D. none of the above
32. Adding new records or changing existing records in a database is an example of ...
- A. restructuring the database
 - B. maintaining the database
 - C. designing the database
 - D. none of the above
33. A field in a table in which the user **MUST** enter data is a
- A. validation field.
 - B. required field.
 - C. default field
 - D. none of the above
34. What database object, does Microsoft Access use to present formatted printout from the database?
- A. Reports.
 - B. Forms.
 - C. Queries.
 - D. Tables.
35. When you close a switchboard, the switchboard will be removed from the screen while the database
- A. is also closed.
 - B. remains open.
 - C. processes macros.
 - D. none of the above.

36. Which of the following characteristics are applicable if field is a **key field** in a Microsoft Access database table?
- I. It cannot contain a null value or missing data.
 - II. It can sometimes contain null value.
 - III. It is indexed.
 - IV. Only numeric values are indexed.
- A. I & III.
 - B. I & IV.
 - C. II & III.
 - D. II & IV.
37. Where in a database are attributes stored? In ...
- A. cells.
 - B. fields
 - C. records.
 - D. queries.
38. In a Relational Database, data is typically stored in a
- A. field.
 - B. record.
 - C. table.
 - D. file.
39. What are queries used for in a database?
- A. Creating tables.
 - B. Defining new data.
 - C. Data Manipulation.
 - D. Constructing the database.
40. Referential Integrity Constraints are used to ...
- A. enforce one to many relationships.
 - B. enforce the uniqueness of the values entered as primary keys.
 - C. ensure that foreign key values correspond to values in the primary key table.
 - D. ensure that values entered for a certain property exists.

SECTION B (TRUE OF FALSE)

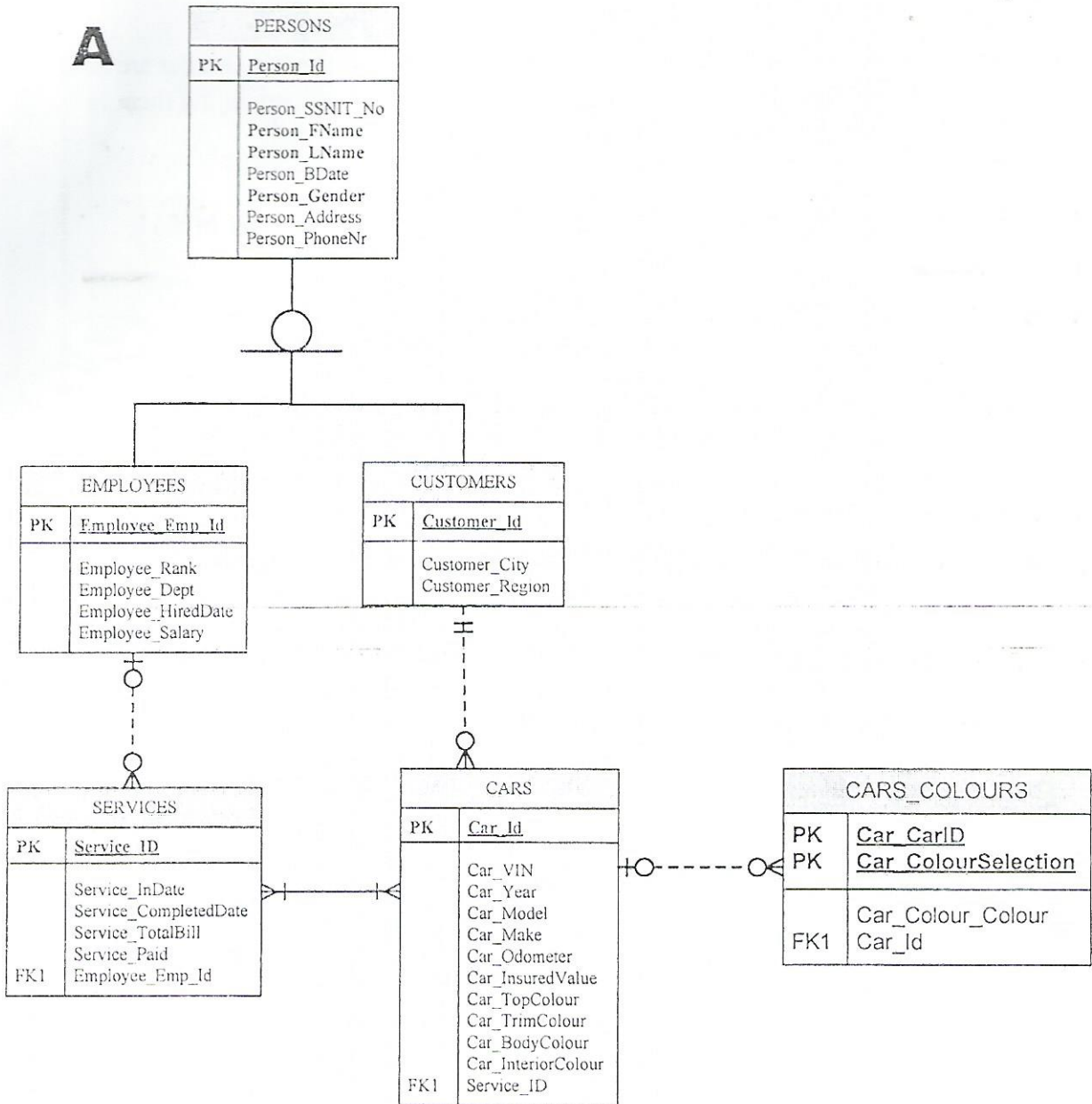
Answer the following questions T for TRUE and F for FALSE)

