

## SECOND SEMESTER

MCA- 210

JAVA PROGRAMMING

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

(A) Instructions for the Paper setter:

The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

### SECTION A

Introduction to Java: Features of Java, difference between Java and C++, data types, variables, arrays, operators-arithmetic, bitwise, relational, Boolean, various control statements.

### SECTION B

Introduction to Classes: Class fundamentals, declaring objects, methods, constructors, garbage collection, passing parameters to methods, recursion, access control, static, final and finally method, Array Single dimensional, Multidimensional array.

### SECTION C

Inheritance, super, multilevel hierarchy, abstract methods and classes. Packages and interfaces, importing packages, exception handling. Exception types, try, catch, finally, throw and throws, creating exception subclasses. Multithread programming, thread priorities, synchronization, messaging, creating multiple threads, inter thread communication.

### SECTION D

Networking, socket overview, client/server, reserved sockets, proxy servers, Internet addressing, Java and the Net, TCP/IP client sockets. An introduction to AWT, GUI graphics, fonts, colours, Introduction of servlet, servlet lifecycle, JSP, JSP lifecycle.

References:

1. Patrick Naughton and Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill, 1999.
2. E. Balaguru Swami, "Programming with Java"<sup>nd</sup>(2 Edition), TMH.

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uniformly and will carry 40% marks in all.

B) Instructions for candidates

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SECTION A

OOP paradigm, Advantages of OOP, Comparison between functional programming and OOP approach, characteristics of Object oriented Language objects, Class, Inheritance, Polymorphism, and abstraction, encapsulation, Dynamic Binding, Message passing. Introduction to C++, Identifier and keywords, constants, C++ Operators, Type conversion, variable declaration, Statement, expressions, User defined data types, Conditional expression (For, While, Do-while) loop statements, breaking control statements (Break, Continue).

SECTION B

Defining a function, types of functions, Inline functions, Call by value & Call by reference, Pre-processor, Header files and standard functions, Structures, Pointers and structures, Unions, Enumeration.

SECTION C

Classes, Member functions, Objects, Array of objects, Nested classes, Constructors, Copy constructors, Destructors, Inline member functions, Static class member, friend functions, Dynamic memory allocation. Inheritance: Single inheritance, Multi-level inheritance, Hierarchical, Virtual base class, Abstract classes, Constructors in Derived classes, Nesting of classes.

SECTION D

Function overloading, Operator overloading, Polymorphism, Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions, Opening and closing of files, Stream member functions, Binary file operations, Structures and file operations, classes and file operations, Random access file processing.

Reference:-

1. D. Ravichandran "Programming with C++" TMH, 1996.
2. Robert Lafore, "Object oriented programming in Turbo C++", Galgotia publications, 1994.
3. Bjarne strautrup, " The C++ Programming Language", Addison Welsly publication co. 1995.
4. Yashvant Kanetkar, "Let us C++", BPB.

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SECTION A

Space and time complexity, Asymptotic notations ( $\Omega, \theta, O, \omega, \circ$ ), Arrays :- One Dimension and two Dimensional Arrays (Storage in Row – major & column major order).

Queue Structures: Insertion, deletion, Priority Queue, D-Queue.

Stack:- Push, Pop operations, Polish notation, Algorithm for Infix to Postfix conversion, Evaluation of Postfix expression.

Link lists, singly link list, Doubly link list, advantage and disadvantage.

SECTION B

Tree basic concept, Tree representation by link list and by arrays, Binary tree, Binary search

tree (Operations:- Insertion, Deletion, Traversals), Heap sort, AVL, B-tree.

SECTION C

Graph concepts, Adjacency list and adjacency matrix representation, DFS, BFS, Topological sorting, strongly connected components, Prim's & Kruskal's algorithm, Dijkstra's algorithm, Warshall's algorithm.

SECTION D

Linear search, Binary search, Bubble sort, selection sort, Insertion sort, Quick sort, Heap sort, Merge sort, Bucket sort, Radix sort and their Comparison in terms of space & time complexity.

Reference:

1. Sartaj Sahni, "Data structures Algorithms and Applications in C++", TMH.

MCA-240

## SYSTEM SOFTWARE

Maximum Time : 3 Hrs.  
Total Marks : 100  
Minimum Pass Marks : 40%

University Examination : 70 Marks  
Continuous Internal Assessment : 30 Marks

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(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

### SECTION A

Introduction to systems software : Definition, features of system programming, system programming V/s Application programming, Types of system programmes.

### SECTION B

Assembler : Single pass assembler, two-pass assembler, and general design procedure of assembler.

Macro Processor : Macro language and its features, macro instructions, features of macro facility, implementation, one pass macro processor, two pass macro processor, macro assemblers.

### SECTION C

Compilers : Overview of compilation process, lexical analysis, syntax analysis, semantic analysis, and intermediate code generation and code optimization techniques, compiler V/s Interpreter.

Linkers & Loaders : Simple linkers, Loaders, and design and implementation of direct linking loader.

Introduction to device drivers, Functions and structure of text editor.

Software tool:- Software tools for program development, Editors, Debug monitors, Programming Environment, User Interface.

### SECTION D

Operating system : Basic concepts of an operating system, Functions of operating system as

resource manager, I/O management, Memory management, Processor management, Information management, Types of operating system – Batch processing, Multiprogramming, Multitasking, time sharing, parallel, Distributed Operating System (With Examples).

References:

1. Donovan, "System programming", (McGraw-Hill), 1991.
2. Aho and Ulman, "Principle of Compilers", Narosa Publishing House, 1986
3. DM Dhamdhere, "System Programming and Operating Systems", (2<sup>nd</sup> Edition), TMH.

MCA-250

INTERNET & WEB TECHNOLOGY

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

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cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Definition of Internet, Internet organisation and committees, Internet, Growth of Internet, Anatomy of Internet, Internet Application, Portals, Introduction about WWW, Definition of DNS ( Domain Name System), IP Addressing.

SECTION B

Definition of Networks, Types of Network, Topologies, PSTN, PSDN, VAN, ISDN, PDNs, Wide Area Network, Introduction about search engines ( Mozilla, Netscape, Opra) Email, Introduction about mail protocol (SMTP, MME), X.25, Frame relay, PPP, NNTP, SMTP, etc.

SECTION C

OSI Reference method, TCP/IP model, FTP, HHTP, HTTPS, Addressing in Internet ( Class A,B,C,D,E) Definition of Ethernet, Intranet, Telnet, Wireless communication, Virtual Circuits, ISDN model, CSMA/CD, Explanation of all layers of OSI and TCP/IP model.

SECTION D

Introduction about HTML, Tag, Types of Tags, Forms, Tables, Images insertion in web page, Introduction about DMTL, CGI, Introduction about XML.

Reference:-

1. A.S. Tanenbaum, "Computer Networks"(3<sup>rd</sup> Edition), PHJ,1999
2. D.E.Comer, "Computer Networks and Internet"(2<sup>nd</sup> Edition), Addison wisely, 2000
3. D.Betsekas and R.Gallagar, "Data Networks"(2<sup>nd</sup> Edition), PHI, 1992
4. Frougan "Data Communications & Networks"(2<sup>nd</sup> Edition), TMH

MCA-260 P

PROGRAMMING LAB- II  
(DATA STRUCTURE PROGRAMMING IN C++)

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

This laboratory course will mainly comprise of exercises on what is learnt under paper :  
MCA-230 (Data structure)