University of Rajasthan
Jaipur

SYLLABUS

Bachelor of Computer Application

B.C.A. Part-I Examination 2022
B.C.A. Part-II Examination 2023
B.C.A. Part-III Examination 2024

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Bachelor of Computer Applications (BCA)

Eligibility for Admission to BCA course session 2014-2015 "A candidate must have passed 10+2 examination (Arts/Science/Commerce) or equivalent with securing 48% or more (minimum pass mark for SC/ST/OBC/SBC candidates) in aggregate without any approximations".

In regard to reservation of Seats for admission to BCA Part I, the reservation policy of Govt. of Rajasthan/University of Rajasthan will be followed.

Admission Procedure: Admission to BCA Part I course will be made on the basis of merit list (10+2 level).

Attendance: A candidate shall be required to put in a minimum of 75% attendance at the lectures and 75% attendance at the practicals separately in each paper, as per university norms.

Scheme of Examination for Bachelor of Computer Applications(BCA):

The Bachelor of Computer Applications will be a **Three Part Course in Faculty of Science** extending over **three academic sessions**. Medium of instructions and examination will be **English only**. There shall be an examination at the end of each part. Each theory paper examination will be of **three hour** duration and shall carry **100 marks**. Theory paper shall contain three parts. All questions are compulsory.

Part – I (very short answer) consists 10 questions of **two marks** each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of **four marks** each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of **twelve marks** each with one question from each unit with internal choice.

Each practical examination (Maximum marks 100) will be of **four hour** duration on one day and carry **60 marks for exercises**(3 exercises) assigned in the examination, 25 marks for **viva-voce** and 15 marks for **practical records and regularity** of the candidate. Other rules and procedures of examinations will be common to those for B.Sc. course.

"A candidate will be promoted to Part III if he/she passed with 40% in **three theory and two practical papers** of Part II examination and with at least 50% in aggregate of these papers. However, if the candidate has not passed Part I Examination then also he/she be promoted to part III if the number of due papers (part I & Part II together) does not exceed **four theory papers and two practical papers**."

Passing of Examination and Promotion to next Part: A candidate must secure at least 36% marks in each paper and 50% marks in aggregate for passing a part examination. A

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candidate will be promoted to part II if he/she has secured at least 40% in **three theory** and **two practical** papers of part I examination and with at least 50% in aggregate of these papers. A candidate will be promoted to Part III if he/she has passed 40% in **three theory** and **two practical** papers of Part II examination and with at least 50% in aggregate of these papers, and has passed Part I examination.

Division and Honors: On successful passing out of all three part examinations (in first attempt), those securing 75% and above in aggregate of all the three parts will be awarded **First division with Honors**, and those securing between 60% or more but less than 75% will be awarded **First division** and rest will be awarded **Second division**.

BCA Part - I

Code	Subject	Hours / Week	Max. Marks
Theory			
BCA-101	Elementary Physics	4	100
BCA-102	Basic Mathematics	4	100
BCA-103	General English	4	100
BCA-104	Principles of Programming Language (Through 'C')	4	100
BCA-105	Computer Organization	4	100
BCA-106	Office Management Tools	4	100
Practical			
BCA-107	Technical Writing and Communication Skills	3	100
BCA-108	C- Laboratory	3	100
BCA-109	Office Automation Laboratory	3	100
BCA-110	Typing Skills Laboratory (English and Hindi Language)	3	100

BCA Part - II

Code	Subject	Hours / Week	Max. Marks
Theory			
BCA-201	Business Accounting	4	100
BCA-202	Discrete Mathematics	4	100
BCA-203	Operating System	4	100
BCA-204	Database Management System	4	100
BCA-205	Web Designing and Multimedia	4	100
	Elective (Any One)		
BCA-206(A)	Object Oriented Programming Concepts (Through C++)	4	100
BCA-206(B)	Programming through VB6.0	4	100
Practical			

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BCA-207	Database Laboratory	3	100
BCA-208	Object Oriented Laboratory	3	100
BCA-209	Web Designing Laboratory	3	100
BCA-210	Multimedia Laboratory	3	100

BCA Part - III

Code	Subject	Hours / Week	Max. Marks
Theory			
BCA-301	Data Structure (Using C/C++)	4	100
BCA-302	System Design Concepts	4	100
BCA-303	Networking Technologies	4	100
BCA-304	Core Java Programming	4	100
BCA-305	E-Commerce	4	100
	Elective (Any One)		
BCA-306(A)	ASP.Net	4	100
BCA-306(B)	PHP	4	100
BCA-306(C)	Linux and Shell Programming	4	100
Practical			
BCA-307	Networking Laboratory	3	100
BCA-308	Core Java Laboratory	3	100
BCA-309	Elective Laboratory	3	100
BCA-310	Project	3	100

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BCA101: Elementary Physics

Question Paper pattern for Main University Examination *Max Marks: 100*

Part - I (very short answer) consists 10 questions of **two marks** each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part - II (short answer) consists 5 questions of **four marks** each with one question from each unit. Maximum limit for each question is up to 80 words.
~~**Part - III (Long answer)** consists 5 questions of **twelve marks** each with one question from each unit~~ with internal choice.

UNIT-I

Electric charge, conductors and insulators, Coulomb's Law, quantization and conservation of electric charge. the electric field, electric lines of force and Gauss' Law of electrostatics, electric potential energy, electric potential, energy and electrical power.
Capacitors, capacitance, capacitors in series and parallel, capacitors with dielectric. Electric current, resistance, resistivity and conductivity, Ohm's law, electromotive force, series and parallel combination of resistances, current in a single loop, Kirchoff's current law, Kirchoff's Voltage law.

UNIT-II

Magnetic field due to a bar magnet, Biot Savrt's law, magnetic field due to a current carrying coil, Force between two parallel currents, Magnetic field inside solenoid and toroid, magnetic flux, Faraday's law of electromagnetic induction, magnetic properties of matter, (diamagnetic, paramagnetic, ferromagnetic and ferromagnetic materials), inductance, energy stored in an inductor, LR circuits.

UNIT-III

Introduction to Logic and implementation with Logic Gates, Logic functions-NOT,AND,OR NOR, EX-NOR. Truth tables, Boolean Algebra. de Morgan's theorems, Standard forms for logical expressions. Sum of Products, Product of Sums specification of logical functions in terms of Minterms and Maxterms. Karnaugh Maps, simplification of logical functions, introduction of "don't care" states, Synthesis using only NAND or only NOR gates.

UNIT – IV

Combinational Circuits Multiplexer-IC 74150 and IC 44151, De multiplexer-IC 74154, Decoder-IC 74139, BCD to Seven segment De-coder IC 7446/7447 IC 7448/7449 Decimal to BCD Priority Encoder IC 7417, parity Checker IC 74180, Magnitude Comparator IC 7485.

UNIT - V

Sequential Circuits : RS Flip Flop, Clocked RS Flip Flop, D Flip Flop, Edge Triggered D Flip Flop, master-Salve Technology and its advantage. Shift Register as Flip Flop system, IC 7496, UP/DOWN counters 74 series asynchronous counters 74 series synchronous

Reference books

1. Bernard Grob, Basic Electronics, Tata Mc Graw Hill.
2. Fowler, Electricity, Tata Mc Graw Hill.
3. Shivakumar, Engineering Physics, Tata Mc Graw Hill
4. Iyer, Circuit Theory, Tata Mc Graw Hill
5. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Vikas Publishing House Pvt.
6. R.P. Jain, Modern Digital Electronics, Tata Mc Graw Hill Publications Company Ltd. New Delhi

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BCA102: Basic Mathematics

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words

Part - II (short answer) consists 5 questions' of four marks each with one question from each unit. Maximum limit for each question is up to 80 words

Part –III (Long answer) consists of 5 questions of Twelve Marks each with one question from each unit and with internal choice.

