<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>External marks</th>
<th>Internal Assessment</th>
<th>Maximum Marks</th>
<th>Pass marks</th>
<th>Exam Duration</th>
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<tr>
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<td>Object Oriented Programming Using C++</td>
<td>80</td>
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INTERNAL ASSESSMENT WILL BE BASED ON THE FOLLOWING CRITERIA:
(I) TWO HANDWRITTEN ASSIGNMENTS : 10 MARKS
(II) ONE CLASS TEST : 5 MARKS
(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: PRACTICAL EXAM WILL BE CONDUCTED ANNUALLY IN TWO SESSIONS. HOWEVER THE WORKLOAD WILL BE DISTRIBUTED IN BOTH THE SEMESTERS ACCORDING TO THE RELEVANT PAPERS.
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:

REFERENCE BOOKS:
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

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

**REFERENCE BOOKS**:

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

TEXT BOOKS

REFERENCE BOOKS:
BCA - 234  SOFTWARE ENGINEERING

Maximum Marks: 100
80
Minimum Pass Marks: 35
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

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

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:

REFERENCE BOOKS:
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

UNIT - II

UNIT - III

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:

REFERENCE BOOKS:
BCA- 236  COMPUTER-ORIENTED NUMERICAL METHODS

Maximum Marks: 100
Time: 3 hours
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

UNIT-III
Interpolation and Approximation:
Polynomial interpolation: Newton, Lagrange's, 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.
BCA - 241 ADVANCED DATA STRUCTURE

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
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

TEXT BOOKS

REFERENCE BOOKS
BCA – 242 Advanced PROGRAMMING USING C++

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

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:

REFERENCE BOOKS:
BCA-243 E-Commerce

Maximum Marks: 100
Minimum Pass Marks: 35
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 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 (SHTP); 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:
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

TEXT BOOKS:

REFERENCE BOOKS:
2. Oracle 8 -PL/SQL programming -Scott Urman
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.

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
BCA - 246 MANAGEMENT INFORMATION SYSTEM

Maximum Marks: 100
80
Minimum Pass Marks: 35
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

UNIT - II

UNIT - III

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:

REFERENCE BOOK: