**Birla Institute of Technology & Science, Pilani**

**Work-Integrated Learning Programmes Division**

**Second Semester 2017-2018**

**Mid-Semester Test (EC-2 Regular)**

Course No. : SS ZG518

Course Title : DATABASE DESIGN AND APPLICATIONS

Nature of Exam : Closed Book

Weightage : 30%

No. of Pages = 2

# No. of Questions = 5

Duration : 2 Hours

Date of Exam : 04/03/2018 (AN)

Note:

1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.
4. Assume that we need to capture the data about Banking system described below.
   1. We capture details of banks; like- name (unique) (Ex. SBI, Canara bank etc.) , category (private or public sector) , headquarters (city) , start year, and CEO.
   2. A bank (like SBI, Canara Bank, Union bank etc.), will have branches identified by branch code. Branch codes are unique within a bank, but may repeat for different banks.

(Ex. SBI and Union Bank both may have branches with code ‘1126’. But no bank can have two branches with same code.

* 1. Each branch will have street, city, manager (name, Designation, contact as sub- Components), turnover as other attributes apart from branch code.
  2. Banks have accounts with unique account number (with in the bank) and customer name, start\_date, cust\_address, cust\_contact (multiple contacts possible), type, balance as other attributes. Accounts are attached to banks, but not to branches. There is no concept of joint account. Every Bank will have at least 1000 accounts. Different banks can have accounts with same account number. But no bank can have two accounts with same account number. (Ex. Acct# 11267 can be there in SBI and Corporation bank as well.). One account is associated with only one bank .

Now, draw the **ER** diagram for the above description. Indicate- cardinality, keys, attributes, min-max, and participation constraints for entity-types involved in the relationships. If found missing, assume necessary data. [5]

1. Design a *Relational Database Schema* that captures all the information and constraints that are depicted in ER diagram you have drawn, as an answer to Q1., above. [5]

Q.3. Look at the following Database schema. [2.5X4=10]

***Student(sid, sname, sbranch)*** // sid is PK

***Company(cid, cname, clocation)*** // cid is PK

***Interview(sid, cid, idate)*** // PK is- (sid, cid) ; sid and cid are FKs

***Placement(sid, cid, salary)*** // PK is- (sid, cid) ; sid and cid are FKs

Now, write Relational Algebra and SQL (both) queries for the following.

1. Get the sid and the sname for those students who have been interviewed by all companies located in ‘Chennai’.
2. Get the cid and cname for those companies who have interviewed at least 50 students but not selected any student.

Note: No need to rename attributes in results. Do not define VIEWS while writing SQL statements. Do not use any sort of Outer joins.

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1. Assume a Diskpack with uniform surface configuration with following specifications.

There are 6 double sided disks in the Diskpack. There are 128 cylinders in the diskpack. Each track has 128 blocks. The block size is 2048 Bytes.

1. Give the capacity of each cylinder in KB.
2. Give the capacity of each surface in MB.
3. Give the total capacity of the Diskpack in GB.

(Note: you need to give the final computed figure in MB/GB as asked; do not leave calculations incomplete; treat 1024 Bytes as 1KB, 1024 KB as 1MB, 1024 MB as 1GB) [1 + 1 + 1 = 3]

* 1. Give the major disadvantage with static external hashing scheme. [2]
     1. Answer the following.
        1. Give an example for *pseudotransitive* Inference Rule.
        2. Give a simple technique (not the matrix approach) to check if a binary decomposition is lossless join decomposition or not. Give simple example.
        3. With simple example explain how we can decompose a relation in 3NF to BCNF.

[1 + 2 + 2 = 5]

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