

**BACHELOR OF COMPUTER APPLICATIONS  
SCHEME OF EXAMINATION – SECOND YEAR(W.E.F. 2014-15)**

<b>Paper No.</b>	<b>Title of Paper</b>	<b>External marks</b>	<b>Internal Assessment</b>	<b>Maximum Marks</b>	<b>Pass marks</b>	<b>Exam Duration</b>
<b>Semester – III</b>						
BCA-231	Object Oriented Programming Using C++	80	20	100	35	3hrs
BCA-232	Data Structures	80	20	100	35	3hrs
BCA-233	Computer Architecture	80	20	100	35	3hrs
BCA-234	Software Engineering	80	20	100	35	3hrs
BCA-235	Fundamentals of Data Base Systems	80	20	100	35	3hrs
BCA-236	Computer Oriented Numerical Methods	80	20	100	35	3hrs
<b>Semester – IV</b>						
BCA-241	Advanced Data Structures	80	20	100	35	3hrs
BCA-242	Advanced Programming using C++	80	20	100	35	3hrs
BCA-243	E-Commerce	80	20	100	35	3hrs
BCA-244	Relational Data Base Management System	80	20	100	35	3hrs
BCA-245	Computer Oriented Statistical Methods	80	20	100	35	3hrs
BCA-246	Management Information System	80	20	100	35	3hrs
BCA-251	Lab – I Based on BCA-231 & BCA- 242	100			35	3hrs
BCA-252	Lab – II Based on BCA-232 & BCA- 241	100			35	3hrs

INTERNAL ASSESSMENT WILL BE BASED ON THE FOLLOWING CRITERIA:

- (I) TWO HANDWRITTEN ASSIGNMENTS : 10 MARKS  
(IST ASSIGNMENT AFTER ONE MONTH & IIND ASSIGNMENT AFTER TWO MONTHS)  
(II) ONE CLASS TEST : 5 MARKS  
(ONE PERIOD DURATION)  
(III) ATTENDANCE : 5 MARKS

MARKS FOR ATTENDANCE WILL BE GIVEN AS UNDER:

1. 91% ONWARDS : 5 MARKS  
2. 81% TO 90% : 4 MARKS  
3. 75% TO 80% : 3 MARKS  
4. 70% TO 75% : 2 MARKS\*  
5. 65% TO 70% : 1 MARK\*

\* FOR STUDENTS ENGAGED IN CO-CURRICULAR ACTIVITIES OF THE COLLEGES ONLY/AUTHENTICATED MEDICAL GROUNDS DULY APPROVED BY THE CONCERNED PRINCIPAL.

**NOTE: 1. PRACTICAL EXAM WILL BE CONDUCTED ANNUALLY IN TWO SESSIONS. HOWEVER THE WORKLOAD WILL BE DISTRIBUTED IN BOTH THE SEMESTERS ACCORDING TO THE RELEVANT PAPERS.**

## **BCA - 231 OBJECT ORIENTED PROGRAMMING USING 'C++'**

**Maximum Marks: 100**

**80**

**Minimum Pass Marks: 35**

**20**

**Time: 3 hours**

**External:**

**Internal:**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Object oriented Programming: Object-Oriented programming features and benefits. Object-Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Scope resolution operator and its significance, Static Data Members, Static member functions, Nested and Local Class, Accessing Members of Class and Structure.

### **UNIT - II**

Constructor, Initialization using constructor, types of constructor– Default, Parameterized & Copy Constructors, Constructor overloading, Default Values to Parameters, Destructors, Console I/O: Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations.

### **UNIT - III**

Manipulators, Friend Function, Friend Class, Arrays, Array of Objects, Passing and Returning Objects to Functions, String Handling in C++, Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference & pointers.

### **UNIT - IV**

Polymorphism: Operators in C++, Precedence and Associativity Rules, Operator Overloading, Unary & Binary Operators Overloading, Function Overloading, Inline Functions

### **TEXT BOOKS:**

1. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

### **REFERENCE BOOKS:**

1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.

## **BCA - 232 DATA STRUCTURES**

**Maximum Marks: 100**

**80**

**Minimum Pass Marks: 35**

**20**

**Time: 3 hours**

**External:**

**Internal:**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.

Strings: Introduction, String strings, String operations, Pattern matching algorithms.

### **UNIT - II**

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparse matrices.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Garbage collection, Applications of linked lists. Algorithms for Insertion, deletion in array, Single linked list

### **UNIT - III**

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

### **UNIT - IV**

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks and using recursion.

