

- N.B.:** (1) Question No. 1 is compulsory.
 (2) Attempt any **four** questions from remaining **six** questions.
 (3) Assume **suitable** data if **necessary**.

1. (a) Consider the following relations :— 15
- student (*id*, name, dept_name, tot_cred)
 course (*course id*, time, dept_name, credits)
 department (*dept_name*, building, budget)
 instructor (*id*, name, dept_name, salary)
 advisor (*s_id*, *i_id*)
 Preq (*course_id*, *preq_id*)
 section (*course_id*, *sec_id*, *semester*, *year*, building, room_no, time slot_id)
 classroom (*building*, *room_no*, capacity)
 timeslot (*timeslot_id*, *day*, *start_time*, *end_time*)
 takes (*id*, *course_id*, *sec_id*, *semester*, *year*, grade)
 teaches (*id*, *course_id*, *sec_id*, *semester*, *year*)
- Write the following queries on above relations :
- Find the names of all instructors from Computer Science department.
 - Find the course, id and titles of all courses taught by an instructor name shrinirasan
 - Find the total capacity of each of the building in the University.
 - Find the courses which are offered in both even and odd semester.
 - Find the names of instructors who have taught at least one course in even semester 2012.
- (b) Explain type constructors in OODB. 5
2. (a) Consider the relation R (A, B, C, D, E, F, G, H, I, J) and the functional dependencies 10
- $\{A, B\} \longrightarrow C$, $A \longrightarrow \{D, E\}$, $B \longrightarrow F$, $F \longrightarrow \{G, H\}$,
 $D \longrightarrow \{I, J\}$, $G \longrightarrow B$
- Determine all candidate keys of R.
 - If R is not in 2NF decompose it into 2 NF.
 - If the relations in part (ii) above are not in 3NF decompose them into 3NF relations.
- (b) Explain ascertain constraints and trigger constraints. 10
3. (a) While working as database analyst for a national sales organization, you are asked to be 10
- part of its datawarehouse teams. Prepare high level summary of main requirements to evaluate DBMS products for data warehousing.
- The project group is ready to make a final decision between ROLAP and MOLAP. What should be the basis for this decision ? Why ?

- (b) Explain the following operations with example :— 10
- (i) Bulk loading
 - (ii) Bulk scanning
 - (iii) Join
 - (iv) Sorting.
4. (a) Consider a Bharat Airline booking system and let us assume that following schema. 10
 customer (cust_id, title, fname, lname, gender, age, address, mobile_no, email)
 flight (flight_no, dept_date, dept_time, arrival_date, arrival_time)
 seat (flight_no, cust_id, dept_date, seat_no, class)
 Ticket (serial_no, flight_no, dept_date, seat_no, cust_id)
 Explain the different types of transparencies in distributed database with respect to above schema.
- (b) What are the most relevant differences between operational and decision support data and explain. 10
5. (a) Consider the cricket database 10
 Match (match_id, team1, team2, ground, date, winner)
 Player (Player_id, lname, fname, country, yborn, bplace, and test)
 Batting (match_id, pid, noovers, maidens, nruns, nwickets)
 Write the persistent objects and write the following OQL queries :—
- (i) Find the fname, lname, about object player from India.
 - (ii) Find the playerid. of players who have made a century in each of ODI matches 2755 and 2689.
 - (iii) Find matchid of all matches in the database in which Tendulkar is batted.
- (b) Consider a cricket database in Q5a. suppose that data is distributed amongst the node in England, West Indies, Australia and India. Describe how will you fragment, replicate and distribute the data. 10
6. (a) What is temporal database ? Explain different types of temporal databases. 10
 (b) Difference between OLAP and OLTP. 5
 (c) Steps for mapping EER schema into relational model. 5
7. (a) Write the ODL schema for University database. 10
 (b) Explain mobile database. 5
 (c) Explain ETL process in data warehousing. 5