

**TEACHING AND EXAMINATION SCHEME**  
**Bachelor of Computer Applications - II Year**  
**2019-20**

Paper Name (Theory)	Lec	Exam Hours	MARKS	
			Min	Max
bca-201 Group (I/II/III/IV/V)	3	3	18	50
bca-202 Group (I/II/III/IV/V)	3	3	18	50
bca-203 Database Management Systems	3	3	18	50
bca-204 Java Programming	3	3	18	50
bca-205 C++ Programming for Object Oriented Systems	3	3	18	50
bca-206 Computer Graphics	3	3	18	50
<b>Total of Theory Marks</b>				<b>300</b>

Paper Name (Practical)	Pract Hours	Exam Hours	MARKS	
			Min	Max
bca-207 MS Access	3	3	18	50
bca-208 Java Programming	3	3	18	50
bca-209 C++ Programming & Computer Graphics	3	3	18	50
<b>Total of Practical Marks</b>				<b>150</b>
<b>Total of Theory &amp; Practical Marks</b>				<b>450</b>

Group	Choice Papers Names	I Year	II Year	III Year
Group I	Physics	I	II	III
	Mathematics	I	II	III
Group II	Computer Practice	I	II	III
	Information Practice	I	II	III
Group III	Geography	I	II	III
	Sociology	I	II	III
Group IV	Accountancy	I	II	III
	Business Studies	I	II	III
Group V	Skill	I	II	III
	Advance Skills	I	II	III



## **SCHEME OF EXAMINATION BACHELOR OF COMPUTER APPLICATIONS**

### **Note:**

The student has to take any one group from among I, II, III, IV, V. The group will continue for the entire three years of BCA respectively for the first 2 papers and the student will not be allowed to change groups.

### **Theory:**

#### **Part A:**

1. 10 Questions of 1.5 mark each – 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

#### **Part B:**

1. 5 Questions of 3 marks each – 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

#### **Part C:**

1. 3 Questions of 7+7+6 marks each – 20 marks.
2. There will be an internal choice in each question.
3. Answer should not exceed 400 words

### **Practical & Projects:**

Practical exams shall be conducted by one internal and one external examiner of a batch of 40 students in a day.

Duration of Practical exam is 3 hours.

A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.

Practical of 50 marks distribution is as under:

- a. 30 marks for practical examination exercise for 3 questions
- b. 10 marks for Viva-voce
- c. 10 marks for Laboratory Exercise File

**Group –I (Science)****bca-201Physics**

Properties of Bulk Matter Elastic behaviour, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity, poisson's ratio; elastic energy. Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, Reynold's number, streamline and turbulent flow. Critical velocity, Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension ideas to drops, bubbles and capillary rise. Heat, temperature, thermal expansion; thermal expansion of solids, liquids, and gases. Anomalous expansion. Specific heat capacity:  $C_p$ ,  $C_v$  – calorimetry; change of state – latent heat. Heat transfer – conduction and thermal conductivity, convection and radiation. Qualitative ideas of Black Body Radiation, Wein's displacement law, and Green House effect. Newton's law of cooling and Stefan's law.

**Thermodynamics**

Thermal equilibrium and definition of temperature (zeroth law of Thermodynamics). Heat, work and internal energy. First law of thermodynamics. Isothermal and adiabatic processes.

Second law of thermodynamics: Reversible and irreversible processes. Heat engines and refrigerators.

**Behaviour of Perfect Gas and Kinetic Theory**

Equation of state of a perfect gas, work done on compressing a gas. Kinetic theory of gases: Assumptions, concept of pressure. Kinetic energy and temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

**Oscillations and Waves**

Periodic motion – period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (SHM) and its equation; phase; oscillations of a spring – restoring force and force constant; energy in SHM – kinetic and potential energies; simple pendulum – derivation of expression for its time period; free, forced and damped oscillations (qualitative ideas only), resonance. Wave motion. Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics. Beats. Doppler effect.

**Electrostatics**

Electric charges and their conservation. Coulomb's law – force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole; torque on a dipole in a uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside). Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two point charges and of electric dipoles in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor, Van de Graaff generator.

## Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity and mobility, and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance. Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel. Kirchhoff's laws and simple applications. Wheatstone bridge, metre bridge. Potentiometer – principle and applications to measure potential difference, and for comparing emf of two cells; measurement of internal resistance of a cell.

<b>Duration: 3 hours</b>	<b>Max Marks: 50</b>
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**Group –II (Computer)**

**bca-201Computer Practices**

Types of communications – oral communication, written communication – formal, informal, business letters – types of letter, writing letters, business correspondence, applying for a job, resume writing, filling an employment application.

Report writing – definition and determining reports purpose, report planning, collecting information, developing an outline, sections of report, types of report, making reports writing effective, drafting circulars, notices, agenda and minutes of meetings.

**Group –III (Arts)****bca-201Geography**

Climate, Vegetation and Soil, Weather and climate - spatial and temporal distribution of temperature, pressure winds and rainfall, Indian monsoon: mechanism, onset and withdrawal, variability of rainfalls: spatial and temporal; use of weather charts; Climatic types (Koeppen). Natural vegetation-forest types and distribution; wild life; conservation; biosphere reserves. Soils - major types (ICAR's classification) and their distribution, soil degradation and conservation.

Hazards and Disasters: Causes, Consequences and Management Floods, Cloudbursts, Droughts: types and impact, Earthquakes and Tsunami, Cyclones: features and impact, Landslides

**People**

Population-distribution, density and growth, Population change-spatial patterns and structure; determinants of population change; Age-sex ratio; rural-urban composition; Human development - concept; selected indicators, international comparisons

**Human Activities**

Primary activities - concept and changing trends; gathering, pastoral, mining, subsistence agriculture, modern agriculture; people engaged in agricultural and allied activities - some examples from selected countries.

Secondary activities-concept; manufacturing: types - household, small scale, large scale; agro based and mineral based industries; people engaged in secondary activities - some examples from selected countries.

Tertiary activities-concept; trade, transport and tourism; services; people engaged in tertiary activities - some examples from selected countries.

Quaternary activities - concept; people engaged in quaternary activities - case study from selected countries.

Transport, Communication & Trade, Land transport - roads, railways; trans-continental railways, Water transport - inland waterways; major ocean routes, Air transport - Intercontinental air routes, Oil and gas pipelines, Satellite communication and cyber space- Importance and usage for geographical information; use of GPS, International trade-Bases and changing patterns; ports as gateways of international trade, role of WTO in International trade, Ocean: National rights and international treaties.

**Human settlements**

Settlement types - rural and urban; morphology of cities (case study); distribution of mega cities; problems of human settlements in developing countries.

**People**

Population: distribution, density and growth; composition of population - linguistic, religious; sex, rural-urban and occupational-regional variations in growth of population. Migration: international, national-causes and consequences. Human development: selected indicators and regional patterns. Population, environment and development.

**Group –IV (Commerce)**

**bca-201Accountancy**

**Bills of Exchange**

Bills of Exchange and Promissory Note: Definition, Features, Parties, Specimen, Distinction. Important Terms: Term of Bill, Days of Grace, Date of Maturity, Bill at Sight, Negotiation, Endorsement, Discounting of bill, Dishonour of bill, Noting of bill, Insolvency of Acceptor, Retirement and Renewal of a bill. Accounting Treatment of bill transactions.

**Financial Statements**

Financial Statements: Meaning and Users. Profit and Loss Account: Gross profit, Operating profit and Net profit. Balance Sheet: Need, Grouping, Marshalling of Assets and Liabilities.

Adjustments in preparation off financial statements with respect to closing stock, outstanding expenses, prepaid expenses, accrued income, income received in advance, depreciation, bad debts, provision for bad debts, provision for discount on debtors, managers' commission, abnormal loss, goods sent for approval and in transit. Preparation of Profit and Loss Account and Balance Sheet of sole proprietorship concerns.

**Financial Statement of Not-for-Profit Organization**

Not for profit organization: Meaning and examples. Receipts and Payments account, Income and Expenditure account: Meaning and Concept of Fund based accounting. Preparation of Income and Expenditure account and Balance Sheet from Receipts and Payments Account with additional information.

