

**JK Lakshmipat University Jaipur**  
**INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
End Term Examination, December 2025  
BCA, Backlog Exam

CS1116: Database Management and Applications  
Time: 2 hours

Max. Marks: 30

**Ques 1. Answer the following questions briefly: (10)**

- a) Mention the meaning of transactional data in one simple line.
- b) Mention the meaning of analytical data in one simple line.
- c) Write one type of structured data.
- d) Write one type of unstructured data.
- e) Write the name of any real-world entity.
- f) Name any attribute that can have parts.
- g) Name any attribute that can hold multiple values.
- h) Write one feature of a weak entity.
- i) Write one purpose served by keys in databases.
- j) Write the name of any one relational algebra operation.

**Ques 2. Draw a neat ER diagram for the following scenario. Identify all relationships, including the additional relationships. Mention cardinalities for each relationship. (5)**

A Hospital maintains information about Patients, Doctors, Appointments and Departments.

A Patient can book many Appointments.

A Doctor attends many Appointments.

Each Doctor belongs to exactly one Department.

A Department can have many Doctors.

A Patient is assigned to one primary Doctor for regular check-ups.

Each Appointment is linked to one Department based on treatment type.

A Doctor can refer a Patient to another Doctor.

**Ques 3. Consider the following tables in the university database: (10)**

Student(Sid, Sname, Dept)

Enroll(Sid, Cid, Grade)

Course(Cid, Cname)

**Answer the following questions:**

- a) Write a relational algebra expression to list all student names.
- b) Write a relational algebra expression to select students from the CS department.
- c) Write a relational algebra expression to join Student and Enroll using left join.
- d) Write a relational algebra expression to find all courses taken by Sid = 10.
- e) Write a relational algebra expression to display only Cid and Cname from Course.
- f) Write an SQL query to show all students.
- g) Write an SQL query to list all students who are enrolled in any course.
- h) Write an SQL query to update Grade = 'A' for Sid = 7.
- i) Write an SQL query to delete rows in Enroll where Grade is NULL.
- j) Write an SQL query to show each course with the count of enrolled students.

**Ques 4. Consider the following relation and answer the questions that follow: (5)**

Relation R(A, B, C, D, E)

Functional Dependencies:

$A \rightarrow B, B \rightarrow C, AD \rightarrow E, CB \rightarrow D$

- a) Compute the closure of A and B.
- b) Check whether A can act as a key. If not, tell what is the key?
- c) Write one transitive dependency from the set.
- d) Mention whether R satisfies 2NF, with a short reason.
- e) Mention whether R satisfies 3NF, with a short reason.