

JK LAKSHMIPAT UNIVERSITY, JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Theory Exam -3 (Regular), December 2021
BCA- Semester I

Roll No.....

COURSE CODE: CS1116

Time: 1.5 hours

COURSE TITLE: Database Management and Applications

Max. Marks: 30

Q.1 a) A manufacturing company produces products. The following product information is stored: product name, product ID and quantity on hand. These products are made up of many components. Each component can be supplied by one or more suppliers. The following component information is kept: component ID, name, description, suppliers who supply them, and products in which they are used. Create an ERD to show how you would track this information. Show entity names, primary keys, attributes for each entity, relationships between the entities and cardinality.

Assumptions

- A supplier can exist without providing components.
- A component does not have to be associated with a supplier.
- A component does not have to be associated with a product. Not all components are used in products.
- A product cannot exist without components.

b) Compare between BCNF and 3NF with the help of suitable example. (6+4) marks

Q.2 a) Solve the given queries in **SQL** and **relational algebra** based on following schemas:-

Sailors(sid, sname, rating, age)

Reserves(sid,bid,day)

Boat(bid,bname,color)

- i. Find the names of sailors who have reserved a red boat.
- ii. Find the names of sailors who have reserved both a red and a green boat.
- iii. Find sailors whose rating is better than some sailor called "Horatio".

b) With the help of suitable example, explain the concept of super key, candidate key, foreign key and primary key.

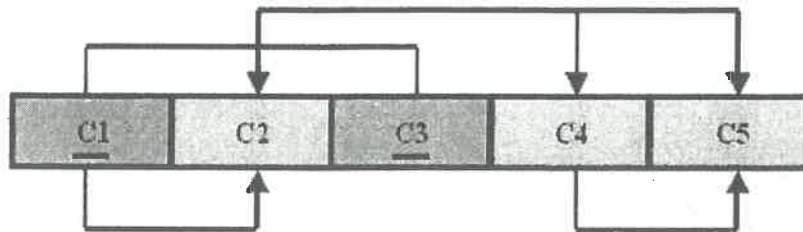
(6+4) marks

Q.3 a) Examine the table shown below.

<i>branchNo</i>	<i>branchAddress</i>	<i>telNo</i>	<i>mgrStaffNo</i>	<i>name</i>
B001	8 Jefferson Way, Portland, OR 97201	503-555-3618	S1500	Tom Daniels
B002	City Center Plaza, Seattle, WA 98122	206-555-6756	S0010	Mary Martinez
B003	14 – 8th Avenue, New York, NY 10012	212-371-3000	S0145	Art Peters
B004	16 – 14th Avenue, Seattle, WA 98128	206-555-3131	S2250	Sally Stern

- Why is this table not in 3NF?
- Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF).
- Identify the primary, (alternate) and foreign keys in your 3NF relations.

b) Given the dependency diagram shown in the following Figure, answer the following questions:



Identify and discuss each of the indicated dependencies in the figure.

(6+4) marks