INTERNATIONAL CENTRE FOR APPLIED SCIENCES
MAHE, MANIPAL
B.Sc. (Applied Sciences) in Engg.
End – Semester Theory Examinations – May 2021
IV SEMESTER- DATABASE MANAGEMENT SYSTEMS (ICS 242)
(BRANCH: CSE)

Time: 3 Hours **Date: 17 May 2021** **Max. Marks: 50**

- ✓ **Answer ALL Questions.**
- ✓ **Missing data, if any, may be suitably assume.**
- ✓ **Plagiarism in any form will invite penalty marks**

1. Answer the following: **(10)**

A. List and explain the different properties of a database transaction.
B. What are the different schemes to authorise users of a database?
C. List any two design issues with the relational database and suggest solutions to overcome the problems.
D. With the help of an example, explain the conversion of an ER-diagram to a relational schema.
E. List and explain any 4 constraints that you would implement for the schema obtained in Q1. D.

2. Perform a SQL operation on the schema below along with its equivalent relational algebra expression using each of the given operators [A-E]: **(10)**

Schema 2.1:
Researcher (ID, Name, Birthdate, AgencyID, ProjectID)
Project (ProjectID, Objective, Description, Status, Timeline, Budget, AgencyID)
Agency (AgencyID, Name, Headquarters, Annual_Budget)

A. Select
B. Project
C. Theta Join
D. Select and project with a Cartesian product
E. Natural Left Outer Join

3. A client from the Cosmos Social Networking Company wants you to develop a database for their company. She provides a database blueprint given in Fig. 3.1 for you to gather the requirements of the database. Based on the blueprint, answer the following questions: **(10)**

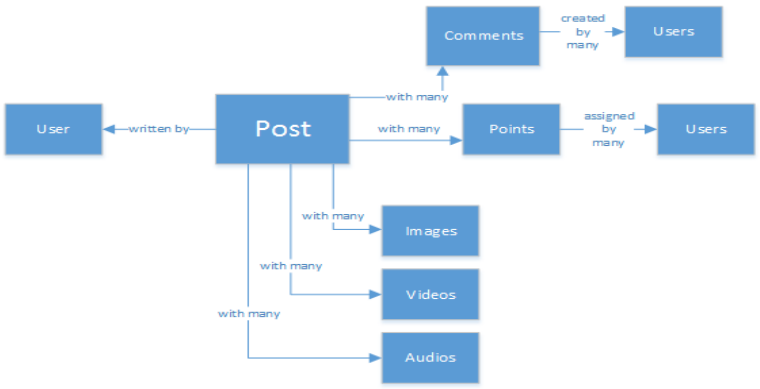

Figure 3.1

A. Identify and list the requirements of the Cosmos database described in Fig 3.1. Design an ER- diagram clearly specifying all the constraints. Additional assumptions if made have to be specified.

B. Write the relational schema for the ER diagram that you have designed. Create one DDL and one DML for the above schema.

4 **A Space station wishes to use a database to store the records relevant to their space mission. Details of all astronauts, space machinery, fuel specifications, space expeditions, satellite launch vehicles, schedules and projects need to be recorded in the database.** **(10)**

A. As a database engineer draw an E-R diagram to model the above Space Database. Convert the ER diagram into a relational schema. Assume and mention appropriate entities and constraints for your design

B. Devise 5 SQL operations that can give you an analytical insight into the Space database.

5 **Explain each of the following terms citing appropriate examples/SQL Commands.** **(10)**

A. Nested Subquery
B. Transaction Control
C. Query Processor
D. Aggregation
E. Scalar Subquery

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