1. A foreign key does not necessarily have to be unique.
2. A bad choice for a primary key for the university's student database is the student's last name.
3. It is always possible to properly design a database and avoid using composite keys.
4. One advantage of designing database tables carefully is to ensure data consistency

5. The process of creating well-behaved sets of tables to efficiently store data, and minimize redundancy is called data integrity.
6. Primary keys can sometimes have any value including nulls.
7. A relational database conceptual model (diagram) cannot contain many-to-many relationship between two tables.
8. A table cannot contain more than one foreign key.
9. A foreign key is not unique and so may have duplicate values.
10. When transforming an EERD into a relation table design, the primary key of the child side of a 1-M relationship (the many side) will become a foreign key in the 1 side of the relationship.
11. All entity types must have a primary key, but it can be borrowed or inherited.
12. SQL provides AS keyword that can be used to assign a name to any column.
13. A group of associated fields are called attributes.
14. The maximum number of entities that can be involved a relationship is two.
15. A conceptual schema is a complete logical view of the database.

SECTION C: DATABASE MODELLING (1 mark each)

Diagrams A and B are notations used in Enhanced Entity Relationship model. Use them to answer all the questions in this section. You will not receive any partial credit for any question for which more than one or an incomplete response is provided.



1. What is the name of the notation labelled 'A' used for the diagram above?
.....
2. How would you describe the link between **SERVICES** and **CARS** entities as represented in the diagram above?
.....
3. How many relations could you map out from the tables **SERVICES** and **CARS**?
.....


4. How many relations could you map out from the tables **PERSONS**, **EMPLOYEES** and **CUSTOMERS**?

.....
5. What is the most appropriate name for the link between the **PERSONS** entity on one hand and those of **COSTOMERS** and **EMPLOYEES** on the other?

.....
6. In the Persons entity above, Person_Fname, Person_Lname and Person_Gender are bold. How would you differentiate them from the other entities when implementing them in the Microsoft Access database?

.....
7. Why is Employee_Id from the EMPLOYEES entity also among attributes of the SERVICES entity?