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

### **TEXT BOOKS**

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill

2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

**REFERENCE BOOKS:**

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
2. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.
3. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

## **BCA - 233 COMPUTER ARCHITECTURE**

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal:**

**20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT -I**

Basic Computer Organisation and Design: Instruction Codes, Computer registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instructions, Input-Output and Interrupt, Design of Basic computer, Design of accumulator logic

### **UNIT -II**

Register Transfer and Microoperations: Register Transfer Language (RTL), register transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit, Microprogrammed Control: Control memory; address sequencing, microprogram sequencer, Design of Control Unit

### **UNIT -III**

Central Processing Unit: General registers Organization, Stack Organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Program Interrupt, RISC, CISC.

### **UNIT -IV**

Memory Organization: Memory hierarchy, Auxiliary Memory, Associative Memory, Interleaved memory, Cache memory, Virtual Memory, Memory Management Hardware, Input Output Organization : Peripheral devices , Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access(DMA),Input-Output Processor(IOP).

### **TEXT BOOKS**

1. Computer System Architecture By. Moris Mano, Pearson Education
2. Computer Architecture and Organization By J.P. Hayes, Tata McGraw Hill

### **REFERENCE BOOKS:**

1. W. Stallings, Computer Organisation and Architecture, 4<sup>th</sup> Edition, Pearson Education
2. Harry, Jordan, Computer Systems Design & Architecture, Edition, Addison Wesley
3. J.D. Carpinelli, Computer Systems Organization & Architecture, Addison Wesley.
4. P.V.S. Rao, "Computer System Architecture", PHI, 2009

## BCA - 234 SOFTWARE ENGINEERING

**Maximum Marks: 100**

**80**

**Minimum Pass Marks: 35**

**20**

**Time: 3 hours**

**External:**

**Internal:**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT - I

Introduction: Program vs. Software, Software Engineering, Programming paradigms, Software Crisis - problem and causes, Phases in Software development: Requirement Analysis, Software Design, Coding, Testing, Maintenance, Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models, Role of Metrics.

### UNIT - II

Feasibility Study, Software Requirement Analysis and Specifications: SRS, Need for SRS, Characteristics of an SRS, Components of an SRS, Problem Analysis, Information gathering tools, Organizing and structuring information, Requirement specification, validation and Verification.. SCM

### UNIT - III

Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision tress, Structured English, Entity-Relationship diagrams, Cohesion and Coupling.

Gantt chart, PERT Chart, Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

### UNIT - IV

Software Project Planning: Cost estimation: COCOMO model, Project scheduling, Staffing and personnel planning, team structure, Software configuration management, Quality assurance plans, Project monitoring plans, Risk Management. Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing.

### TEXT BOOKS:

1. Pressman R. S., "Software Engineering - A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.

### REFERENCE BOOKS:

1. Sommerville, "Software Engineering", Addison Wesley.

2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.
3. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons.

## **BCA - 235 FUNDAMENTALS OF DATABASE SYSTEM**

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal:**

**20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Basic Concepts - Data, Information, Records and files. Traditional file - based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS, Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.

### **UNIT - II**

Database System Architecture - Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances, Data Independence - Logical and Physical Data Independence, Classification of Database Management System, Centralized and Client Server architecture to DBMS.

### **UNIT - III**

Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling, Entity-Relationship Model - Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams.

### **UNIT - IV**

Relational Data Model:-Brief History, Terminology in Relational Data Structure, Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, Base Tables and Views, Basic Concepts of Hierarchical and Network Data Model.

### **TEXT BOOKS:**

1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.

### **REFERENCE BOOKS:**

1. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
2. C. J. Date, "An Introduction to Database Systems", 8<sup>th</sup> edition, Addison Wesley N. Delhi.

## **BCA- 236 COMPUTER-ORIENTED NUMERICAL METHODS**

**Maximum Marks: 100  
hours**

**Time: 3**

**Minimum Pass Marks: 35**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT-I**

Computer Arithmetic: Floating-point representation of numbers, arithmetic operations with normalized floating-point numbers and their consequences, significant figures.

Error in number representation-inherent error, truncation, absolute, relative, percentage and round-off error.

Iterative Methods: Bisection, False position, Newton-Raphson method. Iteration method, discussion of convergence, Bairstow's method.

### **UNIT-II**

Solution of simultaneous linear equations and ordinary differential equations: Gauss-Elimination methods, pivoting, Ill-conditioned equations, refinement of solution. Gauss-Seidal iterative method, Euler method, Euler modified method, Taylor-series method, Runge-Kutta methods, Predictor-Corrector methods.

