

Roll No. BCA 3rd Sem

Total Pages : 03

GSM/D-24

1066

FUNDAMENTALS OF DATABASE
SYSTEM
BCA-235

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question each from Unit I to Unit IV. Q. No. 1 is compulsory.

(Compulsory Question)

1. (a) Define data, information and tuple.
- (b) Who are database designers and application developers ?
- (c) What is the role of mapping in database system architecture ?
- (d) Differentiate between physical and logical data independence.
- (e) What are strong and weak entity ? Write the symbolic representation.
- (f) Differentiate between entity type and entity sets.
- (g) What are the properties of a relation ?
- (h) Write a note on view.

8×2=16

Unit I

2. Define database management system. Differentiate between database systems and file system. Write the advantages and disadvantages of DBMS. 16
3. (a) Write the properties of database management system. Explain responsibilities of database administrator.
(b) Explain the functions and components of database management system. 8+8=16

Unit II

4. Define database instance, database schema and sub-schema. Outline and explain the architecture of Database Management System as proposed by ANSI-SPARC. 16
5. Elaborate the different classifications of database management system. Outline and explain client-server architecture of DBMS. 16

Unit III

6. What are data models ? Write the advantages and disadvantages of record based, objectbased and physical data models. 16
7. (a) What are attributes ? Discuss different types of attribute. State example along with notation. 8

- (b) What is relationship role name and recursive relationships ? Write the cardinality ratios of relationship. 8

Unit IV

8. What is network and hierarchical data model ? Discuss the advantages and disadvantages of data model proposed by DBTG in CODASYL. 16
9. (a) What do you mean by Keys ? Explain different types of keys. 8
- (b) What are relational constraints ? Discuss different types of constraints with examples. 8

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BASICS OF DATA SCIENCE USING EXCEL

Paper-BCA : CC-M3 : B23-CAP-304

Time Allowed : 3 Hours]

[Maximum Marks : 50

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions : 5×2=10

- (a) What is meant by Data science?
- (b) What types of File extensions may be used while importing or exporting a File in and from Excel?
- (c) What is meant by Descriptive statistics?
- (d) Define the mean of a Dataset.
- (e) What is the purpose of the VLOOKUP function in Excel?

UNIT-I

2. (a) How can you use basic functions such as sum, count and average in Excel? Explain using suitable examples.

5

(b) Explain the purpose and use of Sorting and Filtering in Excel using suitable examples. 5

3. What are the various Data types and Formats used in Excel? Explain in detail using suitable examples. 10

UNIT-II

4. Discuss the importance of Visualizing data using charts in Excel. How can you create and customize the charts in Excel? Explain in detail. 10

5. Provide a detailed explanation of Data cleaning techniques, including examples of how to handle missing values, remove duplicates, and correct errors in Excel? 10

UNIT-III

6. What is meant by Predictive models? Explain their purpose and use in detail. Also discuss the various predictive models used in Excel using suitable examples. 10

7. Find the t-test value for the following two sets of values : 7, 2, 9, 8 and 1, 2, 3, 4? Also discuss how it can be implemented in Excel? 10

UNIT-IV

8. Describe the various What-If Analysis tools in Excel using examples of how each tool can be applied in decision-making scenarios? 10

9. What is meant by Correlation and Regression? How these are calculated in Excel? Explain using suitable examples. 10

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**COMPUTER ORIENTED NUMERICAL
METHODS
BCA-236**

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) Determine absolute error, relative error and percentage error in a calculation 24.13 is the actual value and 25.09 is the measured value. 3
- (b) What is difference between floating point number and decimal ? 3
- (c) Estimate the initial approximate root x_0 of equation $f(x) = x^2 - 4x - 2 = 0$ using iterative method ? 3
- (d) What are Ill-conditioned equations system ? Give a 2×2 system of equations as a example ? 3

- (e) Find relation between Δ (Del) and E(shift) operators for interpolations ? 2
- (f) What are three common pitfalls in numerical differentiation ? 2

Unit I

2. (a) Use bisection method for equation $x^3 - 5x - 4 = 0$ for three iterations. 8
- (b) Use false position method to find the positive root of $x^3 - 4x - 9 = 0$. Compute upto 4 iterations. 8
3. (a) Use Newton-Raphson iteration method to find a root of the equation $x^3 - x - 1 = 0$ near $x = 1.5$ (use upto 4 iterations). 8
- (b) Use Bairstow's method to find a root of polynomial $f(x) = x^4 + x^3 + 2x^2 + x + 1 = 0$. 8

