VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering
Fall Semester 2024-25
CAT I

SLOT: G1+TG1

Programme Name & Branch: 5 Year Integrated M.Tech (MID)

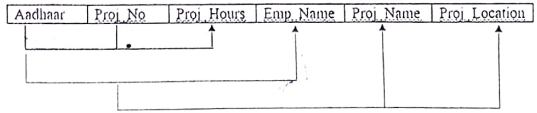
Course Name & Code: MDI3004 - Intelligent Database Systems

Class Number (s): VL2024250102720, VL2024250102707

Faculty Name (s): Dr. Thangaramya K, Dr. Deepika J

Exam Duration: 90 Min. Maximum Marks: 50

General instruction(s): Answer all questions

Q. No.	Question	Max Marks
1.	1. A university maintains data about the following entities: (i) Students including student-id, student-name, sex, major and Grade Point Average (GPA) (ii) Courses, including course-number, course-name, credits, Maximum-Enrolment, Faculty-ID (Handling the Course) and Prerequisites. (iii) Course offerings, including course number, year, semester, Batch Name, Faculty-ID, Timings, and Classroom; (iv) Faculty including Faculty-ID (Identification number), Fname, Department and Designation, and Salary. (v) The enrolment of students in courses having details about student-id, course-number and grades. Construct an E-R diagram for the University. Document all assumptions that you make about the mapping constraints. (4) List the entities, relationships and attributes. (3) Convert E-R diagram into tables (3)	10
2	Provide the module necessary to develop an intelligent database system which supports rule-based inference, object orientation with abstract data types, inheritance and object identity and a query language that supports both rule-based inference and object orientation. It must consist of a database manager in the middle level that interacts with a rule manager and an inference engine which are connected with a query processor for processing the queries. The physical database has separate components for tables, data dictionary and rules. Identify and justify your answers for the following questions. (5*2) 1. Suitable user interfaces for users to submit the queries 2. Object- oriented programming language (front end) 3. An extended QL that accepts object orientation and rule-based inference queries 4. Integration with visualization tool 5. Knowledge base	10
3.	a) Check whether the relation EMP_Project is in 2NF. If it is not in 2NF decompose the relation into 2NF relations in each of decompose the relation mentioned the primary keys and functional dependencies. Emp_Project (7 Marks)  b) Third Normal Form (3NF) is considered adequate for normal relational database design. Justify. (3 Marks)	10
4.	Assume the Telemedicine System with its required entities such as Doctor, UI Interface, Patient and Admin. 1. Derive any 5 sematic relationship among the entities including generalization, aggregation and association. 2. Draw the knowledge graph using the relationships	10
5.	1) Define an ODL schema for a university database that includes the following: Classes: Student, Course, Professor (2) Attributes: Student: name, studentID Course: courseName, courseCode Professor: professorName, professorID Relationships: A Student can enroll in multiple Courses. A Professor can teach multiple Courses. 2) Write an OQL query to retrieve the names of all students enrolled in the course with the course code 'CS101'. (2) 3) Expand the previous university database schema to include a new class Department with attributes departmentName and departmentCode. Establish the following relationships: (2) A Professor belongs to one Department. A Course is offered by one Department. 4) Write an OQL query to find the names of all professors who belong to the Computer Science department. (2) 5) Write an OQL query to retrieve all courses taught by a professor with the name "Dr. John Doe". (2)	10