## School of Engineering
### Second Sessional Examination, Even Semester (AS: 2023-24)
B. Tech: CSF/IOTBC/CCML　　　[Year: 2$^{nd}$]　　　[Semester: 4$^{th}$]

| Course Title: Database Management Systems | Max Marks: 60 |
|---|---|
| Course Code: BCS3401 | Time: 3hrs |

Instructions if any: Read the question Carefully.

| SECTION 'A' | Course Objective | Marks |
|---|---|---|
| Q.N.1. Attempt all parts of the following: | | |
| a) What is the significance of Physical Data Independence? | CO1 | 1 |
| b) What do you understand by Functional Dependency in DBMS? | CO1 | 1 |
| c) Explain Blind Write in Transactions. | CO2 | 1 |
| d) What is Normalization? | CO2 | 1 |
| e) Define schedule? | CO2 | 1 |
| f) What is the concept of Roll Back in Transaction? | CO5 | 1 |
| g) What is Equi-Join in database? | CO2 | 1 |
| h) List the four functions of DBA. | CO4 | 1 |
| **SECTION 'B'** | **Course Objective** | **Marks** |
| Q.N.2. Attempt any two parts of the following: | | |
| a) What are data models? Briefly explain its types. | CO1 | 6 |
| b) Draw the ER-Diagram for Hospital Management System? | CO4 | 6 |
| c) Check whether the given schedule S is conflict serializable or not-S : R1(A) , R2(A) , R1(B) , R2(B) , R3(B) , W1(A) , W2(B) | CO5 | 6 |
| d) Discuss about Transaction. Also explain properties and states of transaction. | CO5 | 6 |
| **SECTION 'C'** | **Course Objective** | **Marks** |
| Q.N.3. Attempt any two parts of the following: | | |
| a) Discuss about Extended features of E-R diagram with example. | CO2 | 5 |
| b) Explain data abstraction in DBMS? | CO5 | 5 |
| c) What are relational constraints? Explain keys associated with them. | CO3 | 5 |

Q.N.4. Attempt any two parts of the following:

| | | | |
|---|---|---|---|
| a) | Given the following set of FDs on schema R (V,W,X,Y,Z) {Z→V, W→Y, XY→Z, V→WX} state whether, the following decomposition are loss-less joint decompositions or not.<br>(i) R1=(V,W,X), R2=(V,Y,Z)<br>(ii) R1=(V,W,X), R2=(X,Y,Z) | CO4 | 5 |
| b) | What is Aggregate Function in SQL? Write SQL query for different Aggregate Function. | CO2 | 5 |
| c) | A set of FDs for the relation R{A, B, C, D, E, F} is AB →C, C → A, BC → D, ACD → B, BE → C, EC → FA, CF → BD, D→ E. Find a minimum cover forth is set of FDs | CO4 | 5 |

**Q.N.5. Attempt any two parts of the following:**

| | | | |
|---|---|---|---|
| a) | Explain about Trigger with suitable example. | CO2 | 5 |
| b) | What is a schedule? Define the concepts of recoverable and cascade less schedule. | CO5 | 5 |
| c) | Discuss log based recovery process? Briefly | CO5 | 5 |

**Q.N.6. Attempt any two parts of the following:**

| | | | |
|---|---|---|---|
| a) | Discuss 2 phase locking protocol and time stamp based protocol with suitable example. | CO5 | 5 |
| b) | Consider the relation R(a,b,c,d) with Set F={a→c,b→d}. Decompose this relation in 2 NF. | CO4 | 5 |
| c) | Consider the following schema for institute library:<br>Student (RollNo, Name, Father_ Name, Branch)<br>Book (ISBN, Title, Author, Publisher)<br>Issue (RollNo, ISBN, Date-of –Issue)<br>Write the following queries in SQL and relational algebra:<br>(i) List roll number and name of all students of the branch 'CSE'.<br>(ii) Find the name of student who has issued a book published by 'ABC' publisher.<br>(iii) List title of all books and their authors issued to a student 'RAM'. | CO4 | 5 |

Table 1: Mapping between COs and questions
(Number of COs may vary from course to course)

| COs | Questions Numbers | Total Marks |
|---|---|---|
| CO1 | 1(a,b),2(a) | 8 |
| CO2 | 1(c,d,e),3(a),4(c),6(a) | 19 |
| CO3 | 3(c) | 5 |
| CO4 | 1(h), 2(b),4(a,c),6(b,c) | 27 |
| CO5 | 1(f),2(c,d),3(b),5(b,c),6(a) | 32 |