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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- December 2018

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

COURSE CODE: 10B11CI312 MAX. MARKS: 35

COURSE NAME: Database Systems

COURSE CREDITS: 3 MAX. TIME: 2 Hrs.

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

Q1. CO-2 i) Discuss the purpose of normalization and need of de-normalization. [3]

ii) Consider a relation R(A,B,C,D) with following functional dependencies. [3]

AB->CD, D->A

Find the highest normal form of R.

Q2. CO-4 i) Differentiate between trivial and non-trivial functional dependency. [2]

ii) Consider the following set F of functional dependencies on schema R(A,B,C). [3]

A->BC, B->C, A->B, A->C

Find the canonical set of functional dependency set F.

Q3. CO-5 A file has 20,000 STUDENT records of fixed-length. Each record has the following fields: NAME (30 bytes), SSN (9 bytes), ADDRESS (40 bytes), PHONE (9 bytes), BIRTHDATE (8 bytes), GENDER (1 byte), MAJORDEPTCODE (4 bytes), MINORDEPTCODE (4 bytes), CLASSCODE (4 bytes), and DEGREEPROGRAM (3 bytes). An additional byte is used as a deletion marker. A block pointer is P=6 bytes long. Consider the block size as 512 bytes. [6]

i) Calculate the record size R in bytes.

ii) Calculate the number of block access to search for a record corresponding to given SSN. Assume that the file is ordered by SSN field.

iii) Assume the file is ordered by the key field SSN and a primary index is constructed on SSN. Calculate the index blocking factor, index record size and the number of block accesses needed to search for and retrieve a record from the file, given its SSN value using the primary index.

Q4. CO-7 i) Give an overview of database design process. [3]

ii) List popular database management systems used in industry. [2]

P.T.O.

Q5. CO-6 i) What is a transaction? Illustrate the states of transaction execution using transition state diagram. [3]

ii) Illustrate the problems caused due to concurrency. Differentiate between strict and rigorous 2PL technique for controlling concurrency. [5]

iii) Write an algorithm for testing conflict serializability of a schedule? Apply this algorithm to the following schedule and check whether it is conflict serializable or not. [5]

T1	T2	T3	T4
	read_item(X)		
		write_item(X)	
		Commit	
write_item(X)			
Commit			
	write_item(Y)		
	read_item(Z)		
	Commit		
			read_item(X)
			read_item(Y)
			Commit