NATIONAL INSTITUTE OF TECHNOLOGY JAMSHEDPUR
Department of Computer Applications
END SEMESTER EXAMINATION DECEMBER -2020

MCA (2st Year): 3rd Semester **Course Code:** CA3301
Computer Applications **Course Name:** Database Management Systems
Time: 03 Hour **Max. Marks:** 50
Name of Faculty: Dr. Danish Ali Khan

Note: The question paper consists of 05 questions. Attempt all questions . All questions are carrying 10 marks each. Assume any suitable missing data . If any.

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1. i) What is constraint in database? Explain types of constraints with suitable example.
ii) In the Context of Data Modeling, What is the Importance of Metadata.
iii) Define Codd's Rule . **4+2+4**

2. i) What is the difference between natural join and equijoin ?
ii) Define Data Redundancy and Consistency in the context of transaction control system?
iii) Define DBMS Transaction Subsystem. **2+4+4**

3. i) Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. Define relationship by using *crow's foot notation.* **6**

A university registrar's office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrolment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modelled.

ii) Consider the following databases schema and write SQL expression for the following questions . **2*2 = 4**

Student (Ssn, Name, Major)

Course (CourseNo, Name, Description, Department, Credits)

Offered (CourseNo, Semester, Year, Instructor Id, Location)

Instructor (InstructorId, Name, Department)

Enroll (Ssn, CourseNo, Semester, Year, Grade)

(*Note* : You are owner of above database and You grants below task to 'student XX' user and 'Prof Shekhar' user using grant/revoke statements and creating view whenever necessary.)

a). Student can view all the information in the course and instructor tables except for Instructor Id.

b) . Student can also view the course no, semester, year, location and instructor name(not instructor id) of all courses that are being offered.

4. Consider the following relational database schema and answer the following questions using relational algebra queries. **5*2 = 10**

passenger (pid, pname, pgender, pcity)

agency (aid, aname, acity)

flight (fid, fdate, time, src, dest)

booking (pid, aid, fid, fdate)

i) Get the details about all flights from Chennai to New Delhi.
ii) Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020.
iii) Find the passenger names for those who do not have any bookings in any flights.
iv) Find the agency names for agencies that located in the same city as passenger with passenger id 123.
v) Find the details of all male passengers who are associated with Jet agency.

5. Let R(A,B,C,D,E,P,G) be a relational schema in which the following FDs are known to hold: **3+3+4**

AB->CD

DE->P

C->E

P->C

B->G

i) Calculate F^+ of the above schema.
ii) Calculate Candidate key of the above schema.
iii) In which normal form the above schema is? Give justification.