THIRD SEMESTER

BCA-310 DATA STRUCTURE

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

University Examination : 70 Marks
Continuous Internal Assessment : 30 Marks

(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 question s,
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
Space and time complexity, Asymptotic notations (Ω,θ, O, ω,$\circ$)
Arrays, Searching Arrays, One Dimension and two Dimensional Arrays. Stack, Infix to Postfix, Postfix Evaluation of Queues, D-Queue, Priority Queue, Singly Link list, Comparison.

SECTION B
Basic concept of Trees, Tree representation by link list and by arrays, Tree reversals, Binary tree, Binary search tree (Insertion, Deletion, Traversals), AVL.

SECTION C
Graph concepts, Adjacency list and adjacency matrix representation, Hamiltonian and Euler's circuit, DFS, BFS, Dijkastra's algorithm, Prims & Kruskal's algorithm.

SECTION D
Linear search, Binary search, Bubble sort, selection sort, Insertion sort, Quick sort, Heap sort, Merge sort, Radix sort, Comparison in turns of space & time complexity.

Reference:

1. Schaum's outlines & Lipschutz, "Data structure", TMH.
2. G.S. Baliya, "Data structure".
3. Schaum's series, "Data structure Algorithms & Applications in C++", TMH.

BCA-320 COMPUTER SYSTEM ARCHITECTURE & DIGITAL ELECTRONICS

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 question s,
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
Number system : Binary, Octal, Decimal, Hexadecimal, Number conversions, Arithmetical operations.
Representation of Information : Integer and floating point representation, Number Representation (Sign Magnitude, 1's complement, 2's complement), Character codes (ASCII,EBCDIC, BCD, 8421,2421, Excess-3,Grey, Self complementing codes).

SECTION B
Basic Building blocks : Boolean algebra, K-maps
Combinational logic design : Half-adder/subtractor, full adder/subtractor, parallel adder, Sequential circuits – Concepts, flip-flops (D,RS, JK, Master-Slave, T), Registers (SISO, SIPO, PISO, PIPO), Counters (Ripple, Asynchronous, Synchronous, Decade, Mod-5, Mod-3, Up-down counters)

SECTION C
Control Memory, Address sequencing, Micro-programming, Micro-instruction, Micro programmed and hard-wired control, Arithmetic and Logic unit, Addressing mode.
I/O control: Programmed & Interrupt control mechanisms, I/O controllers, DMA data transfer schemes, strobe & Handshaking.

SECTION D
Pipelining, Arithmetic pipelining speed up, efficiency, Instruction pipelining Memory hierarchy, Associative memory, cache memory, (Associative, direct, Set associative), Write back & write through policy.

Reference:-

1. C.W. Gear, "Computer Organisation and Programming", McGraw-Hill,1975.
2. A. S. Tannenbaum "Structured computer Organisation", Prentice Hall of India.
3. M.M. Mano "Computer system architecture: Prentice Hall of India, 1983.
4. G.Langhoiz, J.Grancioni and A.Kandel, "Elements of Computer Organisation", Prentice-Hall International, 1988.

BCA-330 OPERATING SYSTEMS

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

University Examination : 70 Marks
Continuous Internal Assessment : 30 Marks

(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 question s,
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 operating System, Definition of batch systems, Time sharing systems, Real time systems, Multitasking, Multiprogramming, System services, System calls.

SECTION B
Process management : - Definition of process, Process states, process control block, process creation, process termination, threads, user threads, kernel threads, cooperating processes, Interprocess communication, CPU scheduling, FCFS, SJF, Round robin scheduling, Multilevel queues, multilevel queue with feedback.

SECTION C
Process synchronization, critical section problem, semaphores, Binary semaphores, Deadlocks ;- Necessary condition, prevention, avoidance of deadlock.

SECTION D
Memory Management: Physical V/s Logical address, Dynamic loading, Swapping, Paging, Segmentation, Fragmentation, Virtual Memory, Demand paging, page replacement algorithms.
Disk scheduling (FCFC, SCAN, C-SCAN, LOOK, C-LOOK)

References:

1. A.S. Tanenbaum, “Structured Computer Organisation”, PHI, 1990.
2. M.M. Mano, “Computer System Architecture”(2nd Edition), Galgotia Publication.
3. J.P. Hayes, “Computer Architecture and Organisation and Programming”, McGraw Hill,1988.

BCA-340 JAVA PROGRAMMING

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

University Examination : 70 Marks
Continuous Internal Assessment : 30 Marks

(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 question s,
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 One dimensional array, Two Dimensional array multidimensional, Function, Functions Overloading.

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
Input/Output, streams, reading and writing console input/output, reading and writing files, applet fundamentals. 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.

References:
1. Patrick Naughton and Herbert Schildt, “The Complete Reference Java 2”, Tata McGraw Hill, 1999.
2. E. Balaguruswami, “Java Programming”, TMH.