Unit- I

Functions : Functions, domain & range of a function, types of functions-constant, identity, polynomial, exponential, logarithmic, trigonometric, inverse- trigonometric, rational, periodic, modulus, signum and greatest integer functions with their graphs. Composite functions, Invertible Functions. Function domain and range, one to one and onto functions, composite functions, inverse of functions. Binary operations.

Unit-II

Matrices and Determinant : Definition and Types of Matrices, Addition , Subtraction and Multiplication of Matrices, Non-commutatively of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix(restrict to square matrices of order 2), Scalar Multiplication. Transpose of a Matrix.

Determinant of a square matrix (up to 3x3 matrices), properties of determinants, minors , cofactors. expansion of determinants, application of determinants in finding the area of a triangle. Invertible matrices. Adjoint and inverse of a matrix, Solution of system of linear equations by inverse matrix method and Cramer's Rule, Eigen Values, Eigen Vectors.

UNIT III

Numerical Methods: Floating Point Numbers and its representation. Normalized Floating point number and their arithmetic operations and consequences. Errors in Numbers. **Finite Difference methods:** The operators E, Δ and∇ their algebraic properties and relations. Difference Table, Fundamental theorem of difference table. One missing term case. Factorial notion of a polynomial. Concept of Zero Difference. Effect of Error in tabular values. **Quadratic Equation**: Solution ol Quadratic Equations, Nature ol Roots Solution of a quadratic equation by factorization method and Shridharacharya's formula. Relation between the roots of a quadratic equation, formation ol quadratic equation from given roots.

UNIT- IV

Statistics : Frequency Distribution, Graphical representation of frequency distribution. Mean, Median, Mode and other measures of Central Tendency, Dispersion, Standard Deviations, Variance. Correlation and regression, Measure of Karl Pearson's coefficient of correlation, regression analysis, properties of regression lines.

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UNIT-V

Probability: Factorial notation n!, Combinations and Permutations, Classical approach of Probability- trial & events, exhaustive events, equally likely events, mutually exclusive events, favourable events, independent events. Classical or mathematical definition of probability. Law of addition of probabilities. Multiplication law of probability and conditional probability. Simple problems based on addition and multiplication law of probabilities.

Reference Books:

(i) C.L. Liu: Elements of Discrete Mathematics, Tata Mc-Graw Hill Publishing Company Ltd.. 2000
(ii) Seymour Lipschutz; Discrete Mathematics;TMH.
(iii) Richard Johnsoribaugh: Discrete Mathematics, Pearson Education, Asia, 2U0I
(iv) John Truss: Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
(v) R.D. Sharma : Basic Mathematics,
(vi) B.L. Agrawal : Basic Statistics, Khanna Pub.
(vii) Stephen Bernstem: Elements of Statistics, TMFI.
(viii) SC Gupta & V.K.Kapoor : Fundamentals of Mathematical, Sultan Chand & Sons., New Delhi.
(ix) S.P.Gupta : Statistical Methods, Sultan Chand & Sons., New Delhi.
(x) V.Rajaraman: Computer Orented Numerical Methods,3rd Edn., PHI
(xi) ARVashishtha and Vipin Vashishitha,: Numerical Analysis, Kedar Nath ram Nath Pub., Meerut.

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BCA103: Communicative English

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words

Part - II (short answer) consists 5 questions' of four marks each with one question from each unit. Maximum limit for each question is up to 80 words

Part –III (Long answer) consists of 5 questions of Twelve Marks each with one question from each unit and with internal choice.

UNIT-I

Concepts and Fundamentals: Narration, Active and Passive Modals. Subject Verb. Concord, Meaning of Communication, Importance &scope of Communication, Communication Scope. Essentials of Good Communication. Verbal and Non-verbal communication. Formal and Informal Communication. Barriers to communication.

UNIT-II

Written Communication : Objectives of written Communication, Merits and dements of written communication, Planning business messages.

Writing Letters : Business letters. Office memorandum, Letters: Official & Informal, Sales letters. Letter Styles/Layout.

UNIT-III

Report Writing : Types of report (Business report & Academic report) ,Format & Drafting of the report, Essentials of good report writing.

Language Skills : Importance of Vocabulary: Choice of words. Common problems with verbs, adjectives, adverbs, pronouns, conjunctions, punctuation, prefix, suffix etc.

UNIT-IV

Oral Communication : Principles of effective oral communication, Media of oral communication, Advantages of oral communication, Disadvantages of oral communication. Styles of oral communication.

Interviews : Importance of Interviews: Art of interviewing. Types of interview, Essential Features, Structure , Guidelines for Interviewer, Guide lines for interviewee.

Arts of Listening : Good listening for improved communications, Art of listening, Meaning, nature and importance of listening. Principles of good listening, Barriers in listening. Comprehension.

UNIT V

Job Application : Types of application, Form & Content of an application, Drafting the application. Preparation of resume.

Project Presentations : Advantages & Disadvantages. Charts, Distribution of time (presentation, questions & answers, summing up). Visual presentation. Guidelines for using visual aids. Electronic media (power-point presentation)

Reference Books

(i) C.S.Rayudu: Communication, Himalaya Pub. House

(ii) Reuben Ray: Communication Today-Understanding, Creative Skill, Himalaya Pub. House

(iii) Malera Treece: Successful Communication

(iv) Boyce & Hull: Business Communication Today, McGraw Hill,

(v) Prof.K.Mohan: Communication skills and Report Writing, Tata McGraw Hill

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BCA104: Principles of Programming (Through 'C')

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT- I

Basic concepts of Programming languages, Programming Domains, Language Evaluation criteria and language categories, Evolution of major programming languages. Describing syntax and semantics formal methods of describing syntax, Pseudo code, Design of Algorithm & Flowchart

UNIT- II

Fundamentals of C: History and importance of C, sample programming, basic structure and execution of C programs, constants, variables, and data types and various type of declarations, different type operators and expressions, evaluation of expressions, operator precedence and associability. Managing input and output operations, decision making and branching decision making.

UNIT- III

Iteration: while, do...while, for loop, nested loops, break & continue, goto statements.
Arrays and Strings: One-dimensional arrays and their declaration and initialization, two-dimensional arrays and their initializations, character arrays (One and Two dimensional), reading and writing strings, string - handling functions.

UNIT-IV

Functions: Need and elements for user defined functions, definition of functions, return values and their types, function calls and declaration, recursion, parameter passing, passing arrays and strings to functions, the scope, visibility and life time of variables.
Understanding Pointers: Accessing the address of a variable, declaration and initialization of pointer variables, accessing a variable through its pointer, pointers and arrays, pointers and function arguments, functions returning pointers.

UNIT -V

Structures and Unions: Defining structure, declaring structure variable and accessing structure members, initialization of structure, operation on individual members, and array of structures, union, size of structure

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BCA105: Computer Organization

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.

Part - II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.