**Computers in Accounting**

Introduction to Computers: Meaning, Capabilities and Components of Computer System. Database concepts for Accounting. Retrieval of accounting information-basic queries.

**Group –V (Skill 1)**

**bca-201 Merchandise Management**

Merchandise Management- Meaning, factors affecting the Merchandising function, function of Merchandise Manager—Planning, organizing, Directing, controlling, coordinating, Merchandise Planning, Process of planning, sales forecast, Identifying the requirement, merchandise control, merchandise buying product line, classification, category management, components of category management, category management process.

**Strategy Management**

Principals of Strategy Management, Fundamentals and Approaches of retail Strategy Management, Basic criteria's to analyses Strategy Management strategy, Retail pricing and merchandise performance, elements of retail price, developing a pricing strategy, Approaches to a pricing strategy Adjustment to retail price, factors affecting retail price, merchandise allocation, Analyzing Merchandise performance, pare to curve. Importance of strategic Management in this competitive retail market.

**Group –I (Science)****bca-202Mathematics****RELATIONS AND FUNCTIONS**

## Relations and Functions

Types of relations: Reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations.

## Inverse Trigonometric Functions

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

**ALGEBRA**

Matrices, Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

## Determinants

Determinant of a square matrix (up to  $3 \times 3$  matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

**CALCULUS Limits and Derivatives**

Derivative introduced as rate of change both as that of distance function and geometrically, intuitive idea of limit, Definition of derivative, relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

**Group –II (Computer)**

**bca-202Information Practices**

Client/server computing: Evolution of client/server concepts, definition, history, need and motivation for client/server approach, client/server environments, characterization of client/server computing, client/server types and examples.

Client/server development tools, advantages of client/server technology connectivity, user productivity reduction in network traffic, faster delivery of systems.

The Role of Client – Client request for service, dynamic data exchange, OLE, Common Object Request Broker Architecture (CORBA), Components of client/server applications

The Role of Server – Server functions, network operating systems, Novel Netware, LAN Manager, Server Operating System, System Application Architecture.

Architecture: Components of client-server architecture, application partitioning, the two-layer and three-layer architectures, communication between clients and servers, use of APIs in client/server computing, middleware technology in client/server computing. Open System Interconnectivity (OSI), Inter Process Communication (IPC)

Client/Server System Development – Network Management, Remote System Administrations, LAN Network Management, Privacy and Security Issue, Developing applications on RDBM, GUI design concepts

**Group –III (Arts)**

**bca-202Sociology**

Western Social Thinkers

Karl Marx on Class Conflict, Emile Durkheim on Division of Labour, Max Weber on Bureaucracy

Indian Sociologists

G.S. Ghurye on Race and Caste, D.P. Mukherjee on Tradition and Change, A.R. Desai on the State, M.N. Srinivas on the Village

Introducing Indian Society

Colonialism, Nationalism, Class and Community

Demographic Structure and Indian Society, Rural-Urban Linkages and Divisions

Social Institutions: Continuity and Change, Family and Kinship, the Caste System

Market as a Social Institution

Pattern of Social Inequality and Exclusion, Caste Prejudice, Scheduled Castes and Other Backward Classes, Marginalization of Tribal Communities, The Struggle for Women's Equality, The Protection of Religious Minorities, Caring for the Differently Abled

The Challenges of Cultural Diversity

Problems of Communalism, Regionalism, Casteism and Patriarchy, Role of the State in a Plural and Unequal Society, What We Share

### **Group –IV (Commerce)**

#### **bca-202 Business Studies**

##### Small Business

Small scale enterprise as defined by MSMED Act 2006 (Micro, Small and Medium Enterprise Development Act). Role of small business in India with special reference to rural areas. Government schemes and agencies for small scale industries: (National Small Industries Corporation) and DIC (District Industrial Center) with special reference to rural, backward and hilly areas.

