BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IM.Sc. **SEMESTER : II**
BRANCH: QEDS **SESSION : SP/2023**

SUBJECT: ED119 PROGRAMMING LANGUAGE AND DATABASE MANAGEMENT SYSTEM
TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.

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Q.1(a)	Explore the possibilities when a derived class inherits from a base class using public, private and protected keywords.	[5]	1
Q.1(b)	(i) Describe function overloading and how is it done? Explain how it is different from polymorphism. (ii) Describe Dangling Pointers and its significance in object-oriented programming.	[5]	1
Q.2(a)	Describe Schema diagram for the university database.	[5]	2
Q.2(b)	Consider the bank database given below. Give an expression in the relational algebra for each of the following queries: (i) Find the name of each branch located in "Chicago". (ii) Find the ID of each borrower who has a loan in branch "Downtown". *branch (branch name, branch city, assets)* *customer (ID, customer name, customer street, customer city)* *loan (loan number, branch name, amount)* *borrower (ID, loan number)* *account (account number, branch name, balance)* *depositor (ID, account number)*	[5]	2
Q.3(a)	*Consider the insurance database given below, where the primary keys are underlined. Construct the following SQL queries for this relational database.* *(i) Find the total number of people who owned cars that were involved in accidents in 2017.* (ii) Delete all year-2010 cars belonging to the person whose ID is '12345'. *person* (*driver_id*, *name*, *address*) *car* (*license_plate*, *model*, *year*) *accident* (*report_number*, *year*, *location*) *owns* (*driver_id*, *license plate*) *participated* (*report_number*, *license_plate*, *driver id*, *damage amount*)	[5]	3
Q.3(b)	Outer join expressions can be computed in SQL without using the SQL outer join operation. To illustrate this fact, show how to rewrite each of the following SQL queries without using the outer join expression. (i) select * from student natural left outer join takes (ii) select * from student natural full outer join takes	[5]	3
Q.4(a)	Create the Entity Relationship model for PUBG game and describe the importance of strong and week entities in the ER model. How one can convert week entities into strong entities?	[5]	4

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Q.4(b) SQL allows a foreign-key dependency to refer to the same relation, as in the following example: [5] 4

```
create table manager
        (employee ID char(20),
         manager ID char(20),
         primary key employee ID,
         foreign key (manager ID) references manager(employee ID)
                                  on delete cascade )
```

Here, employee ID is a key to the table manager, meaning that each employee has at most one manager. The foreign-key clause requires that every manager also be an employee. Explain exactly what happens when a tuple in the relation manager is deleted.

Q.5(a) Suppose that we decompose the schema R = (A, B, C, D, E) into [5] 5

(A, B, C)
(A, D, E).

Show that this decomposition is a lossless decomposition if the following set F of functional dependencies holds:

$A \rightarrow BC$
$CD \rightarrow E$
$B \rightarrow D$
$E \rightarrow A$

Q.5(b) Consider the schema R = (A, B, C, D, E, G) and the set F of functional dependencies: [5] 5

$AB \rightarrow CD$
$B \rightarrow D$
$DE \rightarrow B$
$DEG \rightarrow AB$
$AC \rightarrow DE$

Evaluate the highest normal form. Explain the steps to make R to the highest normal form.

:::::22/07/2023:::::