SYLLABUS
B.COM. PART-II

GROUPING OF SUBJECTS AND SCHEME OF EXAMINATION

Subject		Max.	Min.
A. Foundation Course			
I. Hindi Language		75	26
II. English Language		75	26
B. Three Compulsory Groups			
Group-I			
I. Corporate Accounting	75	150	50
II. Company Law	75		
Group-II			
I. Cost Accounting	75	150	50
II. Principles of Bus. Management	75		
Group-III			
I. Business Statistics	75	150	50
II. Fundamental of Entrepreneurship	75		

B.Com.II year

COMPULSORY

Group - I PAPER - I (CORPORATE ACCOUNTING)

OBJECTIVE

This course enable the students to develop awareness about corporate accounting in conformity with the provisions of companies Act.

(As per company act 2013)

Proposed Syllabus

UNIT-I Issue, Forfeiture, and Re-issue of Shares : Redemption of preference shares; Issue and redemption of debentures.

UNIT-II Final Accounts (as per company act 2013) Liquidation of Company.

UNIT-III Valuation of Goodwill and Shares.

UNIT-IV Accounting for Amalgamation of Companies as per Indian Accounting Standard 14; Accounting for internal reconstruction - excluding intercompany holdings and re-construction schemes.

UNIT-V Consolidated Balance Sheet of holding companies with one subsidiary only.

SUGGESTED READINGS :

1. Dr. S.M. Shukla, Sahitya Bhawan Agra.
2. Dr. Mangal Mehta & Agrawal Published - Indore.
3. Dr. Karim Khanuja - Published - Agra.
4. Gupta R.L., Radhaswamy M; Company Accounts; Sultan Chand & Sons, New Delhi.

Group - II PAPER - I (COST ACCOUNT)

OBJECTIVE
This course exposes the students to the basic concepts and the tools used in cost accounting.

Proposed Syllabus
UNIT-I Introduction : Nature and scope of cost accounting ; Cost concepts and classfication; Methods and techniques; Installation of costing system; Concept of cost audit. Accounting for Material : Material Control; Concept and techniques; Pricing of material issues; Treatment of material losses.
UNIT-II Accounting for Labour : Labour cost control procedure; Labour turnover; Idle time and overtime; Methods of wage payment - time and piece rates; Incentive schemes. Accounting for overheads; Classification and departmentalization; Absorption of overheads; Determination of overhead rates; Under and over absorption, and its treatment.
UNIT-III Cost Ascertainment : Unit costing; Job, batch and contract costing.
UNIT-IV Operating costing; Process Costing - excluding inter - process profits, and joint and by - products.
UNIT-V Cost Records : Intergal and non - integral system; Reconciliation of cost and financial accounts; Break Even Point.

SUGGESTED READINGS :

1. M.L. Agrawal : Sahitya Bhawan Agra.
2. Maheshwari S.N. : Advanced Problems and Solutions in Cost Accounting; Sultan Chand, New Delhi.
3. Arora M.N. : Cost Accounting - Principles and Practice; Vikas, New Delhi.
4. Jain S.P. and Narang K.L. : Cost Accounting; Kalyani New Delhi.

Group - II - PAPER - II
PRINCIPLES OF BUSINESS MANAGEMENT

OBJECTIVE

This Course familiarizes the students with the basics of principles of management.

Proposed Syllabus	
UNIT-I	Introduction : Concept, nature, process, and significance of management; manage-ment roles (Mintzberg); An overview of functional areas of management; Development management thought: Classical and neo-classical systems; Concept approaches.
UNIT-II	Planning : Concept, process and types. Decision making - concept and Bounded rationality; Management by objectives; Corporate planning; Environment analysis and diagnosis; Strategy formulation.
UNIT-III	Organizing : Concept, nature, process and significance; Authority and resident relationships; Centralization and decentralization; Departmentation; Organization structure - forms and contingency factors.
UNIT-IV	Motivating and Leading People at work : Motivation - concept; Theories Herzberg, McGregor, and Ouchi; Financial and non- financial incentives. Leadership - concept and leadrship styles; Leadership theories (Tannenb Schmidt.); Likert's System Management. Communication - nature, process, networks, and barriers, Effective Communication.
UNIT-V	Managerial Control : Concept and process; Effective control system; Technical control - traditional and modern. Management of Change : Concept, nature, and process of planned Resistance to change; Emerging horizons of management in a environment.

