TE, sem. V, Electronics Choice Stream

(3 hrs.) Maximum Marks = 80

12/12/18

NB:

1. Question No. 1 is compulsory and solve any THREE questions from remaining questions
2. Assume suitable data if necessary
3. Draw clean and neat diagrams

			Marks
Q1.		Attempt any four	
	a.	Discuss in brief: advantages of database system over traditional file system	5
	b.	Explain generalization and specialization with respect to EER model	5
	c.	Explain Data Definition Language (DDL) and Data Manipulation Language (DML) with example	5
	d.	Define following terms: i) super key ii) candidate key iii) primary key iv) foreign key v) unique constraint	5
	e.	Discuss ACID properties of transaction	5
Q2.	a.	Consider bank database.	15

- The bank is organized into branches. Each branch is located in a particular city and is identified by a unique name. The bank monitors the assets of each branch.
- Bank customers are identified by their customer-id value. The bank stores each customer's name, and the street and the city where the customer lives. Customers may have accounts and can take out loans.
- The bank offers two types of accounts: savings and checking accounts. Accounts can be held by more than one customer, and a customer can have more than one account. Each account is assigned a unique account number. In addition, each savings account has an interest rate, and overdrafts are recorded for each checking account.
- The bank provides its customers with loans. A loan originates at a particular branch and can be held by one or more customers. A loan is identified by unique loan number. For each loan, the bank keeps track of loan amount and the loan payments.
- Bank employees are identified by their employee-id values. The bank administration stores the name and telephone number of each employee, the names of the employee's dependents, and the employee-id number of the employee's manager. The bank also keeps track of the employee's start date and, thus, length of employment

Draw and explain E-R diagram for the above database. Show clearly following things in E-R diagram

1. Mapping cardinalities
2. Weak / Strong entity (if any)
3. Relationship set
4. Primary key

	b.	Explain different types of database users	5

Q3. a. Explain different relational algebra operators with the help of an example. Also explain the following terms with the help of relational algebra: Set intersection, set difference, natural join 10

b Explain different types of integrity constraints with the help of example of each type, that can be enforced on a database 10

Q4 a. To keep track of office furniture, computers, printers, and other office equipment, the ABC Corporation uses the table structure shown in Table below: 15

Attribute Name	Sample Value	Sample Value	Sample Value
ITEM_ID	231134-678	342245-225	254668-449
ITEM_LABEL	HP DeskJet 895Cse	HP Toner	DT Scanner
ROOM_NUMBER	325	325	123
BLDG_CODE	NTC	NTC	CSF
BLDG_NAME	Nottooclear	Nottooclear	Canseefar
BLDG_MANAGER	I. B. Rightonit	I. B. Rightonit	May B. Next

1. Draw the dependency diagram. Make sure that you label the transitive and/or partial dependencies.
2. Starting with the dependency diagram drawn above create a set of dependency diagrams that meet 3NF requirements. Rename attributes to meet the naming conventions, and create new entities and attributes as necessary.

b. Explain following types of attributes with the help of an example for each type: i)single valued ii) multivalued iii) composite iv) derived 5

Q5 a. Draw the state diagram for a transaction. Discuss every state in brief with the help of an example. 10

b. Consider the following database: 10

Product (maker, model, type)
PC (model, speed, ram, hd, price)
Laptop (model, speed, ram, hd, screen, price)
Printer (model, color, type, price)

The Product relation gives the manufacturer, model number and type (PC, laptop, or printer) of various products. We assume for convenience that model numbers are unique over all manufacturers The PC relation gives for each model number that is a PC the speed (of the processor, in gigahertz), the amount of RAM (in megabytes), the size of the hard disk (in gigabytes), and the price.

Write SQL queries for the following (any FIVE)

1. Find the model number, speed and hard drive capacity for all the PCs with prices below $500
2. Find the makers of PCs with a processor speed of 450 MHz or more
3. Find out the average speed of the PCs produced by maker A.

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4. Find the makers producing at least three distinct models of PCs. Result set: maker, number of PC models
5. Get the laptop models that have a speed smaller than the speed of any PC. Result set: type, model, speed.
6. Find the model number and maker of the lowest priced PC that has 64MB or more memory.

Q6 a.

1. What do you mean by "conflict serializable schedule"? 10
2. State whether following schedule is conflict serializable with justification (refer fig a)
3. Discuss the consistency of the database after execution of following schedule (refer fig b)

T_1	T_2
read(A)	
write(A)	
	read(A)
	write(A)
read(B)	
write(B)	
	read(B)
	write(B)

Figure a

T_1	T_2
read(A)	
$A := A - 50$	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
write(A)	
read(B)	
$B := B + 50$	
write(B)	
commit	
	$B := B + temp$
	write(B)
	commit

Figure b

b. 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. Explain why they should not be placed at a higher or lower level 10

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