### **UNIT-III**

Interpolation and Approximation:

Polynomial interpolation: Newton, Lagranges, Difference tables, Approximation of functions by Taylor Series.

Chebyshev polynomial: First kind, Second kind and their relations, Orthogonal properties.

### **UNIT-IV**

Numerical Differentiation and integration: Differentiation formulae based on polynomial fit, pitfalls in differentiation, Trapezoidal & Simpson Rules, Gaussian Quadrature.

### **REFERENCE BOOKS**

1. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.
2. S. S. Sastry, Introductory Methods of Numerical Analysis.
3. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.
4. H. C. Saxena, Finite Differences and Numerical Analysis.

## **BCA - 241 ADVANCED DATA STRUCTURE**

**Maximum Marks: 100**

**80**

**Minimum Pass Marks: 35**

**20**

**Time: 3 hours**

**External:**

**Internal:**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Binary search trees: introduction, storage, Searching, Insertion and deletion in a Binary search tree, Huffman's algorithm, General trees.

### **UNIT - II**

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, operations on graphs, traversal algorithms in graphs and their implementation, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path.

### **UNIT - III**

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Comparison of various sorting and searching algorithms on the basis of their complexity.

### **UNIT - IV**

Files: Introduction Attributes of a file, Classification of files, File operations, Comparison of various types of files, File organization: Sequential, Indexed-sequential, Random-access file.

Hashing: Introduction, Collision resolution.

### **TEXT BOOKS**

1. Seymour Lipschutz, "Data Structure using C", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

### **REFERENCE BOOKS**

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgraw- Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.

## **BCA - 242 Advanced PROGRAMMING USING C++**

**Maximum Marks: 100**

**80**

**Minimum Pass Marks: 35**

**20**

**Time: 3 hours**

**External:**

**Internal:**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Dynamic Polymorphism: Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor.

### **UNIT - II**

Type Conversion: Basic Type Conversion, Conversion between objects and basic types, Conversion between objects of different classes, Inheritance: Rules of Derivations - Private, Protected and Public Derivations.

### **UNIT - III**

Different Forms of Inheritance - Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance Roles of Constructors and Destructors in Inheritance, Genericity in C++: Templates in C++, Function templates.

### **UNIT - IV**

Class templates in C++, Exception Handling in C++: try, throw and catch, Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Operation on files.

### **TEXT BOOKS:**

1. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

### **REFERENCE BOOKS:**

1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill

## BCA-243 E-Commerce

**Maximum Marks: 100**

**Minimum Pass Marks: 35**

**Time: 3 hours**

**External: 80**

**Internal: 20**

**Note:** Examiner will be required to set Nine Questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### Unit-I

Introduction to E-Commerce:-Business operations; E-commerce practices vs. traditional business practices; concepts of b2b, b2c,c2c,b2g,g2h,g2c; Features of E-Commerce, Types of Ecommerce Systems, Elements of E-Commerce, principles of E-Commerce, Benefits and Limitations of E-Commerce.

Management Issues relating to e-commerce. Operations of E-commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTTP); Electronic payment systems; Secure electronic transaction (SET); SET` s encryption; Process; Cybercash; Smart cards; Indian payment models.

### Unit-II

Applications in governance: EDI in governance; E-government; E-Governance applications of Internet; concept of government –to- business, business-to-government and citizen-to-government; E-governance models; Private sector interface in E-governance. Applications in B2C: Consumers shopping procedure on the Internet; Impact on disinter mediation and re-intermediation; Global market; Strategy of traditional department stores.

### Unit-III

Products in b2c model; success factors of e-brokers; Broker-based services on-line; On-line travel tourism services; Benefits and impact of e-commerce on travel industry; Deal estate market; online stock trading and its benefits; Online banking and its benefits; On-line financial services and their future; E-auctions – benefits, implementation and impact.

### Unit-IV

Applications in B2B: Key technologies for b2b; architectural models of b2b, characteristics of the supplier –oriented marketplace, buyer-oriented marketplace and intermediary-oriented marketplace; Just In Time delivery in b2b; Internet-based EDI from traditional EDI; Marketing Issues in b2b.

Emerging Business models: Retail model; Media model; advisory model, made-to-order manufacturing model; Do-it- yourself model; Information service model; Emerging hybrid

models; Emerging models in India, Internet & E-Commerce scenario in India; Internet security Issues; Legal aspects of E-commerce

### TEXT BOOKS:

1. Turban E., Lee J., King D. and Chung H.M: “Electronic commerce-a Managerial Perspective”, Prentice-Hall International, Inc.
2. Bhatia V., “E-commerce”, Khanna Book Pub. Co.(P) Ltd., Delhi.

