Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

I SEMESTER M.C.A.

MAKEUP EXAMINATIONS, DECEMBER 2018

SUBJECT: ADVANCED DATABASE MANAGEMENT SYSTEMS [MCA 4104]

REVISED CREDIT SYSTEM
(/12/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A.	Explain the various functional components of database system with a neat diagram.	**5**
1B.	A SAS recording company has decided to store information about musicians who perform in its albums. Each musician who records at SAS has an SSN, a name, an address and a phone number. Each instrument used in songs recorded at SAS has a name and a musical key. Each album recorded has a title, a copyright date, a format and an album identifier. Each song recorded has a title and an author. Each musician may play several instruments and a given instrument may be played by several musicians. Each album has a number of songs on it, but no song may appear on more than one album. Each song is performed by one or more musicians and a musician may perform a number of songs. Each album has exactly one musician who acts as its producer. A musician may produce several albums. Draw an ER diagram that captures this information.	**3**
1C.	What are the features of a good relational database design?	**2**
2A.	Write the test for checking whether the decomposition is dependency preserved. Consider *R = (A, B, C, G, H, I).* We decompose it into R1 = (A, B, C, H), R2 = (A, G, I). F={ $A \rightarrow B$, $AB \rightarrow C$, $CG \rightarrow H$, $B \rightarrow H$} Show that this decomposition is ***lossless-join decomposition*** and ***dependency preservation***	**5**
2B.	What is incremental maintenance and how it is applied to a materialized view created by JOIN?	**3**
2C.	What are the different constraints defined in generalization?	**2**

3A.	Explain properties of B+-Tree index file organization and how it is alternative to indexed sequential file organization?	**5**
3B.	Give the automatic lock acquisition algorithm based on *Read* and *Write* instructions in transactions.	**3**
3C.	Discuss the starvation issue associated with lock based concurrency protocols and how it can be resolved?	**2**
4A.	What are the uses of attribute closure? Write the proof for union, decomposition and pseudotransitivity rules using Armstrong's axioms.	**5**
4B.	Consider two files EMP (EMpno, Ename, Job, City, Deptno) & DEPT (Dno, Dname, City) consisting of 700 & 20 records respectively is stored on a Disk having block size 1000 Bytes. Assume record is of size EMP & DEPT is 500 Bytes, 200 Bytes respectively. Find i. Number of Blocks required to store –EMP, DEPT. ii. What is the Join (based on City) Size estimation **EMP ⋈DEPT**, if all Employees are from 10 different cities and Departments are at 5 different cities?	**3**
4C.	How variable length attributes are represented in a record.?	**2**
5A.	Explain how lock manager is implemented along with suitable figure	**5**
5B.	Describe the checkpoints based recovery method.	**3**
5C.	What are the reasons for building distributed database systems.	**2**