

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
November/December, 2023

Marks Scored:

Level : B.E./B.Sc.  
Year : II

Course : COMP 232  
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date **06 DEC 2023**

SECTION "A"

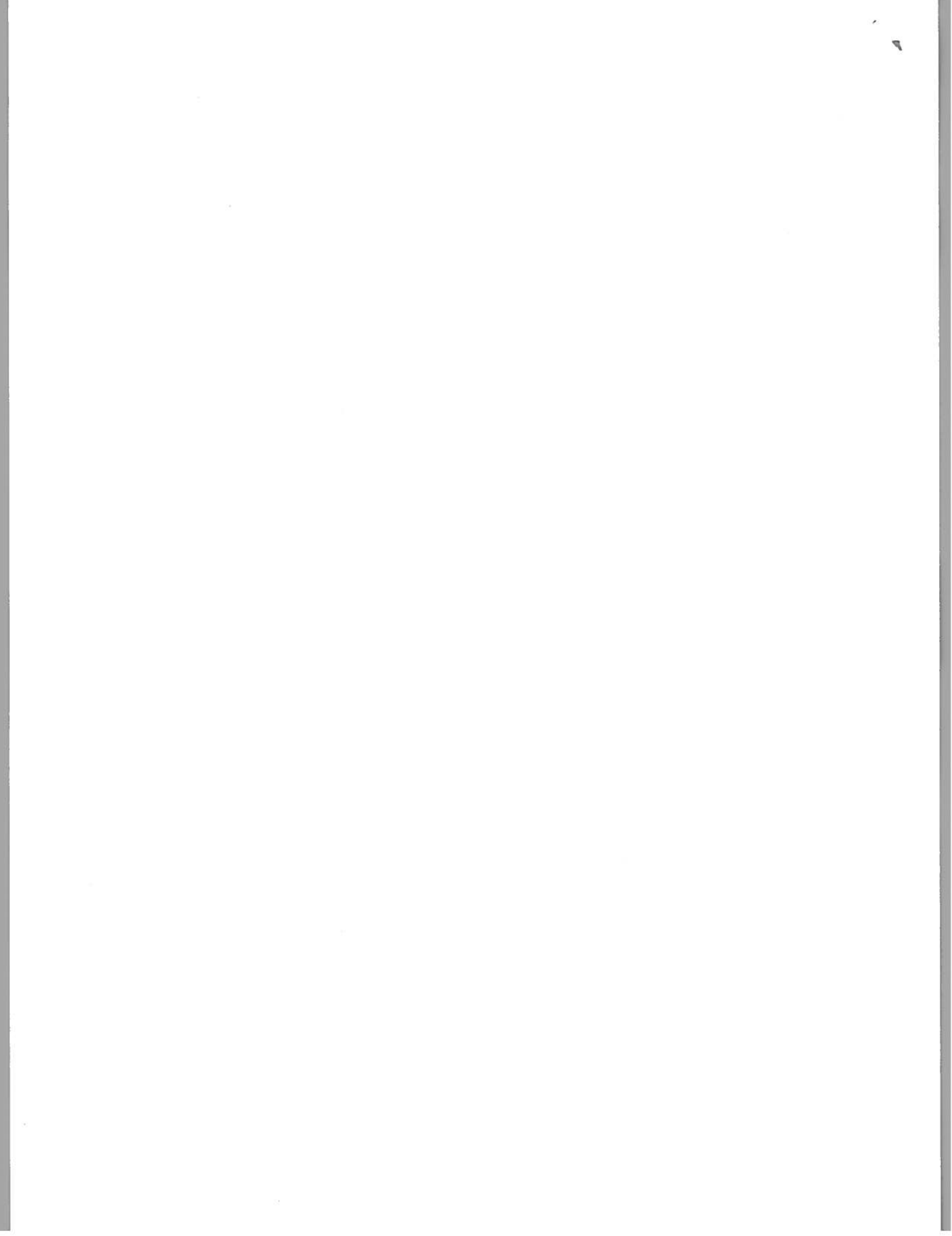
[20 Q. × 0.5 = 10 marks]

Mark [X] in the most appropriate option.