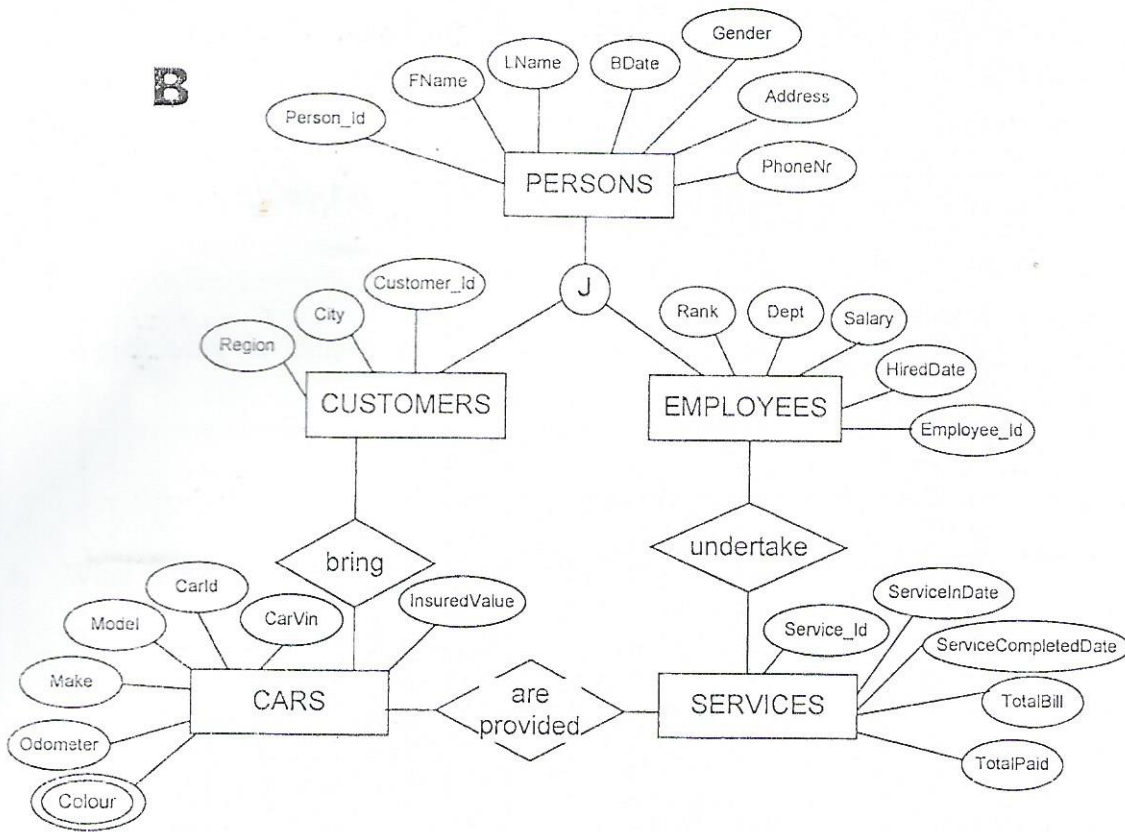
.....
8. From which one attribute in the Persons entity could other values be derived?

.....
9. What is the name of this link  as shown in the diagram?

.....
10. What conceptual object is represented by the diagram below?

SERVICES	
PK	<u>Service_ID</u>
	Service_InDate Service_CompletedDate Service_TotalBill Service_Paid
FKI	Employee_Emp_Id

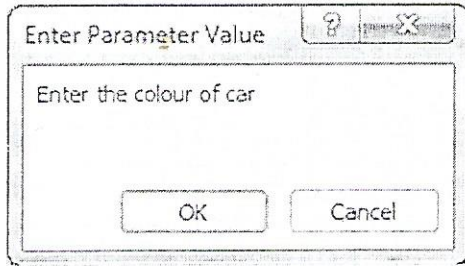
B



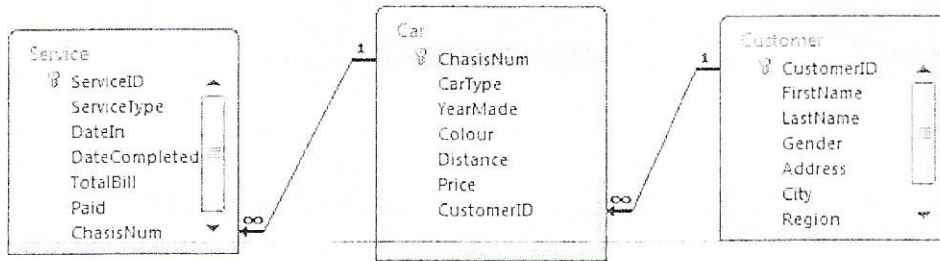
11. What is the name of the notation used for the diagram above?
.....
12. What is the most appropriate name for the attribute **Colour** from the **CARS** entity in the diagram above?
.....
13. What is the *rectangle* representing in the model above?
.....
14. What does *oval* represent in the diagram above?
.....
15. What does a *diamond* symbol represent in the diagram above?
.....
.....
.....

