

# MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institution of Manipal University

## V SEMESTER B.TECH. (MECHATRONICS ENGINEERING) END SEMESTER EXAMINATIONS, NOV 2018

### SUBJECT: DATABASE MANAGEMENT SYSTEMS [MTE 4011]

#### REVISED CREDIT SYSTEM (27/11/2017)

#### Time: 3 Hours

#### MAX. MARKS: 50

- Answer ALL questions.
- Data not provided may be suitably assumed

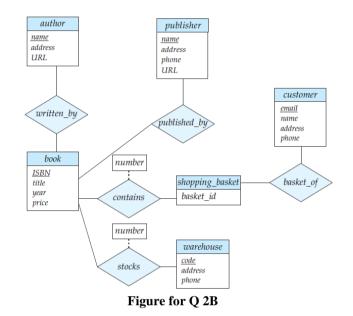
1A.	Describe at least 3 tables that might be used to store information for a social networking system	4
	such as Facebook.	
18.	<ul> <li>i. The following relational schema belongs to which normal form? Convert it into the next normal form.</li> <li>Professor_id → Professor_name</li> <li>Student_rollno→Student_name</li> <li>(Professor_id, Student_rollno→Subject_marks</li> <li>ii. With a suitable example differentiate between the Third normal form (3NF) and Boyce Codd normal form (BCNF).</li> </ul>	6
2A.	Consider the following relations: Student (ID, name, dept_name, tot_cred) Advisor (Student_id, Instructor_id) What is the result of first performing the cross product of the Student and Advisor relations and then performing a selection operation on the result with the predicate Student_id = ID. Represent this using the notations of Relational algebra. Also show the output with some example data.	2
28.	<ul> <li>Consider the E-R diagram in the figure below for Q 2B., which models an online bookstore.</li> <li>i. List the entity sets and their primary keys.</li> <li>ii. Suppose the bookstore adds Blu-ray discs and downloadable video to its collection. The same item may be present in one or both formats, with differing prices. Extend the E-R diagram to model this addition, ignoring the effect on shopping baskets.</li> <li>iii. Now extend the E-R diagram, using generalization, to model the case where a shopping basket may contain any combination of books, Blu-ray discs, or downloadable video.</li> </ul>	4
2C.	Design a database for an automobile company to provide to its dealers to assist them in maintaining customer records and dealer inventory and to assist sales staff in ordering cars. Each vehicle is identified by a vehicle identification number (VIN). Each individual vehicle is a particular model of a particular brand offered by the company (e.g., the XF is a model of the car brand Jaguar of Tata Motors). Each model can be offered with a variety of options, but an individual car may have only some (or none) of the available options. The database needs to store information about models, brands, and options, as well as information about individual dealers, customers, and cars. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.	4

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3A.	Consider the insurance	ce database of the	figure for Q	3A., where the	he primary	v keys are underlined.	3
	Construct the following						
	<b>i.</b> Find the total numb						
	ii. Add a new acciden			values for req	uired attri	butes.	
	iii. Delete the Toyota						
3B.	Suppose that we have a relation marks (ID, score) and we wish to assign grades to students					3	
	based on the score as follows: grade F if score < 40, grade C if $40 \le score < 60$ , grade B if $60 \le$						
	<i>score</i> < 80, and grade <i>A</i> if $80 \le score$ .						
	Write SQL queries to	do the following:					
	<b>i.</b> Display the grade for			narks relation	•		
	ii. Find the number of		ch grade.				
3C.	Consider the SQL que	ery:					4
	select distinct p.a1						
	<b>from</b> <i>p</i> , <i>r</i> 1, <i>r</i> 2						
	<b>where</b> <i>p.a</i> 1 = <i>r</i> 1. <i>a</i> 1 <b>o</b>	<b>r</b> $p.a1 = r2.a1$					
						are either in $r1$ or in	
	r2? Examine carefully	y the cases where	one of $r1$ or	r2 may be en	npty.		
4A.	Give an example of a	serializable scheo	lule with two	o transactions	such that	the order in which	4
	the transactions comm	nit is different fro	m the serialized	zation order.			
4B.	The following conting	gency table summ	arizes superr	narket transac	tion data,	where hot dogs refers	4
	to the transactions con	ntaining hot dogs,	hot dogs re	fers to the trai	nsactions t	hat do not contain hot	
	dogs, hamburgers ref		-				
	the transactions that d			8			
			hot dogs	hot dogs	$\Sigma_{row}$		
			nor augs	noi uogs	-row		
		hamburgers	2,000	500	2,500		
		hamburgan	1 000	1 500	2 500		
		hamburgers	1,000	1,500	2,500		
		$\Sigma_{col}$ sociation rule <i>hot</i>	3,000	2,000 nburgers is	<b>5,000</b> mined. Gi	ven a minimum s this association rule	
	<ul><li>support threshold of strong?</li><li>ii. Based on the given</li></ul>	$\Sigma_{col}$ sociation rule <i>hot</i> f 25% and a minin h data, is the purch	3,000 $dogs \rightarrow har$ num confide hase of <i>hot do</i>	2,000 nburgers is nce threshold	5,000 mined. Gi of 50%, is	s this association rule purchase of	
	<ul><li>support threshold of strong?</li><li>ii. Based on the given hamburgers? If not</li></ul>	$\Sigma_{col}$ sociation rule <i>hot</i> f 25% and a minin the data, is the purch t, what kind of <i>con</i>	3,000 $dogs \rightarrow har$ num confide nase of hot do rrelation rela	2,000 <i>nburgers</i> is nce threshold <i>ogs</i> independentionship exist	<b>5,000</b> mined. Gi of 50%, is ent of the p ts between	s this association rule purchase of the two?	
4C.	support threshold of strong? ii. Based on the given hamburgers? If not Given two objects rep	$\Sigma_{col}$ sociation rule <i>hot</i> f 25% and a minin t data, is the purch t, what kind of <i>con</i> presented by the tu	3,000 $dogs \rightarrow har$ num confide hase of <i>hot da</i> <i>trelation</i> relation uples (22, 1, 4)	2,000 nburgers is nce threshold ogs independentionship exist 42, 10) and (2	<b>5,000</b> mined. Gi of 50%, is ent of the p ts between	s this association rule purchase of the two?	2
4C.	<ul> <li>support threshold of strong?</li> <li>ii. Based on the given hamburgers? If not Given two objects rep</li> <li>i. Compute the Euclid</li> </ul>	$\Sigma_{col}$ sociation rule <i>hot</i> f 25% and a minin t data, is the purch t, what kind of <i>con</i> presented by the tu <i>dean distance</i> betw	3,000 $dogs \rightarrow har$ num confide hase of hot do <u>trelation</u> relation uples (22, 1, 4) ween the two	2,000 <i>nburgers</i> is nce threshold <i>ogs</i> independentionship exist 42, 10) and (2 objects.	<b>5,000</b> mined. Gi of 50%, is ent of the p ts between	s this association rule purchase of the two?	2
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application of improved K-medoids algorithm in charging station planning for mobile robot is effective and practical.

With a sample dataset, show as to how choosing a random centroid in the K-medoids algorithm, could be a limitation.

(**Hint:** Justify your answer by using the changing value of the Absolute Error Criterion when shifting the centroid of a cluster from one point to another.)



person (<u>driver\_id</u>, name, address) car (<u>license</u>, model, year) accident (report\_number, date, location) owns (<u>driver\_id</u>, <u>license</u>) participated (report\_number, <u>license</u>, driver\_id, damage\_amount)

Figure for Q 3A