B.C.A. DEGREE END SEMESTER EXAMINATION - OCTOBER 2024
SEMESTER 3 : MOBILE APPLICATIONS AND CLOUD TECHNOLOGY
COURSE : **19U3CRBCA9 : RDBMS**
(For Regular 2023 Admission and Improvement/Supplementary 2022/2021/2020/2019/2018/2017/2016
Admissions)

Time : Three Hours   Max. Marks: 75

PART A
Answer All (1 mark each)

1.   What is the purpose of the two-phase Locking Protocol?
2.   Write relational algebraic expression to list all staff with age greater than 30.
3.   What is referential integrity constraint?
4.   What is meant by insertion anomaly in a relation?
5.   List out the types of intention locks.
6.   Define the cardinality of a relationship.
7.   Illustrate the advantage of using a database rather than using files.
8.   Construct a Relational Schema for a relation.
9.   List the types of locks in locking protocols.
10. What are the different types of normal forms that exist in the database?

(1 x 10 = 10)

PART B
Answer any 8 (2 marks each)

11. Discuss the use of the transaction manager in DBMS.
12. What are the characteristics of relations?
13. Consider the relation R=(ABCD) and the set of functional dependencies F={AB->CD, D-A}. Identify all the candidate keys of the relation R.
14. Describe third normal form with an example.
15. Write the syntax and use of INSERT command.
16. What is mean by atomicity in a transaction?
17. Differentiate between Cartesian product and natural join operations used in relational algebra.
18. Explain live lock.
19. Differentiate between the Share and the exclusive locks.
20. Give an example of the many-to-many relationship in the ER model.

(2 x 8 = 16)

PART C
Answer any 5 (5 marks each)

21. Explain recovery isolation levels.
22. Consider the relation R=(ABCDE), the set of functional dependency F=[A$\rightarrow$BC, CD$\rightarrow$E, B$\rightarrow$D, E$\rightarrow$A] and the decomposition R1(ABC) and R2(ADE):
     a) Is the decomposition is lossless? Why?
     b) Is the decomposition dependency preserving?
23. Illustrate a weak entity with an example.

24. What is multivalued attributes. Write notes on 1NF and illustrate the same with a suitable example.

25. Convert the ER diagram given below to the relational model.
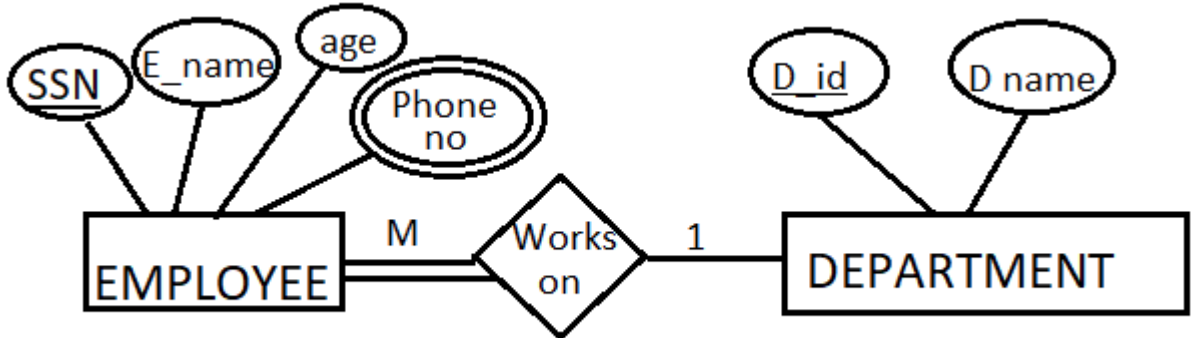
Find all relations from the above ER model. Write the relational schema for each relation.

26. Consider the following relations for a bus reservation system application.
    BUS (ROUTENO, SOURCE, DESTINATION)
    PASSENGER (PID, PNAME, DOB, GENDER)
    BOOK_TICKET (PID, ROUTENO, JOURNEY_DATE, SEAT_NO)
    Construct SQL query to
    a) Display the passengers who had booked the journey from Bangalore to Chennai on 03-NOV-2014.
    b) Show the list of passengers in descending order of their names.

27. Explain about the object based data models.

(5 x 5 = 25)

PART D
Answer any 2 (12 marks each)

28. Discuss any three problem due to the concurrent execution of transactions.

29. Explain 1NF, 2NF, 3NF, and BCNF. Consider the relation R=(ABCDEF) and the set of functional dependencies F=[A->FC, C→D, B→E]. Normalize R into 2NF and then into 3NF.

30. Explain about the fundamental operations of relational algebra.

31. UPS prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the UPS system at a single retail center. Retail centers are characterized by their type, uniqueID, and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a deliveryRoute. Create an Entity Relationship diagram that captures this information about the UPS system. Be certain to indicate identifiers and cardinality constraints.

(12 x 2 = 24)