B.C.A. (Second Year) Exam

BCA 201: Digital Electronics and Computer Architecture

Time: 3 Hrs. **Max. Marks: 100**

Unit –I

Overview of electronics: Electronic components-Resistor, capacitor and Inductors, Semiconductor devices: Diodes, transistors (BJT and FET). Integrated circuits, Popular IC packages, Analog vs digital electronics, Transistor as a switch.
Boolean algebra: Representation of values and complements, De'Morgans theorem-simplifying expressions.

Unit –II

Logic gates: AND, OR, NOT, XOR, XNOR, NAND, NOR gates and their truth tables, Combining logic circuits for expressions using NAND and NOR gates, Logic circuit families and characteristics, SSI, MSI, LSI and VLSI circuits.
Combinational and sequential circuits: (Simple block diagrams, truth tables and IC packages only required). Adders, decoders, multiplexers, encoder circuits , Flip-flops: RS, clocked RS, JK, D and T flip flops, Master slave flip flops, edge and level triggering, Multivibrators - Astable, Bistable, Monostable, counters-ripple and decade. Registers, latches and Tristate buffers.

Unit –III

Building blocks of a computer system: Basic building blocks-I/O, memory, ALU, Control and their interconnections, Control unit and its functions- Instruction-word, Instruction execution cycle, organizational sequence of operation of control registers; controlling of arithmetic operations; branch, skip, jump and shift instructions, ALU-its components.

Unit –IV

Addressing techniques and registers: Addressing techniques-Direct, immediate addressing; paging, relative, Indirect and indexed addressing. Memory buffer register; accumulators; Registers-Indexed, General purpose, Special purpose; overflow, carry, shift, scratch registers; stack pointers; floating point; status information and buffer registers

Unit –V

Memory: Main, RAM, static and Dynamic, ROM, EPROM, EAROM, EEPROM, Cache and Virtual memory.
Interconnecting System components: Buses, Interfacing buses, Bus formats-address, data and control, Interfacing keyboard, display, auxiliary storage devices, and printers. I/O cards in personal computers.
Development of Indian Super Computer 'PARAM': History, Characteristics, Strengths, Weakness and basic Architecture.

Text / Reference Books

1. A.S.Tannenbaum : Structured Computer Organization, Pearson
2. Thomas C. Bartee : Digital Computer Fundamentals, McGraw-Hill
3. Duglus V Hall : Microprocessors and Interfacing: programming and Hardware, McGraw-Hill, 1986.
4. Introduction to Computer Architecture, Stone S.Galgotia Publicatons 1996.
6. Microprocessor Architecture Programming & Applications, R. Gaonkar, Wiley Eastern-1987.
7. Computer Architecture and Organization by N.P. Carter, 4th Edition, McGraw-Hill, 2014.

BCA 202: Database Management System

Time: 3 Hrs. **Max. Marks: 100**

Unit –I

Introduction : Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

Unit –II

ER Model : entities, mapping constrains, keys, E-R diagram, reducing E-R diagrams to tables, generation, aggregation, design of an E-R database scheme.

Unit –III

Relational Model : The catalog, base tables and views. Relational Data Objects - Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases.
Relational Data Integrity - Candidate keys and related matters: Candidate keys. Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

Unit –IV

The SQL Language: Data definition, retrieval and update operations. Table expressions, conditional expressions, embedded SQL.
Views: Introduction, what are views for, data definition, data manipulation, SQL support.

Unit –V

File and system structure : overall system structure, file organisation, logical and physical file organization, sequential and random, hierarchical, inverted, multi list, indexing and hashing, B-tree index files.

Text / Reference Books

1. Date C.J., Database Systems, Addision Wesley.
2. Korth, Database Systems Concepts, McGraw Hill.
3. Database Management System, Ramakrishna, Gehkre, McGraw – Hill
6. Database management systems, Leon alexis, leon Mathews, "Vikash publication
7. Database system, Rob, coronel, 7th edition, Cengage Learning.

BCA 203: Fundamentals of Operating Systems

Time: 3 Hrs. **Max. Marks: 100**

Unit I

Introduction: Definition of an operating system, Mainframe, desktop, single user & multi user OS distributed, real-time and handheld OS.