SUGGESTED READINGS :

1. Dr. R.C. Agrawal, Agra.
2. Dr. S.C. Saxena, Agra.
3. Weihrich and Koontz, et al : Essentials of Management; Tata McGraw Hill, New Delhi.

Group - I - PAPER - II

COMPANY LAW

OBJECTIVE

This objective of this course is to provide basic knowledge of the provisions Companies Act. 2013, along with relevant case law.

Proposed Syllabus
UNIT-I Corporate personalities; Kinds of Companies, Nature & Scope, promotion on and incorporation of companies.
UNIT-II Memorandum of Association; Articles of Association; Prospectus, Shares; share capital - transfer and transmission.
UNIT-III Capital management - borrowing powers, mortgages and charges, debentures. Directors - Managing Director, whole time director, Appointment, Remuneration, and duties.
UNIT-IV Company meetings - kinds, Notice, quorum, voting, proxy, resolutions, minutes.
UNIT-V majority powers and minority rights; Prevention of oppression and mismanagement. Winding up - kinds and conduct.

SUGGESTED READINGS :

1. Singh Avtar : Company Law; Eastern Book Co., Lucknow.
2. Dr. S.M. Shukla, Shahitya Bhawan Agra.
3. Dr. R.C. Agrawal, Shahitya Bhawan Agra.
4. Kapoor N.D. : Company Law - Incorporating the Provisions of the comanies Amendment Act, 2013 Chand & Sons, New Delhi.

Group - III - PAPER - I

BUSINESS STATISTICS

OBJECTIVE

It enable the students to gain understanding of statistical techniques as are applicable to business.

Proposed Syllabus
UNIT-I Introduction : Statistics as a subject; Descriptive Statistics - compared to Inferential Statistics; Types of data; Summation operation; Rules of Sigma Σ operations, Analysis of University Data; Construction of a frequency distribution; Concept of central tendency.
UNIT-II Dispersion - and their measures; Partition values; Skewness and measures;
UNIT-III Analysis of Bivariate Data : Linear regression two variables and correlation.
UNIT-IV Index Number; Meaning, types, and uses; Methods of Constructing price and quantity indices (simple and aggregate); Tests of adequacy; Chain - base index numbers; Base shifting, splicing and deflating; Problems in constructing index numbers; Consumer price index. Analysis of Time Series : Cause of Variation in time series data; Components of a time series; Decomposition - Additive and Multiplicative models; Determination of trend - Moving Averages Method and method of least squares (including linear, second degree, parabolic, and exponential trend); Computation of seasonal indices by simple averages, ratio - to - trend, ratio - to - moving average, and link relative methods.
UNIT-V Forecasting and Methods : Forcasting - concept, types and importance; General approach to forecasting; Methods of forecasting; demand; Industry Vs Company sales forecast; Factors affecting company sales. Theory of Probability : as a concept; The three approaches to defining probability; Addition and multiplication laws of probability; Conditional Probability; Bayes' Theorem; Expectation and Variance of a random variable.

SUGGESTED READINGS :

1. S.M.Shukla, Shahitya Bhawan,Agara.
2. Statistical Analysis, Dr. Rajesh Shukla and J.B. Agrawal

Group - III PAPER - II

FUNDAMENTALS OF ENTREPRENEURSHIP

OBJECTIVE

It Provides exposure to the students to the entrepreneurial culture and industrial growth so as to preparing them to set up and manage their own small units.

Proposed Syllabus
UNIT-I Introduction : The entrepreneur: Definition; Emergence of entrepreneurialclass; Theories of entrepreneurship; Role of socio - economic environment; Characteri-stics.
UNIT-II Promotion of a Venture: Opportunities analysis: External environmental analysis economic, social and technological; Competitive factors; Legal requirements for establishment of a new unit, and raising of funds; Venture capital sources and documentation required.
UNIT-III Entrepreneurial Behavior : Innovation and entrepreneur: Entrepreneurial behavior and Psycho - Theories, Social responsibility.
UNIT-IV Entrepreneurial Development Programs (EDP) : EDP, their role, relevance, and achievements; Role of Government in organizing EDPs; Critical evaluation.
UNIT-V Role of Entrepreneur : Role of an entrepreneur in economic growth as an innovator, generation of employment opportunities, complementing and supplementing economic growth, bringing about social stability and balanced regional development of industries; Role in export promotion and import substitution, forex earnings, and augmenting and meeting local demand.

