**PES University, Bangalore**
(Established under Karnataka Act No. 16 of 2013)
Department of Computer Science and Engineering

**UE18CS252**

**August 2021: END SEMESTER ASSESSMENT (ESA) B.Tech. IV SEMESTER**

**UE18CS252: DATABASE MANAGEMENT SYSTEM**

Time: 3 Hrs.         Answer All Questions         Max Marks: 100

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| 1. | a) | With a neat diagram, Explain the database system environment. | 6 |
| | b) | Explain self-describing nature of database. [3 marks] Provide comparison of database with file system. [3 marks] | 6 |
| | c) | You are given the following requirements for a simple database for the National Hockey League (NHL):<br>1. the NHL has many teams,<br>2. each team has a name, a city, a coach, a captain, and a set of players,<br>3. each player belongs to only one team,<br>4. each player has a name, a position (such as left wing or goalie), a skill level<br>5. a team captain is also a player<br>6. a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 2019) and a score (such as 4 -2)<br><br>Construct a clean and concise ER diagram for the NHL database. List your assumptions and clearly indicate the cardinality mappings, participation constraints in your ER diagram. | 8 |
| 2. | a) | Discuss the Characteristics of Relation. | 6 |
| | b) | Explain Join operation in relational algebra and also discuss Division operation with suitable example. | 8 |
| | c) | Write the following queries as relational algebra expressions.<br>Author(name, city, age, expert_in)<br>Book(title, author_name, pages, price)<br>i) list the author details who are expert in Pattern Recognition and live in Bengaluru.<br>ii) list the titles of the books which are written by Stallings and have either 380 pages or cost Rs.450.<br>iii) display author names, who have authored books on OS and DS as well | 6 |
| 3. | a) | List and explain any four Primary Data types in SQL. | 4 |
| | b) | Considering Company Database, Write SQL Queries for the following:<br>1. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.<br>2. Make a list of all project numbers for projects that involve an employee whose last name is 'Smith', either as a worker or as a manager of the department that controls the project.<br>3. Retrieve all employees whose address is in Houston, Texas | 8 |

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| | | 4. Show the resulting salaries if every employee working on the 'ProductX' project is given a 10% raise. | |
| | c) | Discuss SQL Triggers with example. | 8 |
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| 4. | a) | Explain informal design guidelines for relation schemas | 8 |
| | b) | Which normal form is based on the concept of transitive dependency? Explain with an example the decomposition into 3NF. | 8 |
| | c) | Define Functional Dependency and Normalization. | 4 |
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| 5. | a) | Discuss Interfaces provided by DBMS. | 10 |
| | b) | Explain all the SQL commands which support database transaction. | 6 |
| | c) | Mention the difference between Logical Data Independence and Physical data Independence | 4 |