- Every weak entity must be associated with an identifying entity; that is, the weak entity is said to be \_\_\_\_\_ on the identifying entity set.  
 Existence dependent                       Discriminator  
 Acceptance dependent                       Primary dependent
- Which one of the following features does not belongs to the extended E-R features in the Entity Relationship Diagram?  
 Ternary relationship                       Inheritance  
 Specialization                       Aggregation
- Which of the following statement/s is/are true regarding the Projection Operator in relational algebra?  
 The projection operator in relational algebra output specified attributes from all rows of the input relation removing the duplicates tuples from the output.  
 The projection operator in relational algebra output specified attributes from all rows of the input relation retaining the duplicates tuples from the output.  
 The projection operator in relational algebra output pairs of two input relations that have the same value on all attributes that have the same name.  
 The projection operator in relational algebra output pairs of two input relations that have the different value on all attributes that have the different name.
- Which one of the following patterns matches all the strings beginning with "ab\cd" in SQL operation?  
 like 'ab\cd%' escape '\                       like 'ab%cd%' escape '\'  
 like 'ab//cd%' escape '\                       like 'ab\%cd%' escape '\'
- After a transaction completes successfully, the changes it has made to the database persist, even if there are system failure is best illustrated by the \_\_\_\_\_ transactional properties.  
 Atomicity                       Consistency                       Isolations                       Durability
- The failed transaction state will eventually enters to the \_\_\_\_\_ state which can be further go ahead by either \_\_\_\_\_ or \_\_\_\_\_.  
 Aborted, Restart, Kill                       Partially committed, Abort, Kill  
 Deadlock, Abort, Wait                       Deadlock, Kill, Abort



17. The idea of subclass in object oriented programming is represented by \_\_\_\_\_ relationship in DBMS system.  
 Binary             ISA             n-ary             symmetric
18. Which one of the following statement is false regarding operation on NULL?  
 When we operate on a NULL and another value (including another NULL) using, etc., the result is NULL  
 Aggregate functions ignore NULL  
 NULL and ZERO value are manipulated in different sense.  
 COUNT, like aggregate function, ignores NULL in SQL statement.
19. Which of the line will produce error in the following query?  
Line1: Create Table students  
Line2: { roll\_no int not Null,  
Line3: std\_name varchar2(20) unique,  
Line4: std\_dob date,  
Line5: Primary key (roll\_no)  
Line6: );  
 Line 2             Line 3             Line 4             Line 5
20. An entity in A is associated with at most one entity in B. An entity in B, however, can be associated with any number (zero or more) of entities in A is defined by \_\_\_\_\_ relation.  
 One to One             One to Many  
 Many to One             Many to Many



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Time : 2 hrs. 30 mins.

Course : COMP 232  
Semester : II  
F. M. : 40

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SECTION "B"  
[2Q. × 8 = 16 marks]

Attempt *ALL* questions.

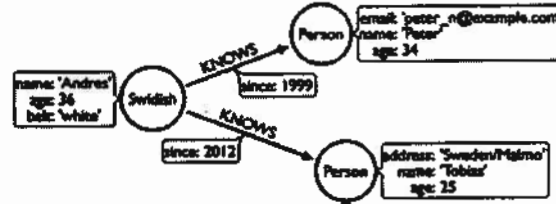
1. Based upon the Database schema and dependencies given below, explain how does the normalization help in the minimization of redundancy in Database Management System.  
R(Project\_code, Project\_title, Project\_Manager, Project\_budget, Emp\_no, Emp\_name, Dept\_no, Dept\_name, Hourly\_rate).  
Dependencies:  
Project\_code, Project\_Title → Project\_budget,  
Project\_code, Emp\_no → Hourly\_rate  
Emp\_no → Ename, Dept\_no  
Dept\_no → Dept\_name  
Emp\_no, Project\_code → Project\_manager  
Project\_code → Project\_title
2. How does the process of conceptual modeling using an entity relationship diagram (ERD) facilitate the accurate representation and understanding of complex data structures in a database management system (DBMS)? Discuss the significance of each component of an ERD and explain how they contribute to the overall integrity and efficiency of a database system. [4+4]

SECTION "C"  
[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

3. How does the database design process differ in relational databases versus non-relational databases (NoSQL)?
4. Explain the situations that arise with Concurrent executions in Database management system and discuss some common techniques used for concurrency control. [2+2]
5. Explain the concept of database recovery in a database management system (DBMS). Discuss some common database recovery techniques used to ensure data durability and availability. [2+2]

6. Taking references with the figure: graph, answer the following questions.



- a. Write a Cypher Query to create the above graph Database.
  - b. Write a Cypher Query to check whether the particular name exist in the list or not.
7. Define the terms schema, tuple, domain and cardinality in DBMS.
8. Discuss the different types of SQL language. Write a SQL query to calculate the average salary of employees in each department, along with the total number of employees in that department. [2+2]
9. State whether the schedule given below is serializable or not. If not state which instruction(s) should be removed else show the conflict equivalent. [2+2]

$T_1$	$T_2$
read (A) $A := A - 50$ write (A)	read (A) $temp := A * 0.1$ $A := A - temp$ write (A)
read (B) $B := B + 50$ write (B) commit	read (B) $B := B + temp$ write (B) commit

Figure: Schedule