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( February )

## COMPUTER APPLICATION

( Honours )

## ( Database Management System )

( BCA-302 )

Marks : 45

Time : 2 hours

The figures in the margin indicate full marks  
for the questions

Answer *any one* question from each Unit

## UNIT—I

- Design an ER diagram for an online bookstore consisting of books, customers and warehouse. Customers purchase books by placing them into a virtual shopping basket. The warehouse contains the stock of books sold by bookstore. Book details such as author, publisher, year, title, price should

be maintained. Customer details such as name, address, e-mail and phone should be kept. Also list out any assumptions you make while designing the ER diagram. 9

- What is a DBMS? What is the difference between physical and logical data independences? 1+4=5
  - Write short notes on any *two* of the following : 2×2=4
    - Entity
    - Participation constraints
    - DBA
    - SQL

## UNIT—II

- With a relevant example, explain how secondary indexes work. 6
  - Explain briefly what is meant by order of a B-tree. 3
- Consider a disk with block size = 512 bytes, a block pointer  $P = 6$  bytes long and record pointer  $P_R = 7$  bytes long. A file has  $r = 30000$  EMPLOYEE records of fixed length. Each

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record has the following fields :

NAME (30 bytes), SSN (9 bytes),  
DEPARTMENTCODE (9 bytes), ADDRESS  
(40 bytes), PHONE (9 bytes), BIRTHDATE  
(8 bytes), SEX (1 byte), JOBCODE (4 bytes),  
SALARY (4 bytes). An additional byte is used  
as a deletion marker.

- (a) Calculate the record size  $R$  in bytes.  
(b) Calculate the blocking factor  $bfr$  and the  
file blocks  $b$ . 9

UNIT—III

5. Discuss briefly the following relational  
algebra operations using suitable examples :  
3×3=9  
(a) Intersection  
(b) Difference  
(c) Union

6. Consider a database with the following  
relations (primary keys are underlined) :
- CUSTOMER(cust#, cname, city)  
ORDER(order#, odate, cust#, ord\_amt)  
ORDER\_ITEM(order#, item#, qty)  
ITEM(item#, unit\_price)  
SHIPMENT(order#, warehouse#, ship\_date)  
WAREHOUSE(warehouse#, city)

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Specify the following queries in SQL : 9

- (a) List the order#, ship\_date for all orders  
shipped from warehouse number 'w2'.  
(b) List all orders for customer number 23.  
(c) List all items in order number 414.

UNIT—IV

7. Discuss insertion, deletion and modification  
anomalies. Why are they considered bad?  
Explain with examples. 9  
8. What undesirable dependencies are avoided  
when a relation is in 3NF? Explain. 9

UNIT—V

9. (a) With the help of a diagram, explain the  
various states that a transaction might  
go through. 4  
(b) Define a schedule. When are two  
operations in a schedule said to be in  
conflict? Give an example. 2+2+1=5  
10. (a) What is meant by concurrent execution  
of database transaction in a multi-user  
system? 5  
(b) What benefit does strict two-phase  
locking provide? What disadvantages  
result? 4

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