

Total number of printed pages-5

53 (IT 402) DBMS

2018

## DATABASE MANAGEMENT SYSTEM

Paper : IT 402 (Back)

Full Marks : 100

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

**Answer any five questions.**

1. Answer in short :  $4 \times 5 = 20$

(i) What are the foreign keys and primary keys in a relation, give examples ?

(ii) What are the physical and logical data independency ?

(iii) What do you mean by regular and weak entity sets, give examples ?

- (iv) What are the foreign keys and merged relation approaches for mapping of binary 1 : 1 relationship type ?
- (v) Write *any one* option for mapping of specialization and generalization concept.
2. (a) Discuss the component modules of a Database Management System and their interactions with neat diagram. 15
- (b) What is an attribute in DBMS ? Define various types of attributes with appropriate examples. 5
3. (a) What is functional dependency ? Write and prove all six inference rules for functional dependency. 15
- (b) Consider the set of functional dependency,  $F = \{Ssn \rightarrow Ename, Pnumber \rightarrow (Pname, Plocation), (Ssn, Pnumber) \rightarrow Hours\}$  Determine the  $F^+$ . 5

4. (a) Consider the following relational schema. 15

EMPLOYEE (Fname, Mname, Lname, Ssn, Bdate, Address, Salary, Super\_Ssn, Dno.)

DEPARTMENT (Dname, Dnumber, Mgr\_Ssn, Mrg\_start\_date)

DEPT\_LOCATION (Dnumber, Dlocation)

PROJECT (Pname, Pnumber, Plocation, Dnum.)

WORKS\_ON (Essn, Pno, hour)

DEPENDENT (Essn, DE\_name, Bdata, Relationship)

Write Relational algebra expression for the following :

- (i) Retrieve the name and address of all employees who work for the research department.
- (ii) 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.
- (iii) Find the name of all employees who work on all projects controlled by department number 5.
- (iv) Retrieve the name of all employees who have no dependent.
- (v) List the name of all employees with two or more dependents.



- (b) What is cardinality ratio? Discuss its types with examples.

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5. (a) Consider the following relational schema

WORKS (Pname, Cname, Salary)

LIVES (Pname, Street, City)

LOCATED\_IN (Cname, City)

Manager (Pname, Mgrname)

where Pname : Person name, Cname : Company name and Mgrname : Manager name.

Write the SQL query for the following :

- (i) List the name of the people who work for the company Wipro along with the cities they live in.
- (ii) Find the people who work for the company Infosys with a salary more than Rs. 50,000. List the names of the people, along with street and city addresses.
- (iii) Find the name of the people who live and work in the same city.

- (iv) Find the person whose salary is more than that of all of the oracle employees.

- (v) Find the name of the companies that are located in every city where the company Infosys is located.

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- (b) Explain two-phase locking protocol. Mention its advantage and disadvantage.

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6. Write short notes on : *(any four)*

5×4=20

- (i) Integrity constraints
- (ii) 3rd Normal Form
- (iii) Natural Join
- (iv) Database Management Systems
- (v) ANSI/SPARC architecture.