SECTION D (MICROSOFT ACCESS AND SQL)

1. The window below is from Microsoft Access. When does this window pop up in Microsoft Access?



The diagram below is captured from Microsoft Access. Use it to answer questions 2–4.



2. Which Microsoft Access Tool is used to activate the window above?
.....
3. What is the name of the symbol “∞” used in the diagram above?
.....
4. Describe the cardinality between Service and Car in the diagram for which the symbol “∞” is being used in the diagram above.
.....

Below is an SQL query captured from a Microsoft Access Database. Use it to answer the statement that has been successfully run. Use it to answer questions 5-10

```
CREATE TABLE Persons
(Person_Id Text (8) UNIQUE NOT NULL PRIMARY KEY,
Person_SSNITNo Text (13),
Person_LastName TEXT(50) NOT NULL,
Person_FirstName TEXT(50) NOT NULL,
Person_BDate Date,
Person_Gender Text (1),
Person_PhoneNo Text(10),
Person_Email Text(30));
```

5. What is the name of the table the query intends to create?

.....

6. What is the primary key field of the table?

.....

7. Which is/are the longest field size(s) defined for any of the text data types?

.....

.....

8. What is the data type defined for the attribute *Person_Bdate*?

.....

9. How many attributes have been created in because of the query?

.....

10. Which of the attributes will occupy the smallest disk space when stored in the database?

.....

Below is an SQL Query sent to a database. Use it to answer question 11 to 14

```
SELECT Persons.Person_LastName, Persons.Person_FirstName,  
       Persons.Person_Gender, Customers.Customer_City  
FROM   Persons, Customers  
WHERE  Persons.Person_Id=Customers.Person_Id AND  
       Person_Gender='F';
```

11. How many fields would be displayed in the result window of the query.

.....

12. What is the main criteria based on which the data is being selected?

.....

13. From how many tables would the data be retrieved?

.....

14. Which one of the fields of the query would contain the same value?

.....

15. By what name would you call a query whose criteria is stated below?

WHERE Persons.Person_Id=Customers.Person_Id AND Customers.Customer_Region=[Enter the Region of Customer];

.....

16. A SELECT statement of query is as follows:

SELECT Persons.Person_LastName, Persons.Person_FirstName, Employees.Employee_Salary, Employees.Employee_Salary*12 AS AnnualSalary

What data would be retrieved because of the addition of Employees.Employee_Salary*12 AS AnnualSalary in the SELECT statement?

.....

Below is a query and its result. Use it to answer questions 17-20

SELECT Persons.Person_Id, Persons.Person_LastName, Persons.Person_FirstName, Customers.Customer_City, Customers.Customer_Region

FROM Persons, Customers

WHERE Persons.Person_Id=Customers.Person_Id AND Customers.Customer_Region=[Enter the Region of Customer];

Query2

Person_Id	Person_LastName	Person_FirstName	Customer_City	Customer_Region
PER14787	Patience	Komeleo	Tema	Greater Accra
PER98767	Joyce	Dodzi	Tema	Greater Accra
PER14785	Felicia	Kwakuyi	Tema	Greater Accra
PER02147	Kekeli	Amedeka	Accra	Greater Accra
PER01452	Simon	Amoako	Accra	Greater Accra
PER98655	Francis	Frimpong	Tema	Greater Accra
PER14725	Daniel	Ameka	Tema	Greater Accra
PER01445	James	Bendt	Accra	Greater Accra

17. How many records have been retrieved?

.....

18. In how many cities are the customers residing?

.....

19. From how many fields were the results retrieved?

.....

20. Which city has the highest number of customers?

.....

SECTION E

1. Define all the following terms. (1 mark each)

1.1. An attribute

.....
.....

1.2. Simple attribute

.....
.....

1.3. Composite attribute

.....
.....

1.4. Multivalued attribute

.....
.....

1.5. Required attribute

.....
.....

1.6. Optional attribute

.....
.....

1.7. Primary key

.....
.....

1.8. Composite primary key

.....
.....

1.9. Foreign key

.....
.....

1.10. Candidate key

.....
.....