

2016

COMPUTER SCIENCE

(Major)

Paper : 4-2

(Database Management System)

Full Marks : 60

Time : 3 hours

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

1. Answer the following questions as directed :

1×7=7

- (a) Whenever a record is larger than a block, we must use a/an
- (i) spanned organization
 - (ii) unspanned organization
 - (iii) Both (i) and (ii)
 - (iv) None of the above

(Choose the correct option)

- (b) It is possible to represent a file that logically should have variable-length records as a fixed-length records file.

(Write True or False)

(c) To improve the efficiency of retrieval of records from a file, _____ is used.

(Fill in the blank)

(d) Internal schema hides the details of physical storage structure.

(Write True or False)

(e) _____ integrity constraint is used to maintain the consistency among tuples of the two relations.

(Fill in the blank)

(f) Entity types that do not have key attributes of their own are called

(i) regular entity

(ii) strong entity

(iii) weak entity

(iv) owner entity

(Choose the correct option)

(g) The second normal form is based on the concept of

(i) transitive dependency

(ii) full-functional dependency

(iii) normal dependency

(iv) None of the above

(Choose the correct option)

2. Answer the following questions : $2 \times 4 = 8$

(a) What is blocking factor?

(b) What is meant by program-data independence?

(c) Write the purpose of natural join and outer join.

(d) What is the purpose of GROUP BY clause?

3. Answer any *three* questions : $5 \times 3 = 15$

(a) Briefly explain the role of DBA.

(b) Briefly explain the characteristics of the database approach.

(c) Discuss the entity integrity and referential integrity constraints. Why is each considered important?

(d) Describe the steps of ER-to-relational mapping algorithm.

(e) Give an overview of informal design guidelines for relational schemas.

(4)

4. Consider the relational schema and write SQL statements to perform the following tasks : $2 \times 7 = 14$

EMPLOYEE (SSN, NAME, BDATE, SALARY, SEX, SUPERSSN, DNO)

DEPARTMENT (DNO, DNAME, MGRSSN)

- (a) Retrieve the name of all employees who work for 'Purchase' department.
- (b) For each employee, retrieve the employee's name and supervisor's name.
- (c) Retrieve all employees in department number 2 whose salary is between ₹ 20,000 and ₹ 30,000.
- (d) For each department, retrieve the department number, the number of employees in the department and their average salary.
- (e) Increase salary of all employees working in 'Systems' department by 7%.
- (f) Delete the record for employees who work in 'Research' department.
- (g) Create a view that has department name, manager name and manager salary for every department.

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(Continued)

(5)

5. Answer any *two* questions : $8 \times 2 = 16$

- (a) Briefly explain the advantages of using DBMS.
- (b) List the operations of relational algebra and the purpose of each.
- (c) Define BCNF. How does it differ from 3NF? Why is it considered a stronger form of 3NF?
- (d) Write short notes on any *two* of the following :
 - (i) ER model
 - (ii) DFD
 - (iii) Different types of keys

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