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

**Work-Integrated Learning Programmes Division**

**Second Semester 2020-2021**

**Mid-Semester Test**

**(EC-2 Regular)**

Course No. : CSI ZG518

Course Title : Database Design and Applications

Nature of Exam : Open Book

No. of Pages = 2

# No. of Questions = 5

Weightage : 30%

Duration : 2 Hours

Date of Exam : Sunday, 07/03/2021 (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. A sports organization running at national level has many entities including stadiums, sports persons, coaches, support staff, and administrators.

* Support staffs maintain the stadiums.
* Coaches train the sports persons.
* Every sports person must be trained by exactly one coach and every coach must train at least one sports person. There is a start date associated with training.
* Coaches and support staff are paid by the administrators on monthly salary basis.
* Every administrator must have to be either coach or support staff or sports person.

The relationship between sports persons-coaches in aggregation are related to the support staff-stadium where sports person and coaches play and train at native stadiums and maintained by support staff.

Draw the complete ER diagram with necessary attributes and primary keys of each attributes. The relationships between entities must be clearly depicted. State your assumptions clearly while drawing the complete ER diagram. [(0.5+0.5+1+0.5+1.5+2) = 6 Marks]

1. Write the correct relational schema for the administrator, coach, support staff and sports person. Form the relational schema for the relationship between two relationships namely sportsperson-coach and support staff-stadium. [(2+2) = 4 Marks]
2. The schema R is given to you having six attributes and functional dependencies.

R= (A,B,C,D,E,F)

A🡪B

B🡪E,F

C,D 🡪E

Give the lossless decomposition of schema R into 3 NF. [(3+5+2) = 10 Marks]

1. For the relational database schema discussed in class and presented below, write the Relational algebra query using the relational operators



* 1. Find the names of all the employees who work on every project
  2. Find the names of all the employees who are directly supervised by ‘Sumit’
  3. List the names of all department managers who have no dependents [2+1+2 = 5 Marks]

1. For the same relation presented above, write the SQL queries to retrieve the following
   1. Find the names and addresses of all employees who work on at least one project located in Delhi but whose department has no location in Delhi.
   2. Find the names of all the employees who work on every project
   3. Find the names of all employees who do not work on any project [2+2+1 = 5 Marks]

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