

2020

B.C.A.

[HONOURS]

(Database Management System)

Paper : BCA-203

Full Marks : 80

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.***Answer Q. No.1** and any **four** from the rest.

1. Answer any **eight** questions:  $2 \times 8 = 16$
- What is database instances and schemas?
  - What is transitive dependency?
  - What is superkey?
  - What is meant by composite and multivalued attributes?
  - Define BCNF.
  - Write two disadvantages of the index sequential file organization.
  - What do you mean by bucket overflow? Write the reasons behind this.

[Turn over]

- What do you mean by referential integrity?
  - What do you mean by cardinality and degree of a relation?
  - Write the syntax of 'alter table' – command with a suitable example.
  - What is a 'cursor'? Explain its purposes.
  - Define database transaction.
2. a) Draw an ER-Diagram for a banking enterprise by using the following entities with respect to their attributes given below:
- customer (customer\_id, customer\_name, .....)
  - branch (branch\_name, branch\_city, .....)
  - loan (loan\_no, amount, .....)
  - employee (emp\_id, emp\_name, .....)
  - account (acct\_no, balance, .....)
  - payment (payment\_date, payment\_num, payment\_amt)
- What is meant by Generalization and Aggregation?
  - Explain the difference between a weak and a strong entity set.
  - Explain the distinction between total and partial constraints.

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e) What is derived attributes?  
 $6+(2+2)+2+2+2=16$

3. a) Why is normalization necessary in database design?  
b) State two disadvantages of 1NF.  
c) Compare 3NF and BCNF.  
d) What is triggers? Write the need for triggers.  
e) Explain three schema architecture of DBMS.  
 $3+2+3+(2+2)+4=16$

4. a) What is triggers?  
b) What is data dictionary?  
c) Explain with example, the following relational algebraic operations:  
i) select operation  
ii) project operation  
iii) rename operation  
d) Consider the relational database given below. Give an expression in the relational algebra to express each of the following queries :  
employee(person\_name, street, city)  
works (person\_name, company\_name, salary)  
company (company\_name, city)  
manages (person\_name, manager\_name)

- i) Find the names of all employees who work for xyz corporation.  
ii) Find the names, street address, and cities of residence of who work for abc bank corporation.  
iii) Find the names of all employees in this database who live in the same city as the company for which they work.  
 $2+2+(2+2+2)+(2 \times 3)=16$

5. a) Given the relation R(A, B, C, D) and the set of functional dependencies (FDs)  
 $F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C, AC \rightarrow D\}$   
Obtain minimal set of FDs that is equivalent to the given set and determine the candidate keys.  
b) Consider a relational schema R(A,B,C,D,E) and the set of FDs  
 $F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$   
i) Show if the decomposition  $R_1(A,B,C)$  and  $R_2(A,B,E)$  of R is a lossless.  
ii) Show if dependency is preserved in the above decomposition.

iii) Show if the decomposition  $R_2(A,B,C)$  and  $R_4(C,D,E)$  of  $R$  is lossless join decomposition.  $8+8=16$

6. a) Observe the relational schema given below :  
Create appropriate queries.

Employee (e\_no, e\_name, street, city)

Works (e\_name, company\_name, salary)

Company (company\_name, city)

Manager (e\_name, manager\_name)

- i) Find the names and cities of residence of all employees who work for 'XYZ' consultants.
- ii) Find the names of all employees who live in the same city as the company for which they work.
- iii) Find the names of employee(s) who do not work for a particular company say 'ACME'.
- iv) Find the names of all employees who earn more than every employee of 'Purbasa IT Solutions'.

b) What is oracle function? Explain any two functions with syntax and examples.

c) Explain 'HAVING' and 'GROUP-BY' clause with proper syntax and suitable example.

d) What is the command for updating the contents of a table? Write a suitable example to demonstrate it.

e) How to modify the structure of a table? Write the syntax with proper example.

$(2 \times 4) + 2 + 2 + 2 + 2 = 16$

7. Write short notes from the following (any **four**):

$4 \times 4 = 16$

a) Network Data Model

b) Dense and Sparse indices

c) B<sup>+</sup> tree

d) Database Administrator

e) Dynamic hashing

f) Concurrency control in DBMS