Part - III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT-1

Computer System History and Architecture development von Neumann machine, Mother Board, System clock, Bus (Data, Address Control), Bus architecture (ISA, MCA, EISA, PCI, AGP), Expansion slots and cards (Network adapter cards, SCSI card, Sound card, TV tuner card, PC card), Ports (Serial Parallel, AGP, USB hire Wire), cables (RS 2.12, BIN), Input devices Output devices , Storage devices, random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Floppy Disk, I lard Disk tracks, cylinders, scclots, Hard Drive Interfaces Optical Disks . Magnetic tape. Modern (fax/Datay Voice.)

UNIT-II

Basic building blocks I/O, Memory, ALU and its components, Control Unit and its functions. Instruction -word. Instruction and Execution cycle, branch, skip, jump and shift instruction, Operation of control registers; Controlling of arithmetic operations, Classification of Computers (Workstation, Mainframe, Super Computer, Client Server Computer. Notebook. Tablet, PalmTop Computer).

UNIT III

Basics of Computer Architecture ,System Bus and instruction cycles, memory subsystem organization and interfacing, system buses and instruction cycles, I/O subsystem organization and interfacing. Register transfer language. CPU design: Specifying a CPU design, and implementation of a simple CPU(fetching instructions from memory, decoding and executing instructions, establishing required data path, Design of ALU, Design of Control Unit and design verification). Design and implementation a simple micro processor. Feature of Pentium microprocessor.

UNIT IV

Addressing Techniques: Direct, Indirect Immediate, Relative, Indexed addressing and paging. Registers. Indexed ,General purpose, Special purpose, overflow, carry, shift scratch. Memory Butter register, accumulators, stack pointers, floating point, status information and buffer registers. Memory: Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, EAROM, Cache and Virtual memory.

UNIT- V

Buses, Interfacing buses, Bus formats - address, data and control, Interfacing keyboard, display, auxiliary storage devices and pointers. I/O cards in personal computers. Introduction to Microprocessor and Microcontrollers: Introduction to 8085,8086 microprocessor, DMA Controller, examples of few instructions to understand addressing techniques.Difference between microprocessor and Microcontrollers. RISC Vs. CICS.

Recommended Books

(i) A.S. Tanenbaum : Structured Computer Organization, PHI

(ii) William Stallings: Computer Organization and Architecture , Sixth Edition, Pearson Education

(iii) John D. Carpinelli: Computer Systems Organization & Architecture; 3rd Edition; Person Education Asia, 2008

(iv) M. Morris Mano; Computer System Architectures; III Edition, Prentice Hall of India,2008

(v) B. Malvino: Digital Computer Electronics III Edition; TMHL

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scratch. Memory Buffer register; accumulators; stack pointers; floating point; status information and buffer registers. Memory: Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, EAROM, Cache and Virtual memory.

UNIT- V

Buses, Interfacing buses, Bus formats – address, data and control, Interfacing keyboard, display, auxiliary storage devices and printers. I/O cards in personal computers.
Introduction to Microprocessors and Microcontrollers: introduction to 8085 microprocessor, examples of few instructions to understand addressing techniques. Difference between microprocessor and microcontrollers, RISC v/s CISC.

Recommended Books

1. Andrew S. Tanenbaum , Structured Computer Organization,Printice Hall
2. William Stallings, Computer Organization and Architecture , Sixth Edition, Pearson
3. John D. Carpinelli: Computer Systems Organization & Architecture; 3rd Edition; Person Education Asia,2008
4. M, Morris Mano: Computer System Architectures; III Edition, Prentice Hall of India,2008
5. Malvino B ; Digital Computer Electronics III Edition; TMHL

BCA106: Office Management Tools

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part – I (very short answer) consists 10 questions of **two marks** each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of **four marks** each with one question from each unit. Maximum limit for each question is up to 80 words.
Part III (Long answer) consists 5 questions of **twelve marks** each with one question from each unit with internal choice.

UNIT- I

Introduction to Operating System: Introduction to Operating system, FAT and NT file systems, file and directory structures and naming rules of files, booting process, system files, Dos Commands (internal & external)
Windows 7/8, Windows concept features, Desktop, Taskbar, Start menu, My Computer, Recycle bin, Windows Accessories(Calculator, Notepad, Paint, Word Pad, Character Map Windows Explorer Entertainment, System Tools, Communication). Sharing information between programs, Smart devices tools and applications

UNIT II

MS Word: Word processing, MS Word features, creating, saving and opening documents in Word, interface, toolbars, ruler, zoom, keyboard shortcuts, editing, proofreading, printing & formatting documents, advance features of MS Word, tool & package name

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thesaurus, mail merge, handling graphics, tables, converting a Word document into various formats like-text, rich text format, Word perfect, etc.

UNIT- III

MS Excel: Worksheet basics, creating worksheet, entering data into worksheet, data, text, dates, alphanumeric values saving & quitting worksheet, opening and moving around in an existing worksheet, Toolbars and menus, Keyboard shorteuts, working with single and multiple workbook, working with formula & cell referencing, Auto sum, coping formulas, absolute and relative addressing, formatting of worksheet, previewing & printing worksheet, Graphs and Charts, Database, macros, multiple worksheets-concepts.

UNIT- IV

Power Point: Creating and viewing a presentation, managing Slide Shows, navigating through a presentation, using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, applying and modifying designs, adding graphics, multimedia and special effects.

UNIT- V

Microsoft Access: Planning a database (tables, queries, forms, reports), creating and editing database, customizing tables, linking tables, designing and using forms, modifying database structure. Sorting and Indexing database, querying a database and generating reports.

Reference Books:

1. Microsoft; 2007/2010 Microsoft Office System, PHI.
2. Microsoft; Microsoft Office 2007/2010: Plain & Simple; PHI.
3. Microsoft; Microsoft Office XP: Plain & Simple; PHI.
4. Sanjay Saxena: A First Course in Computers 2003 Edition: Vikas Pub.

BCA 107 : Technical Writing and Communication Skills

Practical Lab Exercises based on Theory Paper BCA 103.

BCA 108 : C Laboratory

Practical Lab Exercises based on Theory Paper BCA 104

BCA 109 : Office Automation Laboratory

Practical Lab Exercises based on Theory Paper BCA 106

BCA 110 : Typing Skills Laboratory (English and Hindi)

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BCA Part - II

BCA201: Business Accounting

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT I

Basics of Bookkeeping and Accounting : Financial Accounting – Definition ,Scope and Objective of Financial Accounting. Users of accounting information, Limitations of Financial Accounting. Financial Accounting Principles, Concepts and Conventions.

UNIT II

System of Bookkeeping : Accounting Process, Double Entry System, Books of Prime Entry, Subsidiary Books, Recording of Cash and Bank Transactions.

UNIT III

Ledger Accounts – Preparation of Ledger Accounts, Bank Reconciliation Statements, Preparation of Trial Balance.
Depreciation Accounting – Meaning, need and importance of depreciation, Straight Line and Diminishing Balance method, Computation and Accounting Statement of Depreciation, change in Depreciation method. Provisions & Reserves, Rectification of Errors.

UNIT IV

Final Accounts : Opening and Closing Entries, Trading, Profit and Loss accounts and Balance Sheet.

UNIT V

Final Accounts with Adjustments : Adjustments of Dividends, Drawings, Outstanding incomes and expenses, Depreciation. Tax liabilities. Insurance Claims for loss of Stock and loss of Profit.

