**[ 20-HKPGDEN-M2S(N)21J ]**

**PGCA/ScIT/PGDCA 2nd Semester (New) Exam., 2020**

# FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEM

[ PGCA/ScIT/PGDCA-S2-03 ]

**( Theory )**

*Full Marks* : 50

*Time* : 2 hours

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

**1.** *(a)* Answer the following questions : 1×4=4

*(i)* What types of data are stored in master file? Give examples.

*(ii)* Give examples of two transaction control statements commands.

*(iii)* Define composite key giving suitable examples.

*(iv)* Define transaction.

*(b)* Fill in the blanks : 1×2=2

*(i)* A table is in Boyce-Codd Normal Form (BCNF) if the only determinants in the table are the _____ key.

*(ii)* _____ operation is used to select subset of tuples from a relation.

*(c)* Choose the appropriate option : 1×2=2

*(i)* Which one of the following is not a valid relational database?

(1) IMS

(2) SYBASE

(3) ORACLE

(4) UNIFY

*(ii)* Which of the following schemas defines the stored data structures in terms of database model used?

(1) External

(2) Conceptual

(3) Internal

(4) None of the above

**2.** Answer any *five* of the following questions : 2×5=10

*(a)* Write the basic features of query tree giving its definition.

*(b)* What is data consistency?

*(c)* Why do we need SQL?

*(d)* Write the meaning of the following operation :

$$\pi_{ename,\ age}(EMPLOYEE)$$

Also mention the conditions for compatibility of UNION operation.

*(e)* Give the difference between full outer join and inner join in SQL commands.

*(f)* What is functional dependency?

**3.** Answer any *two* of the following questions : 3×2=6

*(a)* Mention the rules for functional dependency diagram.

*(b)* Define absolute and relative cell address in case of Direct Access Organization.

*(c)* Briefly describe conservative two-phase locking technique.

**4.** Answer any *three* of the following questions : 6×3=18

*(a)* Briefly describe six advantages of DBMS. 6

*(b)* Define degree of a relationship type. Give examples of binary and ternary relation. Also define cardinality ratio and participation constraints. 2+1+3=6

*(c)* Draw an ER diagram for inventory management systems by selecting entity types, attributes and their relationship. 6

*(d)* Why is normalization required? How do we convert a database in 2NF to 3NF? Explain with an example. 2+4=6



( Continued )

**5.** Answer any *one* of the following questions : 8

*(a)* Consider the following table :

BOOKS (book_id, b_name, author, purchase_date, cost)
ISSUE_RETURN (book_id, member_id, issue_date, return_date)
MEMBERS (member_id, m_name, address, phone, birth_date)

Formulate SQL queries to the following : 2+2+2+2=8

*(i)* Find the names of all those books that have not been issued.

*(ii)* Display the member_id and the number of books issued to that member (assume that if a book in ISSUE_RETURN relation does not have a return_date, then it is issued).

*(iii)* Display the names and authors of books that have been issued at any time to a member whose member_id is "lib20".

*(iv)* Find the book that has been issued the maximum number of times.

*(b)* *(i)* In the context of a relational model, briefly discuss each of the following : 4

Domain, Tuple, Properties of primary key

*(ii)* Briefly discuss the different threats to databases. What is role-based access control? 4

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