Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Course: Advanced Database Management Systems

Program: B.Tech.-CSE with all specialization

Course Code: CSEG2017

Semester : III

Time : 03 hrs.

Max. Marks : 100

Instructions:

Instructions: SECTION A (Attempt all questions)						
Q 1	Explain the difference between logical and physical data independence.	4	CO1			
Q 2	Design a generalization—specialization hierarchy for a motor-vehicle sales company. The company sells motorcycles, passenger cars, vans, and buses. Justify your placement of attributes at each level of the hierarchy.	4	CO2			
Q 3	Differentiate between primary, secondary and cluster indexing.	4	CO3			
Q 4	Discuss the steps involved in query processing.	4	CO4			
Q 5	How does granularity of data items affect the performance of concurrency control? What factor affect selection of granularity size for data items?	4	CO6			
	SECTION B (Attempt all questions)					
Q 6	State the different advantages of DBMS in comparison to file system.	8	CO1			
Q 7	 Consider the following information about a university database: Professors have an SSN, a name, an age, a rank, and a research specialty. Projects have a project number, a sponsor name (e.g., UPES), a starting date, an ending date, and a budget. Graduate students have an SSN, a name, an age, and a degree program (e.g., B. Tech., M.S. or Ph.D.). Each project is managed by one professor (known as the project's principal investigator). Each project is worked on by one or more professors (known as the project's co-investigators). Professors can manage and/or work on multiple projects. Each project is worked on by one or more graduate students (known as the project's research assistants). When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one. 	8	CO2			

	 Departments have a department number, a department name, and a main office. Departments have a professor (known as the chairman) who runs the department. Professor work in one or more departments, and for each department that they work in, a time percentage is associated with their job. Graduate students have one major department in which they are working on their degree. Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take. 		
Q 8	Consider a disk with a sector size of 512 bytes, 2000 tracks per surface, 50 sectors per track, five double-sided platters, and average seek time of 10 msec. a) Give examples of valid block sizes. Is 256 bytes a valid block size? 2048? 51200? b) If the disk platters rotate at 5400 rpm (revolutions per minute), what is the maximum rotational delay? c) If one track of data can be transferred per revolution, what is the transfer rate?	8	СОЗ
Q 9	Using suitable example, define the basic operations of the relational algebra? Or Explain the advantages of distributed database management system. Also discuss the key functions provided by distributed database management system in addition to those of centralized DBMS.	8	CO4
Q 10	Consider a relation R (A, B, C, D) with the instance given on RHS: Which of the following functional dependencies are satisfied by this relation? a) $A \rightarrow B$ b) $A \rightarrow CD$ c) $AB \rightarrow CD$ d) $C \rightarrow D$ e) $B \rightarrow A$ f) $BD \rightarrow AC$ g) $AD \rightarrow BC$ h) (h) $D \rightarrow B$ Or Suppose you are given a relation R with four attributes ABCD. For each of the following sets of Functional Dependency, assuming those are the only dependencies that hold for R, do the following: (a) Identify the candidate key(s) for R. (b) Identify the best normal form that R satisfies (1NF, 2NF, 3NF, BCNF). (i). $C \rightarrow D$, $C \rightarrow A$, $B \rightarrow C$ (ii) $B \rightarrow C$, $D \rightarrow A$ (iv) $A \rightarrow B$, $BC \rightarrow D$, $A \rightarrow C$	8	CO5

	SECTION-C (Attempt all questions)		
Q 11	Through suitable example explain the following terms: a) Lossy/Lossless decomposition b) Dependency preserving c) Multivalued Dependency d) 4NF e) 5NF	20	CO5
Q12	a) Find the number of block access in case of primary index, secondary index and without index for the following detail: No of records in main file=30000 Record size in main file =100 bytes Block size=1024 Record size in index file=15 bytes b) Through diagram show the different modules of database system environment. Also explain the functioning of those modules. Or a) Write the SQL query and relational algebra query to retrieve the following data: i. Retrieve the name and address of all employees who work for the 'Research' department. ii. Retrieve the names of employees who have no dependents. Use the following schema while writing the queries	(10+10	CO1, CO3
	FNAME MINIT LNAME SSN BDATE ADDRESS SEX SALARY SUPERSSN DNO DEPARTMENT DNAME DNUMBER MGRSSN MGRSTARTDATE DEPENDENT ESSN DEPENDENT_NAME SEX BDATE RELATIONSHIP		CO4, CO6
	b) Explain the shadow paging recovery technique with the help of a diagram. What are the three drawbacks associated with shadow paging.		