Recommended reference books :

1. Shukla & Grewal : Advanced Accounts.
2. Sharma, Shah, Agrawal : Finacial Accounting.
3. Rajesh Agrawal & R Srinivasan : Accounting Made Easy (Tata McGraw-Hill)

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BCA202 : Discrete Mathematics

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT - I

Number Systems: Number systems- natural numbers, integers, rational numbers, real numbers, complex numbers, arithmetic modulo a positive integer. Radix r representation (decimal and binary), Change of radix(decimal to binary and vice versa) .
Binomial Theorem and Mathematical Induction : Binomial theorem for positive integral indices, general and middle term in binomial expansion with simple applications. Some simple problems of Principle of Mathematical induction.

Recurrence Relations and Generating Functions : Recurrence relation, linear recurrence relation with constant coefficients, solution of linear recurrence relation with constant coefficients. Generating functions, Solution of recurrence relations using generating functions.

UNIT- II

Sets : Definition of sets, representation of sets, type of sets, Operations on sets, Sub sets, Power set, Universal set, Complement of a set, Union and Intersection of two sets, Venn diagrams, De-Morgans law of sets, Partition of sets, Duality Principles.
Relations: Relation, Types of relations- reflexive, symmetric, anti-symmetric, transitive , equivalence and partial order relation. Relation and diagraphs, Cartesian product of two sets.
Functions: Function, domain and range, One to one and onto functions, composite functions, inverse of a functions. Binary operations.

UNIT - III

Logic and Proofs : Proposition, Conjunction, Disjunction, Negation, Compound proposition, Conditional propositions (Hypothesis, conclusion, necessary and sufficient condition) and Logical equivalence, De Morgan's law, Tautology and contradiction, quantifiers, universally quantified statements, component of a Mathematical system (axiom, definitions, undefined terms, theorem, lema and corollary), proofs (direct proofs, indirect proofs, proof by contra-positive), Mathematical Induction.
Boolean Algebra : Definition and Laws of Boolean Algebra, Boolean functions, Simplification of Boolean functions, Special forms of Boolean functions, Application of Boolean algebra(open and closed switches, switches in series and parallel). Logic gates and Circuits.

UNIT – IV

Graph : Basic terminology, directed and undirected graphs, path and connectivity, types of graphs- Null, Regular, Complementary, Complete, Weighted and Bipartite. Subgraphs, Operation on graphs- union, intersection, complement , product and composition. Representation of graphs in computer memory(matrix representation)- Adjacency matrix, Incidence matrix. Fusion of graphs, Isomorphic and Homeomorphic graphs, paths and cycles, Eulerian and Hamiltonian graphs, shortest path algorithm. Planar graphs, graph coloring. S Shortest path algorithms. Travelling salesman problem

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UNIT - V

Tree : Definition of tree, Fundamental terminologies-Node, Child, Parent, Root, Leaf, Level, Height and Subling. Rooted trees, Ordered trees, Binary tree, Complete binary tree, Tree of an algebraic expression, Tree searching (traversal algorithms)- Preorder, Inorder and Postorder. Distance and centre, Relation between general tree and binary tree, Spanning trees, Algorithms for minimal spanning trees (Kruskal's and Prim's). Game tree.

Recommended reference books :

1. C.l.Liu ; elements of Discrete Mathematics Tata McGraw Hill publishing Company Ltd., 2000
2. Richard johnsonbaugh disvrete mathematics prearson Asia 2001 .
3. John Truss : Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
4. Robert J.McEliece : Introduction to Discrete Mathematics, Tata Mc. Graw Hill, India.
5. Lipschutz : Discrete Mathematics, Tata Mc. Graw Hill India.
6. Kenneth H. Rosen, Discrete mathematics and Applications, Tata Mc. Graw Hill, India.

BCA203 : Operating System

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

Necessity of Operating system. Operating system terminology, Evolution of Operating Systems (multiprogramming systems, batch systems, timesharing system, Process control and Real-time system). Factors in OS Design (performance protection and security, correctness, maintainability application integration, portability, and interoperability).
Device Management: General device characteristics, I/O Programming concepts, device controllers, device drivers Interrupts Driven I/O Memory Mapped I/O, Direct Memory Access Buffering, Device Management Scenarios (serial communications, sequentially accessed storage devices, randomly accessed devices).

UNIT – II

Process Management: Process definition, Process control, initializing Operating System, Process Address Spaces Process Abstraction, resource Abstraction and Process Hierarchy. Scheduling Mechanisms, Partitioning a process into small processes Non-preemptive strategies (first come-first served, shortest job next, priority scheduling deadline scheduling), Preemptive strategies (Round Robin, two quesues, multiple level queues). Basic Synchronization principles . Interactive processes coordinating processes, Semaphores, Shared memory multiprocessors, AND Synchronization, Inter process communication, inter process messages, mailboxes.
Deadlocks, Resource Status Modeling Handling deadlocks, deadlock detection and resolution deadlock avoidance.

UNIT – III

Memory Management: Requirements on the primary memory, mapping the address space to primary memory, dynamic memory for data structures, Memory allocation (Fixed partition Memory allocation strategy), Dynamic Address Relocation, Memory Manger Strategies (Swapping, Virtual Memory, Shared Memory Multiprocessors). Virtual Memory : Address translation paging, Static and dynamic paging algorithms.

UNIT – IV

Information Management: Files (Low level files, structured files, database management systems, multimedia storage). Low level file implementation. Storage Abstraction (Structure sequential files, indexed sequential files, database Management Systems, Multimedia documents). Memory mapped files, Directories, directory implementation, file sharing information across network remote Viruses and Worms, Security Design principles, Authentications, Protection mechanisms, encryption, Protection of User Files.

UNIT – V

Distributed Computing: Distributed process management, message passing, remote procedure call, distributed memory management, security in distributed environment., Introduction of Parallel Processing.

Protection an Security goals, Domain of Protections, Security Problems, Authentication, System threats, Encryptions,

Introduction of different Operating systems (Linux, Unix, Windows Server)

Recommended reference books:

1. Galvin P.B, Silberschatz; Operating System Principles; (Seventh Edition),J Wiley 2008
2. Tanenbaum A.S, Modern Operating Systems, 2nd Edn. PHI Publ,2003
3. William Stalling: Operating Systems, Internal & Design Principles, Sixth Edn; Pearson, 2009.
4. Gary Nutt: Operating Systems-A Modern Perspective (Second Edition) , Pearson Education, 2008.
5. D.M. Dhamdhere: Systems Programming and Operating Systems (Second Edition), Tata McGraw Hill Publishing company Limited.
6. Harvey M. Deitel, Operating Systems, Pearson Education.

BCA204 : Data base Management System

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT- I

Database System Concepts & Architecture: Overview of DBMS, Basic DBMS terminology, data base system v/s file system, Advantages and dis-advantages of DBMS, Codd rules, data independence, Architecture of a DBMS, Schemas, Instances, Database Languages, Database Administrator, Data Models.

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UNIT- II

Data Modeling: Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation.

Relational Algebra: Fundamental operations of relational algebra & their implementation, interdependence of operations.

UNIT -III

Database Design: Funetional dependencies, loss less decomposition, 1st, 2nd & 3rd normal forms, dependency preservation, boyce codd NF. Introduction to Transactions, transaction states.

Security : Access control, Backup, recovery, maintenance and performance.

