

Bachelor of Computer Application (BCA) Examination  
IV Semester

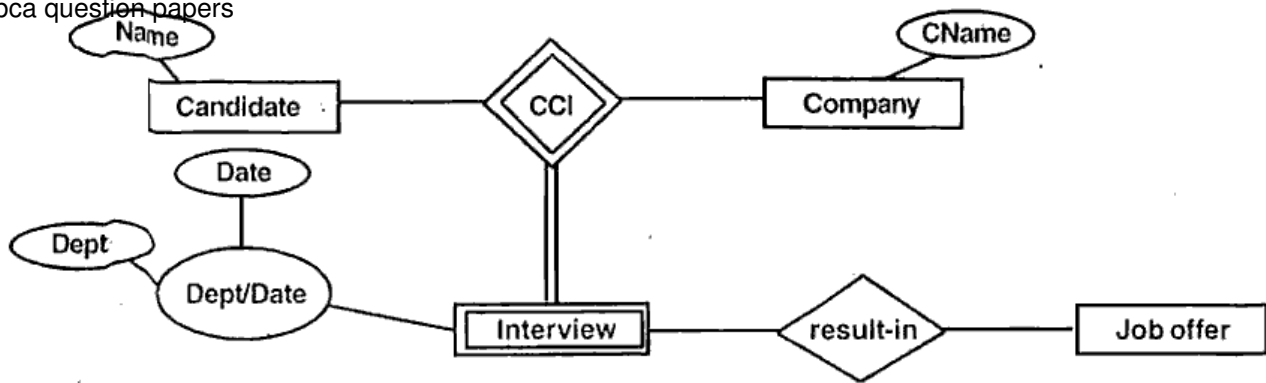
**Data Base Management System**

Time : 3 Hours ]

[ Max. Marks : 50

**Note : Attempt all questions, choosing any two parts of each question. Each question carries equal marks.**

1. (a) Explain the difference between external, internal and conceptual schemas. How are these different schema layers related to the concepts of logical and physical data independence ?
- (b) Identify the main components in a DBMS and briefly explain what they do.
- (c) Which of the following plays an important role in representing information about the real world in a database ? Explain briefly.
- (i) The data definition language.  
(ii) The data manipulation language.  
(iii) The data model.
2. (a) Define the following terms :  
Entity Set, Domain, Many-to-Many Constraint, Participation Constraint and Aggregation.
- (b) A company database needs to store information about employees (identified by ssn, with salary and phone as attributes), departments (identified by dno, with dname and budget as attributes) and children of employees (with name and age as attributes). Employees work in departments; each department is managed by an employee; a child must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known.  
Draw an ER diagram that captures this information.
- (c) Apply Reverse Engineering by forming problem statement out of given E-R diagram. Mention all the constraints in the E-R diagram.



3. (a) Consider the following schema :
- Sailors (sid : integer, sname : string, rating : integer, age : real)
- Boats (bid : integer, bname : string, color : string)
- Reserves (sid : integer, bid : integer, day : date)

Write the following queries in SQL :

- (i) Find the names of sailors who have reserved boat no. 103.
  - (ii) Find the names of sailors who have reserved atleast one boat.
  - (iii) Find the sailors with the highest rating.
  - (iv) Find the names of sailors who have reserved a red or a green boat.
  - (v) Find the age of the youngest sailor for each rating level.
- (b) What are the parts of a basic SQL query ? What types of SQL constraints can be specified using the query language ?
- (c) Write a short note on Database Sublanguages.
4. (a) Define Functional Dependencies. How are primary keys related to FD's ? When is a decomposition said to be dependency preserving ?
- (b) Consider a relation R with five attributes ABCDE. You are given following dependencies  $A \rightarrow B$ ,  $BC \rightarrow E$  and  $ED \rightarrow A$ .
- (i) List all keys of R.
  - (ii) Is R in 3NF ? Justify,
  - (iii) Is R in BCNF ? Justify.
- (c) What do you mean by null value in a table ? What are Integrity Constraints ? Explain by example.
5. (a) What is Dynamic SQL ? List the various data types supported by SQL.
- (b) Explain –any five CODD's rules.
- (c) With the help of relational schema of your choice, explain relational algebra operations (any five).

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