Unit II

Operating System Structures: System components, operating system services, system calls, systems programs, system structure, virtual machines.

Unit – III

Process Management: criteria, scheduling algorithms, algorithm evaluation.
Process Synchronization: The critical section problem, semaphores, classical problems of synchronization.

Unit IV

Memory Management: Swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

Unit V

Virtual Memory: Demand paging, page replacement, allocation of frames, thrashing.

Text / Reference Books

1. Silberschatz G.G., Operating System Concepts, John Wiley & Sons Inc.
2. Modern Operating Systems, Andrew S. Tanenbum, Pearson Edition, 2nd edition, 2004.
3. Operating Systems, Gary Nutt, Pearson Education, 3rd Edition, 2004.
4. Operating Systems, Harvey M. Dietal, Pearson Education, 3rd edition, 2004.
5. Fundamentals of Operating Systems, A.M. (1979).

BCA 204: Data Structure

Time: 3 Hrs Max. Marks: 100

Unit I

Introduction: structure and problem solving, algorithmic notation, Data Structure, Algorithms and sub algorithms, introduction to algorithm analysis for time and space

Unit II

Primitive and non primitive data structure concept, representation and manipulation of strings, concept and terminology for non primitive data structure, concept of arrays, stacks, queues. Basic operations on arrays, stacks & queues.

Unit III

Linear data structures and their linked storage representation: pointers and linked allocation, linked linear list, singly linked list, application of linked linear lists.

Unit IV

Non Linear data structure: Trees, types of trees, Graphs and their representations, applications of graph.

Unit V

Sorting and searching: concept of sorting and searching, selection sort, bubble sort, merge sort, binary search

Text / Reference Books

1. An Introduction to Data Structures with Applications, Tremblay & Sorensons, Tata Mcgraw hills publications.
2. Data structure and algorithms, Aho., Alfred V., Pearson Education.
3. Fundamentals of Data structure in C, Horowitz, Ellis, Galgotia publication.
4. Introduction to Data Structure and algorithms with C++ , Rowe, Glenn W., Prentice , Hall
5. Data structures using C and C++ , Langsun , Augenstein , Tenenbaum Aaron M, Prentice Hall

BCA 205: Data Communication and Computer Networking

Time: 3 Hrs. **Max. Marks: 100**

Unit - I

Components of a data communication system, model of a data communication, data transmission concepts, digital and analog transmission, serial/parallel data transmission, signal encoding techniques, modulation and modems.

Unit - II

Guided and unguided transmission media, Transmission impairments, channel capacity, baud rate, bandwidth, multiplexing techniques, synchronous and asynchronous transmission, simplex, half duples and full duplex transmission.

Unit - III

Circuit switching, Packet switching and Message switching , Connection oriented and Connection less services, Computer Networks Protocols and Standards, Local area networks, Types of LAN (star, Ethernet, bus, FDDI), LAN Technology(IEEE 802.3, 802.4, 802.5), wide area networks.

Unit – IV

ISO-OSI model of networking, different layers and their functions, Networking and Internetworking, Services gateways, bridges, repeaters, routers, Introduction to ISDN, DSL and cable TV modem.

Unit - V

Introduction to Internet applications like DNS, FTP, SMTP, SNMP, WWW, HTTP, URL, E-mail, Teleconferencing & Electronic Banking, Network Security and privacy, Awareness of Indian Networks-NIC NET,ERNET etc, introduction to mobile computing, impact of social engineering sites.

Text / Reference Books

1. Behrouz and Forouzan - Introduction to Data Communication and Networking - 2nd Edition - TMH – 2001.
2. Stallings W. Data and Computer Communications, Pearson Educations.
3. Jean Wairand - Communication Networks (A first Course) - Second Edition - WCB/ McGraw Hill - 1998.
4. S. Tannanbauim, Computer Networks, Pearson Educations.

BCA 206: Practical I: Database Management Lab.

Experiments based on the paper BCA 202 and project development for Internal Assessment.

BCA 207: Practical II: Data Structure Lab.

Experiments based on the paper BCA 204 and project development for Internal Assessment.