UNIT- IV

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, insert, update and delete operations, Joins, Unions, Intersection, Minus in SQL.

UNIT- V

Introduction to Advance DBMS:

Object-based Databases : Object-Oriented Databases: Object-oriented data model, Object Oriented Languages, Persistent Programming Languages. Object-Relational Databases: Nested Relations, Storage for Object Databases

Distributed Databases : Distributed Data Storage, Distributed Transactions, Commit protocol, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing

Reference Books:

1. Korth H F and Silberschataz A, System Concepts, Sixth Edition; McGraw Hill,2006
2. Leon, and Leon, SQL Tata McGraw Hill Pub. Co. Ltd.
3. Ivan Bayross; SQL/PL 4th Edn: BPB,2009
4. Navathe S.B. Elmasri R,; Fundamentals of Database Systems, Fifth Edition, Pearson 2009.
5. Ramakrishan and Gharke, Database Management Systems, 3rd Edition, Tata Mc Graw Hill, 2003.
6. Data C J Database Management Systems, Pearson Education Asia.
7. Singh S.K.; Database Systems; I Edition; Pearson, 2006.

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BCA205 : Web Designing and Multimedia

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

World Wide Web : Elements of the Web, Web browser and its types, viewing pages with a browser, using a browser for Mail, News and chat, Security and Privacy issues (cookies, firewalls, executable Applets and scripts, blocking system), Plug-Ins and Active controls, dealing with Web pages that contain Active X, playing streaming Audio and Video, playing MP music. Using Search engines, subscriptions and channels, making use of web resources (Portal, News and weather, sports Personal Financing and Investing, Entertainment, shopping, Computers and Internet, Travel, Health and Medicine, Communities and Clubs).

UNIT – II

HTML Fundamentals: Introduction to HTML, Creating HTML Pages, incorporating Horizontal Rules and Graphical Elements, Hyper-links, Creating HTML Tables, Creating HTML Forms, HTML and Image Techniques, HTML and Page, Frames, Development of Website and Webpage (Planning, Navigation and Themes, Elements of a Web page, steps of creating a site, publishing and publicizing site structuring web site.

UNIT–III

Introduction to DHTML: features of DHTML, CSS: Types of Style sheets, Different elements of Style sheets, Filter effects, IFrame, DIV and Layer Tags.

UNIT–IV

Java Script Fundamental: Introduction to Java Script Working with Variables and Data Functions, Methods and Events, Controlling Programming Flow. The Java Script Object Model Java Script language Objects, Developing Interactive Forms, Cookies and Java Script Security Controlling Frames in Java Script, Client – Side Java Script Custom, JavaScript Objects. Introduction to JQuery and AJAX.

UNIT – V

Introduction of Photoshop
Creating a New File:- Main Selections, Picking color, Filling a selection with color, More ways to choose colors and fill selections, Painting with paintbrush tool, Using the magic wand tool and applying a filter, Saving your document (save your file:- Save file as a JPEG, TIFF, GIF, PNG), Introduction and use of layers, Introduction and use of tool of PhotoShop.
Introduction to Coral draw-
Introduction to coral draw, use and importance in designing, various graphic file and file extension, vector image and raster images, introduction to screen and work area.
Introduction and use of tool of coral draw.

References :

1. Mastering HTML 5.0 by Deborah S.Ray an Eric J. Ray From BPB
2. Mastering Java Script, BPB publication.
3. Black book Photoshop,
4. Blackbook CorallDraw.
5. M.L. Young: Complete Reference to Internet, 2nd Edition, Tata McGraw Hill, 2006
6. Thomas A. Powel: Web Design: C.R., Second Edition TMH, 2000
7. Thomas A. Powel: HTML & XHTML: C.R., Fourth Edition: TMH, 2005
8. G. Reverdon, Handbook HTML, BPB Publications
9. Joel Sklar: Principles of Web Design BPB Publications

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BCA206 (A) : Object Oriented Concepts (Through 'C++')

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

Introduction to Object Oriented Concepts: Evolution of OOP, OOP Paradigm, advantages of OOP, comparison between functional programming and OOP approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading.

UNIT – II

Introduction to C++: C++ tokens, data types, C++ operators, type conversion, variable declaration, arrays, statements, expressions, conditional statements, Jumping statements, loops, functions, pointers, structures.

UNIT – III

Classes and Objects: Classes, objects, defining member functions, arrays of class objects, pointers and classes, passing objects, constructors, types of constructors, destructors, this pointer, access specifiers, friend functions, inline functions.

UNIT – IV

Inheritance: Introduction, Importance of Inheritance, types of inheritance, Constructor and Destructor in derived classes.
Polymorphism: Function overloading, operator overloading, virtual functions, pure virtual functions

UNIT – V

File Management: Handling Data files (sequential and random), Opening and closing of files, stream state member functions, Operations on Files. Templates, Exception Handling.

Reference Books

1. Herbert Schildt; C++ : The Complete Reference 4th Edn; TMH, 2003.
2. Robert Lafore; Object Oriented Programming in C++ 4th Edition; Techmedia.
3. Balagurusamy ; Object Oriented Programming in C++; 4th Edition TMH,2009.
4. Venugopal, Rajkumar; Mastering C++; Tata Mcgrow Hill, 2006.
5. Kanetkar Y.: LET US C++; BPB; 2009.
6. Deitel and deitel; How to program C++, Addison Wesley, Pearson Education Aisa
7. John R. Hubbard, Programming with C++, McGraw Hill International

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BCA206 (B) : Programming through VB 6.0

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

Introduction - Introduction Graphical User Interface (GUI), Programming Language (Procedural, Object Oriented, Event Driven), The Visual Basic Environment, Editions of Visual Basic, Features of VB, How to use VB complier, debug and run the programs, Introduction to tool box, object naming conventions, setting properties, Methods and Events, Working with basic objects - forms, labels, textboxes, command buttons, option button, check box, Frame and Image.

UNIT – II

Programming Fundamentals - Data types in VB, Variables and Declaration, Scope of variables, Operators in VB, sub procedures and functions, Control structures - IF, Select ..case, Do while ...loop, Do ... loop while, Do ... loop until, For ..Next, Exit For, Exit Do, With .. End With. Fixed size and Dynamic Arrays, control array, Data type conversion functions, VB Built in functions – Date, time, Format and String.

UNIT – III

Additional Controls and Menus - List box and combo box controls, Scroll bars, Picture box control, Shape and line controls, Timer control, Menu basics, Menu Editor, Creating menus, Assigning access keys and short cuts, Separating menu items, creating popup menus, controlling menus at run time.

UNIT – IV

Dialog Boxes, Mouse Events, MDI Forms and Error Handling - Standard, Custom and Common Dialog Control and Mouse Events, Creating and using MDI Form, Arranging the child forms, Adjusting the size of controls, Runtime errors, Handling runtime errors by on error .. Statements, Err object, Debug and immediate window.