##### Internal Trade

Services rendered by a wholesaler and a retailer Types of retail - trade - Itinerant and small scale fixed shops Large scale retailers - Departmental stores, chain stores, mail order business Concept of automatic vending machine Chambers of Commerce and Industry: Basic functions Main documents used in internal trade: Performa invoice, invoice, debit note, credit note. LR (Lorry receipt) and RR (Railway Receipt) Terms of Trade: COD (Cash on Delivery), FOB (Free on Board), CIF (Cost, Insurance and Freight), E&OE (Errors and Omissions Excepted)

##### International Trade

Meaning, difference between internal trade and external trade: Meaning and characteristics of international trade. Problems of international trade: Advantages and disadvantages of international trade Export Trade - Meaning, objective and procedure of Export Trade Import Trade - Meaning, objective and procedure: Meaning and functions of import trade; purpose and procedure Documents involved in International Trade; documents involved in export trade, indent, letter of credit, shipping order, shipping bills, mate's receipt, bill of lading, certificate of origin, consular invoice, documentary bill of exchange (DA/DP), specimen, importance World Trade Organization (WTO) meaning and objective

##### Nature and Significance of Management

Management - concept, objectives and importance, Management as Science, Art and Profession Levels of management, Management functions - planning, organising, staffing, directing and controlling, Coordination - concept, characteristics and importance

##### Principles of Management

Principles of Management - concept, nature and significance Fayol's principles of management Taylor's Scientific Management - principles and techniques

##### Management and Business Environment

Business Environment - concept and importance, Dimensions of Business Environment - Economic, Social, Technological, Political and Legal, Impact of Government policy changes on business with special reference to liberalization, privatization and globalisation in India.

##### Planning

Concept, importance and limitations, Planning process, Single use and Standing Plans - Objectives, Strategy, Policy, Procedure, Method, Rule, Budget and Programme.

**Group –V (Skill 2)**

**bca-202Banking Management System**

Definition & Principles of Banking: Present structure of banking System in India.  
Brief History; Management Principles in Banks; Managerial Functions in banks. Management of Deposits and advances; Deposit mobilization; Classification and nature of Deposit accounts; advances, Lending practices, Types of advances.

**Investment Management system**

Liquidity and profitability; preparation of cheques, Bills ,Endorsement ;Government securities, documents of title of goods –receipts ,Records, Evaluation of loans application; profit and loss accounts; balance sheet and statutory report regarding cash revenue.

**bca-203 Database Management Systems**

Overview of DBMS: Basic DBMS terminology, DBA and his responsibilities, physical and logical data independence, architecture of DBMS, distributed databases, structure design and Client/server architecture.

Entity-Relationship Model, entity, entity set, attributes, tuples, domains, keys, super and candidate key, overview of hierarchical, network and relational models, comparison of network, hierarchical and relational models

Relational Model: Storage organization for relations, relational algebra, set operators, relational operators, decomposition of relation schemes, functional dependencies, multi-valued dependencies, normalization up to DKNF.

Relational Query Language: DDL, DML, DCL, database integrity, domain integrity, entity integrity, referential integrity, security, authorization, access matrix, concurrency, locks, serializability, recovery

Distributed database design, architecture of distributed processing system, data communication concept, data placement, placement of DDBMS and other components, concurrency, control and recovery, transaction management, need of recovery, recovery techniques, serializability, blocking, dead locks, introduction to query optimization.

MS-Access: Create a Table in MS Access -Data Types, Field Properties, Fieldsnames, types, properties, default values, format, caption, validationrules Data Entry Add record delete recode and edit text Sort, find/replace,filter/select, re-arrange columns, freeze columns. Edit a Tables- copy, delete, import, modify table structure find replace.

Setting up Relationships- Define relationships, add a relationship, set a rule for Referential Integrity, change the join type, delete a relationship, save relationship Queries & Filter –difference between queries and filter,filter using multiple fields AND,OR,advance filter Queries create Query with one table,fiend record with select query, find duplicate record with query,find unmatched record with query, run query,save and change query.

Introduction to Forms Types of Basic Forms: Columnar, Tabular, Datasheet, Main/Subforms, add headers and footers, add fields to form, add text to form use label option button, check box,combo box, list box Forms Wizard, Create Template.

