Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
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A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

END SEMESTER EXAMINATIONS, NOV 2017

SUBJECT: ADVANCED DATABASE SYSTEMS [CSE 4005]

REVISED CREDIT SYSTEM

25/Nov/2017

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Draw diagrams wherever applicable.

1.A Why is it difficult to estimate response time for a query evaluation plan? **3**

ID	*course_id*	*sec_id*	*semester*	*year*
10101	CS-101	1	Fall	2009
10101	CS-315	1	Spring	2010
10101	CS-347	1	Fall	2009
12121	FIN-201	1	Spring	2010
15151	MU-199	1	Spring	2010
22222	PHY-101	1	Fall	2009
32343	HIS-351	1	Spring	2010
45565	CS-101	1	Spring	2010
45565	CS-319	1	Spring	2010
76766	BIO-101	1	Summer	2009
76766	BIO-301	1	Summer	2010
83821	CS-190	1	Spring	2009
83821	CS-190	2	Spring	2009
83821	CS-319	2	Spring	2010
98345	EE-181	1	Spring	2009

teaches table

Fig 1.1

1.B Showing each intermediate step, sort the table in Fig 1.1 by course_id using External Sort Merge where there are 5 block available in the memory for sorting; and one block in memory can hold 1 tuple data. **4**

1.C Show that selection operation (in relational algebra) is commutative in the ***teaches*** relation shown in Fig 1.1 for the query: **3**
Select * from (Select * from teaches where sec_id =1) where year = 2009

2.A Consider the following Schedule with Transaction T1 & T2 where: **3**

$R_n[A]$ represents Read by Transaction n on variable A
$W_n[A]$ represents Write by Transaction n on variable A
C_n represents Commit by Transaction n
$R_1[X] \rightarrow R_1[Y] \rightarrow R_2[X] \rightarrow W_2[X] \rightarrow R_2[Y] \rightarrow W_1[X] \rightarrow W_1[Y] \rightarrow W_2[Y] \rightarrow C_1 \rightarrow C_2$

Is this schedule allowed in strict Two Phase Locking? Why?

2.B Describe Validation based protocol with an example. **3**

2.C **4**

Beginning of log
<T_0 start>
<T_0, B, 2000, 2050>
<T_1 start>
<checkpoint {T_0, T_1}>
<T_1, C, 700, 600>
<T_1 commit>
<T_2 start>
<T_2, A, 500, 400>
<T_0, B, 2000>
<T_0 abort>
CRASH

Fig2.1

For the log shown in Fig 2.1 perform recovery showing all steps involved.

3.A Consider the following queries executed on *teaches* table shown in Fig 1.1 **5**

i) Select * from teaches

ii) Select * from teaches where ID between 15151 and 83821

iii) Select * from teaches where ID = 22222

Assuming that *ID* is the partitioning attribute as well as hashing attribute, which partitioning technique(s) is/are best suited for each of these queries? Explain.

3.B Describe different types of data fragmentation with example. **5**

4A. A car-rental company maintains a database for all vehicles in its current fleet. For all vehicles, it includes the vehicle identification number, license number, manufacturer, model, date of purchase, and color. Special data are included for certain types of vehicles: **5**

- Trucks: cargo capacity.
- Sports cars: horsepower, renter age requirement.
- Vans: number of passengers.
- Off-road vehicles: ground clearance, drivetrain (four- or two-wheel drive).

Write SQL statement to perform the following:
(Assume that MyDate, Color and DriveTrainType are pre-defined types.)

i) Create a user-defined type for myVehicle with all related information and explicitly declare that subtypes may be created from myVehicle.

ii) Create a table *vehicle* with *myVehicle.*

iii) Inherit *myVehicle* and create *Truck* type with the additional attributes.

iv) Inherit *myVehicle* and create *sportsCar* type with the additional attributes.

v) Inherit *myVehicle* and create *van* type with the additional attributes.

4.B List and explain the different approaches to make objects persistent. **3**

4.C In XML, describe Tags and Elements with an example. **2**

5.A Explain two types of time with respect to Temporal Databases? What is the name for a table that stores both kind of time? Explain it with an example. **4**

5.B. Draw an IT Project Request Workflow for the following description: **2**

An IT project request is assigned to a first approver (their manager) and if not approved, it's returned to the submitter with a notification. If it is approved by their manager, it proceeds to IT. If accepted, the process ends. If rejected it is returned to the submitter.

5.C List the disk-related limitations and optimization opportunities in Main Memory databases **4**

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