UNIT – V

Database Connectivity and Crystal Reports - Connecting with databases through ADODC control, Bounded and unbounded methods for displaying data, Accessing and Navigating database Recordsets - Tabletype, Dynaset, snapshot, dynamic and forward only, connecting database using connection string, Introduction to crystal reports, sections of report, creation of report using database, linking report with vb programs

Reference Books

1. Petroutsos Evangelos: Mastering Visual Basic 6.0; BPB Publications, 2002.
2. Norton's Peter: Guide to Visual Basic 6.0. Techmedia.
3. Kurata Deborah: Doing Objects in Visual Basic, Techmedia.
4. Mastering Database Programming with Visual Basic 6 by Petroutsos

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BCA-207: Database Laboratory

Practical Lab Exercises based on Theory Paper BCA- 204

BCA-208: Web Designing Laboratory

Practical Lab Exercises based on Theory Paper BCA -205

BCA-209: Multimedia Laboratory

Practical Lab Exercises based on Theory Paper BCA- 205

Elective (any One)

BCA-210(A):Object Oriented Laboratory

Practical Lab Exercises based on Theory Paper BCA -206(A)

BCA-210(B): Programming through VB 6.0 Laboratory

Practical Lab Exercises based on Theory Paper BCA- 206(B)

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BCA Part - III

BCA301 : Data Structure (Using C/ C++)

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

Introduction to Algorithm Design: Algorithm, its characteristics, efficiency of algorithms, analyzing Algorithms and problems.

Linear Structure: Arrays, records, stack, operation on stack, implementation of stack as an array, queue, types of queues, operations on queue, implementation of queue.

UNIT – II

Linked Structure : List representation, Polish notations, operations on linked list - get node and free node operation, implementing the list operation, inserting into an ordered linked list, deleting, circular linked list, doubly linked list, implementation of stack and queues using linked list.

UNIT – III

Tree Structure : Concept and terminology, Types of trees, Binary search tree, inserting, deleting and searching into binary search tree, implementing the insert, search and delete algorithms, tree traversals , Huffman's algorithm.

UNIT – IV

Graph Structure : Graph representation - Adjacency matrix, adjacency list, Warshall's algorithm , adjacency multilist representation. Orthogonal representation of graph . Graph traversals - bfs and dfs. Shortest path, all pairs of shortest paths, transitive closure, reflexive transitive closure.

UNIT – V

Searching and sorting : Searching - sequential searching, binary searching, hashing. Sorting - selection sort, bubble sort, quick sort, heap sort, merge sort, and insertion sort, efficiency considerations.

Recommended reference books

1. S. Lipschutz: Data Structures; Mc Graw Hill International Edition,2008.
2. A.V. Aho, J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, 3rd Edition; Pearson Education Asia,2008
3. Salaria R.S.: Data Structure and Algorithms Using C/C++, 4th Edition; Khanna.
4. Jean-Paul Tremblay and Paul G. Sorenson. An Introduction to Data structures with applications TMH Publishing Co Ltd.
5. A. Michael Berman: Data Structures via C++ Oxford University Press.
6. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with applications, TMH Publishing Co. Ltd.

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BCA302 : System Design Concepts.

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

Introduction to Systems Design Environment:
Systems Development Approaches-Function Oriented. Data Oriented, Object Oriented, Development Process, Methodologies, Tools, Modeling Methods, Processing Types and Systems, Batch Processing, Realtime Processing.
System Development Life Cycle, Linear or Waterfall Cycle, Linear cycle phase problem definition, system specification, system design, system development, testing, maintenance Problems with Linear Life Cycle, Iterative Cycles, Spiral model Requirements analysis, Importance of Communication, Identifying Requirements, Data and Fact Gathering Techniques, Feasibility Studies, Introduction to Prototyping, Rapid Prototyping Tools, Benefits of prototyping.

UNIT – II

System Design: Interface design tools, user interface evaluations, Introduction to Process Modeling, Introduction to Data Modeling.
System Design Techniques, Document Flow Diagrams, Documents, Physical Movement of documents, Usefulness of Document Flow diagram, Data Flow Diagrams, DFD notation, Context diagram DFD leveling, Process descriptions structured English, Decision Trees and Decision Tables, Entity Relationship Diagrams, Entities, Attributes, Relationship, Degree, Optionality, Resolving many to many relationship, Exclusive relationship, Structure Charts, Modules, Parameter passing. Execution sequence, Structured Design, Conversion from Data Flow Diagrams to Structure Charts.

UNIT – III

Testing fundamentals: Objectives, principles, testability, Test cases: White box & Black box testing strategies: verification & validation, UNIT test, integration testing, validation, testing, system testing, System Implementation, Maintenance and documentation, Document Configurations Maintaining a Configuration.

UNIT – IV

S/W Project planning Objectives, Decomposition techniques : S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models : COCOMO Model. S/W Design : Objectives, Principles, Concepts, Design methodologies Data design, Architectural design, procedural design, Object oriented concepts.

UNIT – V

An overview of Management Information System: Definition & Characteristics Components of MIS, Frame Work for Understanding MIS, Information & its concepts & Levels of Management, Simon's Model of decision Making, Structured Vs Unstructured decisions, Formal Vs Informal system.

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

Refereuces :

1. Igor Hawryszkiewyez, Introduction to System Analysis and Design, 4th edition, Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentey,Systems analysis and Design Methods 4th edition, Tata McGraw-Hill.
3. Roger, S. Pressman, " Softwere Engimeering-A Practitioner's Approach", Thrid Edition, McGraw Hill
4. R.E. Fairley, 'Softwere Engineering Concepts", McGraw Hill
5. J. Kanter, "Management/Information Systems". PHI.
6. Jalota "An Integrated Approach to Softwere Engineering", Narosa Publishing House.
7. Gordon B. Davis & M.H. Olson. " Management Information Systems : Conceptual Foundation, structure & Development."

BCA303 : Networking Technologies

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT-I

Network architecture, configuring network, network strategies, networks types, LAN, MAN and WAN [Basic concepts, Line configuration, topology, transmission mode, identify key components of network, categories of network, differentiating between LAN, MAN, WANS and Internet].

UNIT - II

The OSI model, The physical layer (bandwidth limited signals, transmission media, wireless transmission), the data link layer, error detection and correction, data link protocols, Bridges, the network layerm routing algorithm, congestion control algorithm, internet working, the transport layer, the application layer, MAC protocols for high speedsLANs.

UNIT-III

Introduction to TCP/IP [Understand the TCP/IP Protocol Suite, its history and modification processes compare TCP/IP to the Open Systems Interconnection (OSI) reference model, Examine a number of TCP/IP applications such as FTP, Telnet, DNS, DHCP, Boot, etc. connection, Inter Internetworking, IP, IPv6 IP multicasting, Routing protocols, TCP, UDP, SNMP SMTP and MIME, HTTP

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UNIT-IV

Circuit Switching: Simple switching Network, Circuit Switching Networks, Brief idea of following (detail working) not required:
Circuit Switching Concepts: Space Division switching, Time Division Multiplexing, Routing in circuit switching Networks, Control Signalling, Inchannel & common channel signaling, Brief idea of SS7. Packet Switching: Packet switching principles, Routing,X.25 Data Encoding: Spread Spectrum. Asynchrous and Synchronous transmission, Full and Half duplex, Interfacing, Functional and Procedural aspects of V.24,

UNIT-V

Data Communication Systems, Serial Data formats, encoded data formats, error detection and correction], information about microwave, information about microwave in Communications, Satellite, Geosynchronous Satellites and optical fiber communication [Basic concept of light propagation, Fiber Cables, Optical fiber versus Metalic cable facilities, Light sources, Optical Detectors, Fiber cable losses, SONET, ISDN, DSL

Recommended Books :

1. William Stallings: Data & Communications,Sixth Edition
2. A. S. Tanenbaum : Computer Networks
3. Behrouz A Foruzan, Data Communication and Networking; 3rd Edition; Tata McGraw Hill., 2004

BCA304 : Core Java Programming

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT – I

Overview of Object Oriented Concepts in Java.
Introduction: getting and installing the Java Development Kit, Java features like security, portability, byte code, java virtual machine, object oriented, robust, multithreading, architectural neutral, distributed and dynamic, Java programming language structure and syntax, control statements (The If statement, Logical Operators, The Conditional Operator, the Switch Statement, Variable Scop, Loops).