Introduction to Reports,Types of Basic Reports: Single Column, Tabular Report Groups/Total, single table report multi table report preview report print report, Creating Reports and Labels, Wizard

### **bca-204Java Programming**

Introduction to Java, history, characteristics, Object Oriented Programming, data types, variables, arrays, difference between Java and C++Control statements: Selection, iteration, jump statements, operators

Classes and Methods: Introducing classes, Class fundamentals, Declaring Objects, Assigning object reference variables. Introducing method , Constructors, The this Keyword, Garbage Collection-Finalize() method, Overloading methods, Using objects as parameters, Argument Passing , Returning Objects, Recursion , static and final keyword , Nested and Inner Classes , String Class ,Command Line arguments.

Inheritance, Packages, Interfaces: Inheritance Basics , using super, method overriding , Dynamic method dispatch , abstract classes , Using final with inheritance , Packages , Access Protection, Importing packages ,Interfaces.

Exception Handling, Multithreading, Applet : Exception handling fundamentals, Types, Using try, catch, throw, throws and finally , Java thread model , Creating a Thread , Creating multiple threads,Thread priorities , synchronization , Inter-thread communication , Applet Basics , Applet Skeleton, HTML applet tag – Passing parameters to applet

I/O Streams, Utility Classes:I/O Streams- Byte Streams , Character Streams , Reading and Writing Files, Legacy Classes and Interface: Vector, Stack, The Enumeration Interface, Utility classes: StringTokenizer, Date, Calendar,Random, Scanner

Javax.Swing Package : JButton , JLabel,JTextField , JPasswordField, JRadioButton, JCheckBox, JComboBox ,JList,JToggleButton,JSeparator, JSpinner, JTabbedPane, JTable,JToolBar ,JToolTip , JFrame , JPanel , JDialog , JSlider, Introduction to Event Handling: Event Classes – Event Listener interfaces

### **bca-205C++ Programming for Object Oriented Systems**

Object Oriented Concepts, Tokens, Expressions and Control Structures Introduction: Basic Elements of Programming, Console I/O Operations.

Control Structures: Control and Looping Statements. Function: Function Prototyping, Call and Return by Reference, Inline Function, Default and Const Arguments, Function Overloading, Arrays, Manipulators and Enumeration.

Classes and Object, Object Oriented Methodology: Basic Concepts/Characteristics of OOP. Advantages and Application of OOP's, Procedural Programming Vs OOP

Classes and Objects: Specifying a Class, Creating Objects, Private & Public Data Members and Member Functions, Defining Inline Member Functions, Static Data Members and Member Functions. Arrays within Class, Arrays of Objects, Objects as Function Arguments, Returning Objects.

Constructors, Destructors, Operators Overloading and Inheritance. Constructors and Destructors: Introduction, Parameterized Constructors, Multiple Constructors in A Class, Constructors With Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, Const Objects, Destructors Operators Overloading: Definition, Unary and Binary Overloading, Rules for Operator Overloading.

Inheritance: Defining Derived Classes, Types of Inheritance, Constructors and Destructors in Derived Classes.

Pointers Virtual & Friend functions and file handling Pointers: Pointer to Objects, this Pointer, New and Delete Operators, Virtual Function, Friend Functions. Opening, Closing a File, File Modes, File Pointers and their Manipulation, Sequential Input and Output Operations: Updating a File, Random Access, and Error Handling During File Operations, Command Line Arguments.

### **bca-206Computer Graphics**

Graphics hardware: The functional characteristics of the systems are emphasized

Input devices: Keyboard, touch panel, light pens, graphic tablets, joysticks, track ball, data glove, digitizer, image scanner, mouse, voice systems.

Hard copy devices: Input and non-impact printers such as line printer, dot matrix, laser, inkjet, electrostatic, flat bed and drum plotters.

Video Display Devices: Refresh cathode ray tube, raster scan displays, random scan displays, colour CRT monitors, direct view storage tube, flat panel displays, 3-D view devices, virtual reality, raster scan systems, random scan systems, graphics monitors and work stations.

Scan conversion algorithms for line, circle and ellipse, Bresenham's algorithms, area filling techniques, character generation.

2-dimensional graphics: Cartesian and Homogeneous co-ordinate system, Geometric transformations (translation, scaling rotation, reflection, shearing, 2-dimensional viewing transformation and clipping (line, polygon and text).