**BCA - 244 RELATIONAL DATABASE MANAGEMENT SYSTEM**  
**Maximum Marks: 100** **External:**  
**80**  
**Minimum Pass Marks: 35** **Internal:**  
**20**  
**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

#### **UNIT - I**

Relational Model Concepts, Codd's Rules for Relational Model, Relational Algebra:-Selection and Projection, Set Operation, Renaming, Join and Division, Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.

#### **UNIT - II**

Functional Dependencies and Normalization:-Purpose, Data Redundancy and Update Anomalies, Functional Dependencies:-Full Functional Dependencies and Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

#### **UNIT - III**

SQL: Data Definition and data types, SQL Operators, Specifying Constraints in SQL, Basic DDL, DML and DCL commands in SQL, Simple Queries, Nested Queries, Tables, Views, Indexes, Aggregate Functions, Clauses

#### **UNIT - IV**

PL/SQL architecture, PL/SQL and SQL\*Plus, PL/SQL Basics, Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Execution Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL, Cursors in PL/SQL, Triggers in PL/SQL, Programming using PL/SQL.

#### **TEXT BOOKS:**

1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.
2. Ivan Bayross, "SQL, PL/SQL-The Programming Language of ORACLE", BPB Publications 3<sup>rd</sup> edition.

#### **REFERENCE BOOKS:**

1. C. J. Date, "An Introduction to Database Systems", 8<sup>th</sup> edition, Addison Wesley N. Delhi.
2. Oracle 8 -PL/SQL programming -Scott Urman
3. A Guide to the SQL Standard, Data,C. and Darwen, H.3<sup>rd</sup> Edition, Reading, MA:1994, Addison-Wesley Publications, New Delhi.

## **BCA - 245 COMPUTER-ORIENTED STATISTICAL METHODS**

**Maximum Marks: 100**

**80**

**Minimum Pass Marks: 35**

**20**

**Time: 3 hours**

**External:**

**Internal:**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT-I**

Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency, Measure of Central Tendency, Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.

Measure of Dispersion: Range, Quartile Deviation, mean deviation, Coefficient of mean Deviation, Standard Deviation

Moments : Moments About mean, Moments about any point, Moment about origin, Moment about mean in terms of moment about any point, Moment about any point in terms of Moment about mean.

### **UNIT-II**

Probability Distribution: Random Variable- Discrete Random and Continuous Random variable, Probability Distribution of a Random Variable, Mathematical Expectation

Types: Binomial, Poisson, Normal Distribution, Mean and Variance of Binomial, Poisson, and Normal Distribution.

Correlation: Introduction, Types, Properties, Methods of Correlation: Karl Pearson's Coefficient of Correlation, Rank Correlation and Concurrent Deviation method, Probable error.

### **UNIT-III**

Regression: Introduction, Aim of Regression Analysis, Types of Regression Analysis, Lines of Regression, Properties of Regression Coefficient and Regression Lines, Comparison with Correlation.

Curve Fitting: Straight Line, Parabolic curve, Geometric Curve and Exponential Curve

Baye's Theorem in Decision Making, Forecasting Techniques

### **UNIT-IV**

Sample introduction, Sampling: Meaning, methods of Sampling, Statistical Inference: Test of Hypothesis, Types of hypothesis, Procedure of hypothesis Testing, Type I and Type II error, One Tailed and two tailed Test, Types of test of Significance: Test of significance for Attribute-Test of No. of success and test of proportion of success, Test of significance for large samples - Test of significance for single mean and Difference of mean, Test of significance for small samples ( t-test) - test the significance between the mean of a random sample, between the mean of two independent samples

Chi square Test, ANOVA: Meaning, Assumptions, One way classification, ANOVA Table for One-Way Classified Data

**REFERENCE BOOKS**

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.

## **BCA - 246 MANAGEMENT INFORMATION SYSTEM**

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal:**

**20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach, Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

### **UNIT -II**

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

### **UNIT - III**

Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

### **UNIT - IV**

Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce - technologies, applications, Decision support systems - support systems for planning, control and decision-making

### **TEXT BOOK:**

1. J. Kanter, "Management/Information Systems", PHI.
2. Gordon B. Davis, M. H. Olson, "Management Information Systems - Conceptual foundations, structure and Development", McGraw Hill.

### **REFERENCE BOOK:**

1. James A. O'Brien, "Management Information Systems", Tata McGraw-Hill.
2. James A. Senn, "Analysis & Design of Information Systems", Second edition, McGraw Hill.
3. Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management", PHI.
4. Lucas, "Analysis, Design & Implementation of Information System", McGraw Hill.