UNIT – II

Java arrays, Java Strings, Operations on Strings and String Buffer Objects, Class, Objects, Methods and Problem solving using classes, objects and relationships.
Inheritance, types of Inheritance, packages and interface, exception handling

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UNIT - III

Java utilities like java.lang, java.util, java.io, GUI in Java using AWT and Swing, Event Handling Mechanisms, AWT based effective GUI in Java : Detailed overview of AWT classes, Graphics primitives and UI Components, Layout features, Standalone GUI applications, Layout Managers, Implementation of event driven mechanism, Delegation of even model, Listeners and Adapters, Inner classes.

UNIT - IV

Applets : Introduction to Applet coding, Applet life cycle, Graphis facility, Color and Font, Passing parameters to applets, Apletcontext, Inter Applet Communication. **Threading in Java :** Fundamentals of Multi-threading Java coding with Thread classes, thread Management in Java, Implicit wait, Using Runnable interface, Thread Management in Java, Implicit wait, Using Runnable interface, Thread Synchronization, Inter thread communication.

UNIT – V

Overview of Networking in Java : URL class and its usage through connection, Sockets based connectivity, TCP/IP Sockets and server sockets, Datagram Sockets. Collections in Java-Array List, stack, queue, Hash table, Collection class hierarchy, JDBC and Jar files.

References

1. Patrick Naughton, Herbert Schildt :, Java, The Complete Reference : 7th Edition.
2. E. Balagurusamy: Programming with Java- Tata McGrawHill Publishers, II Edition.
3. Khalid A. Mughal, Rolf W. Rasmussen; A Programmer's Guide to Java Certification (2nd Edn.).
4. Cay. S Horstmann, Gary Cornell; Core Java Vol I & II; The Sun Micro Systems Press.
5. Ken Arnold, James Gosling: Core Java Fundamentals(Volume I and Volume 2). 2nd Edition-, Addison Wesley.
6. Kathy Sierra, Head first Java, 2nd Edition, Orielly.
7. Bruce Eckel: Thinking in Java, 4th Edition.

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BCA 305 : E- Commerce

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.

Part - II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.

Part - III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT-I

Introduction to Electronic Commerce : Definition of Electronic Commerce, The scope of Electronic Commerce. Business Strategy in an Electronic Commerce : The value chain, Competitive advantage, Business strategy. Business to Business Electronic Commerce : Inter-organizational transactions, Electronic markets, Electronic data interchange (EDI), EDI: the nuts and bolts, EDI and Business Inter organizational E-Commerce.

UNIT-II

Testing & Implementation: Introduction to Testing, Understanding Testing, Applying Testing. Challenges and Opportunities in Applying Verification and Validation.

Implementation : Understanding Implementation. Applying Implementation Planning with example, Challenges and Opportunities of Implementation Planning.

UNIT-III

Electronic Payment Systems: Special features required in payment systems, Types of E-payment systems, E-Cash, E-cheque, credit card, Smart Card, Electronic Purses, E-Marketing, E-Customer Relationship Management, E Supply Chain Management.

Security Issues in E-Commerce: Security risk of E-Commerce, Types of threats, Security tools and risk management approach. Cyber laws, Business Ethics.

UNIT-IV

Introduction to e-banking: Definition, Transaction websites components, E-Banking support services, Wireless Banking.

E-Banking Risk: Transaction/Operation Risk, Credit Risk, Liquidity/Internet Risk, Price Risk, Strategic Risk, Reputation Risk

UNIT V

Introduction to M-Commerce: Business using smart devices (Mobile, e-wallet, online shopping and payment system via mobile, security and privacy features), Mobile delivery technology, applications of M Commerce. M Wallet, Mobile Shopping. Security Issues: Device security, Language security, wireless security, security assessment, Tokenization, 3D security, OTP generation, PCI compliance.

Reference:

(i) Sushila Madan &, Ashish Kumar: Securing transactions and payment system for m-commerce, IGI Global Inc.

(ii) PI Joseph, E-Commerce: A Managerial Perspective,PHI,2002.

(iii) Ravi Kalakota & A.B. Whinston, Frontiers of elcctmnic Commerce Pearson Eduction,

(iv) Ravi Kaiakota & A.B. Whinston, electronic Commerce-A Manager's Guide, Pearson Education.

(v) Agarwaia Kamlesh, N. & Agarwala Deeksha: Business on the Net introduction to the E-Commerce, Macmillan India.

(vi) Bharat Bhaskar: Electronic Commerce-Framework Technologies and Applications, TMH

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BCA306 (A): Advance Technologies of Programming through ASP.NET

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.

Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.

Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT-I

Introduction to .Net framework: Managed Code and the CLR Intermediate Language, Metadata and JIT Compilation Automatic Memory Management

The Framework Class Library: .Net objects- ASP .NET, NET web services, Windows Forms.

Elements : Variable and constants data types, declaration. Operators, types precedence, Expressions Program flow, Decision statements, properties, delegate, indexer, attributes , Loop statements.

UNIT-II

Types: Structures, Enumerations, Reference data types, arrays.

Windows Programming: Creating windows forms windows controls, Button, Check box, Combo box, Label, List box Radio Button, Text box, Events, Click, close deactivate, Load, mousemove, mousedown, mouseup.

Menus and Dialog Boxes : Creating menus, menu items, context menu, Using dialog boxes, show dialog() method.

UNIT - III

ADO.NET : Architecture of ADO.NET, ADO.NET providers, Connection, Command, Data Adapter, Dataset, Connecting to Data Source, Accessing Data with Data set and Data reader, Create an ADO.NET application, Using Stored Procedures.

UNIT-IV

ASP.NET Features: Application of States and Structure; Change the Home Directory in IIS- Add a Virtual Directory in IIS- Set a Default Document for IIS – Change Log File Properties for IIS-Stop, Start, or Pause a Web Site. Server security and application security issues.

UNIT-V

Creating Web Controls: Web Controls, HTML Controls, Using Internist Control, Using Input Validation Controls, Selecting Controls for Applications, Data Controls and Adding web controls to

Creating Web Forms: Server Controls, Types of Server Controls, state management- Types and applications, Adding ASP.NET Code to a page.

