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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- October 2018

B.Tech. (CSE, IT, BI) III Semester

COURSE CODE: 10B11CI312 MAX. MARKS: 25

COURSE NAME: Database Systems

COURSE CREDITS: 3 MAX. TIME: 1.5 Hrs.

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q1. CO-1 Describe three-schema architecture for the database management system with necessary diagram. Why do we need mapping between schema levels? [5]

Q2. CO-2 i) Discuss the problems caused due to redundancy in the database. Also give examples. [3]

ii) Let R(A,B,C,D,E,P,G) be a relational schema in which the following functional dependencies are known to be hold. [3]

AB->CD, DE->P, C->E, P->C, B->G

List all the candidate keys of R. Also find the highest normal form of R.

Q3. CO-3 i) What is a complete set of relational operations? Give example. [2]

ii) On the basis of the given Publication Database State, answer the following questions. [4]

r(author)

Author_id	first_name	last_name
1	John	McCarthy
2	Dennis	Ritchie
3	Ken	Thompson
4	Claude	Shannon
5	Alan	Turing
6	Alonzo	Church
7	Perry	White
8	Moshe	Vardi
9	Roy	Batty

r(author_pub)

Author_id	pub_id	Author_position
1	1	1
2	2	1
3	2	2
4	3	1
5	4	1
5	5	1
6	6	1

r(book)

book_id	book_title	month	year	editor
1	CACM	April	1960	8
2	CACM	July	1974	8
3	BST	July	1948	2
4	LMS	November	1936	7
5	Mind	October	1950	NULL
6	AMS	Month	1941	NULL
7	AAAI	July	2012	9
8	NIPS	July	2012	9

r(pub)

Pub_id	title	book_id
1	LISP	1
2	Unix	2
3	Info Theory	3
4	Turing Machines	4
5	Turing Test	5
6	Lambda Calculus	6

a. Write a relational algebra expression that returns the name of all authors who are book editors.

b. Write a relational algebra expression that returns the name of all authors who are not book editors.

c. How many tuples are returned by the following relational algebra expression?

$$\text{author} \bowtie_{\text{author\_id=editor}} \text{book}$$

d. Write the tuples that are returned by the following relational algebra expression.

$$\text{author} \bowtie_{\text{author\_id=editor}} \text{book}$$

P.T.O

Q4. CO-4 Suppose the relational schema R(A,B,C,D,E) holds following FDs. [5]
A->BC, CD->E, B->D, E->A.
R is decomposed into R1(A,B,C) and R2(A,D,E). Check whether this decomposition is:

i) Lossy/Lossless decomposition
ii) Dependency preserving/Not dependency preserving

Q5. CO-5 What is indexing? Differentiate between primary and cluster indexing. [3]