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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree (S, FE) Examination January 2024 (2015 Scheme)

Course Code: CS208

Course Name: PRINCIPLES OF DATABASE DESIGN (CS, IT)

Max. Marks: 100 Duration: 3 Hours

Limit answers to the required points.

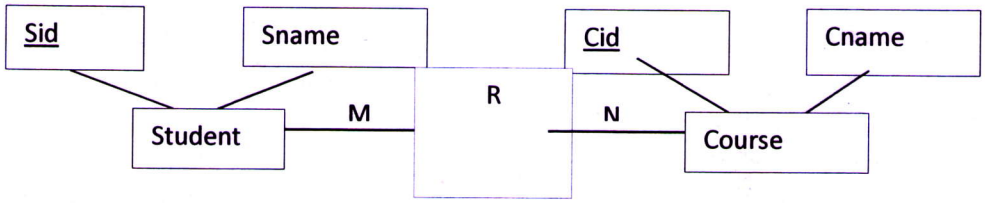
PART A

Answer all questions, each carries 3 marks. Marks

1 Give suitable examples for *multivalued, derived and composite attributes.* (3)

2 What do you meant by cardinality of a relationship? Illustrate with suitable examples (3)

3 Consider the ER diagram. Each student can attend any number of courses and course is offered for many students. (3)



i) Write SQL DDL statements for relationship R.

4 What is referential integrity constraint? Explain with an example (3)

PART B

Answer any two full questions, each carries 9 marks.

5 a) With the help of a neat diagram explain the three-schema architecture of DBMS. (6)

b) What is the difference between procedural and nonprocedural DML? (3)

6 a) Consider the following relations

Faculty (Fno, Name,Gender, Age, Salary, Dnum)

Department (Dno, Dname ,Dlocation)

Course (Cno, Cname, Credits, Odno)

Teaching (Fno, Cno, Semester)

Dnum is a foreign key that identifies the department to which a faculty belongs. Odno is a foreign key identifying the department that offers a course

Write relational algebra expressions for the following queries:

a) Name of female faculty in the 'CS' department. (2)

b) Name of faculty member offering course 'PDD' (3)

c) Name of faculty members not offering any course (4)

7 a) How equijoin is different from natural join? What is left outer join? Give examples. (6)

b) Explain the characteristics of the database approach. (3)

PART C

Answer all questions, each carries 3 marks.

8 How does BCNF differ from 3NF? Explain with an example. (3)

9 Given a relation schema R (A, B, C, D) and set of dependencies. F= {A →BC, C→D}. R is decomposed into R1 (A, B, C) and R2(C, D). Is this decomposition loss-less? (3)

10 Illustrate the concept of trigger with an example. (3)

11 Illustrate DELETE and UPDATE clauses using suitable examples. (3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Consider the following relations (9)

Suppliers (Sid, Sname, Address)
Parts (Pid, Pname, Colour)
Catalog (Sid, Pid, Cost)
Sid is the key for Suppliers, Pid is the key for Parts and Sid and Pid together form the key for Catalog. The Catalog relation lists the prices charged for parts by suppliers.
Write SQL expressions for the following queries:

a) Find the Sid of suppliers who supply some white or blue part.
b) Find the name of suppliers who supply some blue part.
c) Find the cost of blue part supplied to address 'ASN'.

13 a) Give suitable example for nested sub queries. Write the advantages of nested query? (4)

b) Given below are two sets of FDs for a relation R(A,B,C,D,E). Are they equivalent? (5)

F1 = {A → B, AB → C, D → AC,D →E}

F2 = {A→ BC, D→ E}

14 a) What are the basic data types available for attributes in SQL? (3)

b) What are Armstrong's axioms? (3)

c) What is meant by transitive dependency? Give an example. (3)

PART E

Answer any four full questions, each carries 10 marks.

15 a) How is clustering index different from primary index? (3)

b) There are 12000 records in a data file. Each record in the file is of 75 bytes. Compute the number of block accesses if i) Single level secondary index is available on a field of size 15 bytes. ii) Multilevel index is available on the same field. (7)
Assume that the block size is 394 bytes, that un-spanned organization is used and that block and record pointers are 5 and 7 bytes, respectively.

16		Describe the structure of B+ tree nodes. How does B+ tree differ from B tree?	(10)
17	a)	What is two-phase locking protocol? How does it guarantee serializability?	(7)
	b)	Is the following schedule serilaizable? r1(X);r3(X);w3(X);w1(X);r2(X);	(3)
18	a)	Draw a state diagram and explain the different transaction states.	(5)
	b)	Explain the terms Conflict equivalent and Conflict serializability?	(5)
19		Consider the following tables INSTRUCTOR (Id, Name, Dept, Salary) TEACHES (Id, Course-id, Semester, Year) COURSE (Course-id, Title, Dept, Credits) Show an initial query tree for the following query and optimize it using the rules of heuristics. SELECT Name, Title, Semester, Year FROM INSTRUCTOR, TEACHES< COURSE WHERE COURSE. Course-id = TEACHES. Course-id AND TEACHES.Id = INSTRUCTOR.Id AND INSTRUCTOR.Dept = 'PDD'.	(10)
20	a)	Write a small RDF document and show its equivalent graph structure.	(3)
	b)	What are the components of GIS?	(3)
	c)	Write a short note on Big Data.	(4)

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