Web Services and WCF: Introduction to Web Services protocol and standards WSDL Documents-Visual Studio.NET Architecture of WCF, WCF Client

Reference Books:

1. Mathew Mac Donald: Beginning ASP.NET 4.0 in C# 2010, 3rd Edition, A Pres.
2. Bill Evjen Scott Hanselman, Devin Rader: Professional ASP.NET4, 2010, Willey.
3. George Shepherd: Microsoft ASP.NET Step by step, 2010 Microsoft Press.
4. Imar Spaanjaars: Beginning ASP.NET 4: in C# and VB (Wrox Programming to Programmer) , 2010 Wicly Publishing.
5. Steven Holzner: ASP NET 4.0 (Cover C# & VB) Black Book; Dreamtech Press
6. Steven Holzner: .NET Programming Black Book, Dreamtech Press

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BCA306 (B): Advance Technologies of Programming through PHP

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT - I

Introduction to PHP: Server side Scripting Vs Client Side Scripting, Evaluation of PHP, Features of Php, Basic Syntax, Variable and constant, Data types, Operators and Expressions

UNIT - II

Decision Making: If, Multiple Ifs, Nested Ifs, Loops (while, do...while, for loop, foreach), Nested Loops, Jumping Statement.
Arrays: Numeric, Associative and Multidimensional Arrays

UNIT-III

Strings: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function, Pattern matching, Replacing text, Splitting a string with a Regular Expression

Functions: Defining a Function, Calling a Function, Parameter passing, Returning value from function

UNIT-IV

Form Data Handling: $_GET, $_POST, $_REQUEST Variables, Cookies handling, Session Management, URL encryption and security functions.
Exception Handling: Understanding Exception and error, Try, catch, throw

UNIT-V

File Handling: Opening and closing a file, Copying, renaming and deleting a file
Database Handling: Connection with MySql Database or ODBC, Performing basic database, operation (Insert, Delete, Update, Select), Setting query parameter.

References

1. PHP, The CompleteReference, Steven Holzner, TMH
2. Beginning PHP 5.3, Matt Doyle, John Wiley & Sons

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BCA306 (C): Linux and Shell Programming

Question Paper pattern for Main University Examination *Max Marks: 100*

Part – I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT-I

The Operating System: Linux history, Linux features, Linux distributions, Linux's relationship to Unix, Overview of Linux architecture, Installation, Booting, Login and Shutdown Process, Start up scripts, controlling processes, system processes (an overview, command line. Introduction to Linux Security.

UNIT-II

The Linux File System; Basic Principals, Pathnames, Mounting and Un-mounting File Systems, Different File Types, File permissions, Disk Usage Limits, Directory Structure, Cheek and Repair File Systems Security and file permissions. Shells in Linux.

UNIT-III

Filter-The grep family, advanced filters-sed and awk vi editor: General startup of vi editor and it modes, Creating and editing files, features of vi, screen movement, cursor movement insertion, deletion searching, submitting operations, yank put, delete commands reading & writing files.

UNIT - IV

Shell: meaning and purpose of shell, introduction to types of shell. the command line, standard input and standard output, redirection pipes, filters special characters for searching files and pathnames.

UNIT-V

Shell programming shell Meta character local and global shell variables- interactive shell scripts – shell script arguments- looping and making choice- for loop, case, while and until, shell functions eval.

Recommended reference/Text Books:

1. Beginning Linux Programming N, Mathew, R. Stones, Wrox, Wiley India Ed.
2. Peterson Richard, " The Complete Reference Linux " Tata McGraw Hill.
3. Simitabha Das, "Unix/Linux Concepts & Applications". Tata McGraw Hill
4. Yshavant P, Kanetkar, Shell Programming
5. Linux System Programming, Robert Love, O" Reilly SPD.
6. Vijay Shekhar; Red hat Linux study guide firewall media
7. Richard Petersen. The Complete Reference , Linux, TMH

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BCA 307: Networking Laboratory

Practical Lab Exercises based on Theory Paper BCA -303

BCA 308: Core Java Laboratory

Practical Lab Exercises based on Theory Paper BCA- 304

Elective Laboratory (Any one from BCA-309)

BCA309(A): ASP.NET

Practical Lab Exercises based on Theory Paper BCA -309(A)

BCA309(B):PHP

Practical Lab Exercises based on Theory Paper BCA- 309(B)

BCA309(C):Linux OS and Shell Programming

Practical Lab Exercises based on Theory Paper BCA- 309(C)

BCA-310: Project

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[redacted]

BCA 310: Project

Examination Time : Three Hours
Maximum Marks : 100

Guidelines for preparing the Project Report (BCA-310)

I. Objective: Student should able to develop a small real time application using any Programming Languages which is part of their course curriculum or any new upcoming Programming Language.

II. Guidelines regarding project:

1. Students should work in group. Minimum number of students in one group can be 2. Maximum number of students in one group can be 4.
2. Students will be working under supervision of one teacher.
3. Students will submit a synopsis of the project.
4. Two copies of the report should be submitted.
5. The reports should be spiral bound along with the soft copy of the project.
6. The reports should be submitted with the following guidelines in the prescribed format.
   - Paper size : A4
   - Margins : Left 1.5, Right, Top and Bottom 1 inch
   - Font : Times New Roman
   - Chapter Heading : 16pt
   - Sub Heading : 14, Sub-Sub Headings: 12 Bold
   - Running Matter : 12 pt
   - All topics should be numbered accordingly.
   - Paragraph Gap : 6 Pt Maximum
   - Line Spacing : 1.5

III: **Top Page**

<Title of Project Work>

Project report submitted in partial fulfillment of the requirement for the award of the Degree of Bachelor of Computer Application

By
<Name of the Candidate>
Roll No.
Enrollment No. :
Session: <Session>

<University Logo>

< Name of the Constituent/ Affiliated College>
University of Rajasthan
Jaipur

Second Page

Certificate

This is to certify that the project report entitled ..... being submitted by Mr/Mrs..... in partial fulfilment for the award of the Degree of Bachelor of Computer Application to the University of Rajasthan is a record of bonafied work carried out by himself/herself under my guidance and supervision.
The results embodied in this project report have not been submitted to any other University or Institute for the award of any Degree or Diploma.

(HOD)

Guide Name
Designation

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Third Page

The third page may include the Certificate given by Organization or Company where candidate has done his/her project.

Fourth Page

The fourth page should contain the declaration by the students (see the sample format)

DECLARATION

This is to certify that the work reported in the present project entitled "**<Title Of The Project Work>**" is a record of work done by me in the <Department Name>, <Name of the College/ Organization>. The reports are based on the project work done entirely by us and not copied from any other source.

Signature of Candidate
<Mr. / Ms. Name of the Student >
Class:
Roll No.
Enrolment No.
Session:

Fifth Page

The fifth page may include the Acknowledgement.

Sixth and Seventh Page

In this page, a table of contents, list of tables, list of figures must be provided.

Eighth Page

The eighth page should contain an abstract of the Project report. The candidate may emphasize here his/her contributions in the project.

NOTE: All the above pages are to be numbered in Roman numerals of lower case. Ex. i, ii, iii, iv, ... except the top page.

The following is suggested format for arranging the project report matter into various chapters:

1. Introduction
   This chapter must describe introduction about your project.
2. Literature Survey/Review of Literature
3. Define the problem.
   Define the modules and their functionalities
   Hardware / Software requirements
4. System Design and Implementation
   /* Actual Implementation of the problem should be described in this chapter. */

   The design part must include the following items
   - DFDs in case of Database projects
   - UML diagrams. This UML diagrams must include the following
   - Class Diagrams
   - Interaction diagrams-Sequence and Collaboration diagrams
   - Object Diagrams
   - Use case diagrams
   - Control Flow diagrams
   - Database Design
   -

   In Case of a database projects, the report must include the following items.
   - E-R Diagrams
5. Results and Discussions
6. Conclusions & Future Enhancements / Recommendations
7. References / Bibliography
8. Appendices (if any)

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