Unit II

4. (a) Use Gauss Elimination method to solve :

$$X + 3Y + 8Z = 4$$

$$X + 4Y + 3Z = -2$$

$$X + 3Y + 4Z = 1.$$

8

- (b) Solve the following system of equations using Gauss-Seidel iterative method :

$$2x - y = 1$$

$$-x + 2y = 4$$

using successive method starting with (0, 0) as Initial values. 8

5. (a) Use modified Euler's method to solve :

$$dy/dx = x + y^2 ; y(0) = 1$$

Taking $h = 0.05$ in the range $0 \leq x \leq 0.10$. 8

- (b) Use Runge-Kutta Method to solve differential equation :

$$dy/dx = x + y; y(0) = 1$$

in the range $0 \leq x \leq 0.2$ taking $h = 0.1$. 8

Unit III

6. (a) Given the table :

X : 5 10 15 20

Y : 0.08716 0.17365 0.25882 0.34202

Find $y(6)$ using Newton's forward interpolation formula. 8

- (b) Use Newton's Backward interpolation formula to find y when $x = 23.4$ from the following table :

$x :$	19	20	21	22	23	24	25
$y :$	91.00	100.25	110.0	120.25	131.0	142.55	154.0

8

7. (a) Use Newton's divided difference formula for unequal interval to find an interpolating polynomial for the data :

$x :$	0.0	0.5	1.0	2.0
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$y :$	0.00	0.57	1.46	5.05
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8

- (b) Using Lagrange's interpolation formula, find y for $x = 2$ for the data :

$x :$	0.0	0.1	0.3
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$y :$	-0.5	0.0	0.2
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8

Unit IV

8. (a) Find $y'(x_0)$ and $y''(x_0)$ at $x = 2.2$ given the following table :

$X :$	1.4	1.6	1.8	2.0	2.2
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$Y :$	4.0552	4.9530	6.0496	7.3891	9.0250
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8

- (b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ to five decimal places by

Trapezoidal rule where the interval $(0, 1)$ is subdivided into 6 equal parts.

8

9. (a) Use Simpson's 1/3rd rule to evaluate $\int_0^1 x^4 dx$,
considering 6 strips. 8

(b) Use Gaussian quadrature formula of second order
to evaluate $\int_1^2 \frac{dx}{x}$. 8

DATA BASE TECHNOLOGIES

Paper-CC-C3 : B23-CAP-303 / B23-CTS-303

Time allowed : 3 Hours]

[Maximum Marks : 50

Note : Attempt five questions in all, selecting **one** question from each unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions in brief: $4 \times 2\frac{1}{2} = 10$
- (i) Write short note on views.
 - (ii) What is the purpose of Cartesian product operation in relational algebra?
 - (iii) Describe the demerits of hierarchical data model and network data model.
 - (iv) Explain various components of DBMS environment.

UNIT-I

2. What is the purpose of mapping between various layers of the 3-tier architecture of DBMS? Explain with the help of suitable examples. 10

3. What do you understand by Database Administrator? Describe the Role and Responsibilities of Database Administrator. 10

UNIT-II

4. Draw and explain the purpose of various symbolic notations used for designing entity-relationship model. Take an example to illustrate. 10
5. Explain the following with examples (with respect to Entity-Relationship Model): 10
- (a) Entity (b) Entity Sets
(c) Entity Type (d) Type of Attributes.

UNIT-III

6. What do you understand by "complete set of operators" in Relational Algebra? Justify. 10
7. Define Relational Calculus. Explain various types of Relational Calculus. 10

UNIT-IV

8. What is the role of functional dependency during Normalisation of database? State the inference rules for functional dependency. 10
9. Explain the following normal forms along with suitable examples: 10
- (a) 1 NF (b) 2NF
(c) 3 NF (d) BCNF.

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FUNDAMENTALS OF DATA BASE SYSTEM

Paper I

Time : Three Hours]

[Maximum Marks : $\begin{cases} \text{B.A.} : 25 \\ \text{B. Sc.} : 40 \end{cases}$

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory.
Attempt *four* more questions, selecting *one* question
from each Unit. All questions carry equal marks.

(Compulsory Question)

1. (a) Define Attribute and Tuple.
- (b) Distinguish between composite and atomic attributes.
- (c) Define Data Independence.
- (d) Differentiate between casual users and Naive users of DBMS.
- (e) Define the terms Schema and Mapping. 5,8

Unit I

2. What is the difference between File system approach and Database system approach ? 5,8

3. Define Database. What are the characteristics of Database ? 5,8

Unit II

4. Differentiate between Logical and Physical Data Independence. 5,8
5. Explain the three-level architecture of DBMS. Also discuss the advantages of three-level architecture. 5,8

Unit III

6. Discuss Physical Data Model and Conceptual Data Model. 5,8
7. Write short notes on the following : 5,8
- (a) Entity, Entity type, Entity Set
 - (b) Degree and cardinality of relationship.

Unit IV

8. Explain Relational Data Model and integrity rules using examples. 5,8

9. Define the following terms :

5,8

- (a) Super key, candidate key, alternate key.
- (b) Centralised and client-server architecture of DBMS.