SUGGESTED READINGS :

3. Srivastava S.B. : A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
4. Tandon B.C. : Environment and Entrepreneur; Chugh Publications, Allahabad.
5. Prasanna Chandra : Project Preparation, Appraisal, Implementation; Tata McGrow Hill, New Delhi.

COMPUTER APPLICATION

MARKS DISTRIBUTION PAPER - I

INTERNET APPLICATION & E-COMMERCE

Proposed Syllabus

UNIT - I Introduction to HTML

Introduction to Internet & World Wide Web

Internet- Indian and the Internet, Profile of Indian Surfer, History of the Internet, Indian Internet History, Technological Foundation of Internet, Application in Internet Environment, Movement of files/data between two computers, TCP/IP, IP Addresses, Domain Name System, Domain Name Services, allocation of second level domains in India, Internet & India.

World Wide Web (WWW) - WWW consortium browsing and Information retrieval, exploring the WWW, address : URL.

UNIT - II

Introduction to HTML & Designing Web Page

Concept to Website, Web standards, What is HTML, HTML documents / file, HTML Editor, Explanation of the structure of Homepage, Elements in HTML Documents, HTML Elements, HTML Tags & Basic HTML Tags, viewing the source of web page & downloading the web page source, Extensible HTML, CSS, XML, XSL.

HTML Document Structure - Head Section

Illustration of Document Structure, Mark-up elements within the Head : BASE, ISINDEX, LINK, META, TITLE, SCRIPT.

UNIT - III

HTML Document Structure & HTML Forms

Body Section - Illustration, Body

elements, Backgrounds, TEXT BODY element, ADDRESS, BLOCKQUOTE, TABLE, COMMENTS, CHARACTER Emphasis modes, Logical styles, Physical Styles, FONT, BASEFONT and CENTER.

Image, Internal and External Linking Between Web Pages - IMG Elements, HEIGHT, WIDTH, ALT, ALLIGN, Illustration of IMG elements, Hypertext Anchors, NAME attribute in Anchor.

HTML Forms - Forms, Form tag, Form Structure, Input types, Drop down menu or select menu tags, image buttons.

UNIT - IV

Introduction to E-Commerce & Business Strategy in Electronic Age

E-Commerce - Scope & definition of language, E-commerce & Trade cycle, E-markets, E-Data Interchange, Internet Commerce, E-commerce in Perspective.

Business Strategy - The value chain, competitive advantage, business strategy, Case-Study : e-commerce in Passenger Air Transport.

UNIT - V

B to B e-Commerce & B to C e-Commerce Business to Business e-Commerce - Inter- organisational Transactions, Electronic markets, Electronic Data Interchange (EDI) - the nuts and bolts, EDI and business, Inter roganizational e- Commerce.

Business to Consumer e-Commerce - Consumer trade transactions.

The elements of e-Commerce - elements, e-visibility, e-shop online payments, delivering the goods, after sales service, Internet e-Commerce Security A web site evaluation model.

e-Business - Introduction, Internet Bookshops, Software Supplies & support, e-newspapers, internet banking, virtual auctions, online share dealing, gambling on net, e-diversity.

COMPUTER APPLICATION

PAPER - II

RELATIONAL DATABASE MANAGEMENT SYSTEM

Proposed Syllabus

UNIT - I

DATABASE SYSTEM CONCEPT & ENTITY RELATIONSHIP MODEL :

Operational data, why database, data independence, an Architecture for a Data base system, DDL & DML, Data Dictionary, Data Structures and Corresponding Operators, Data Models, The Relational approach, The Network approach, DBMS storage structure and access method. Entity-Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; strong and weak entities Generatization; Specialization and aggregation. Converting and ER-model into relational.

UNIT - II

Relational Database Management System Relational Model : Structure to Relational Database, Relational Algebra, The Domain Relational, Calculus, Extended Relational- Algebra Operation, Modification of database, Views **Relational Database Design** :- Pitfalls in Relational Database Design, Decomposition, Functional Dependencies, Normalization : INF, 2NF, BCNF, 3NF, 4NF, 5NF operations not involving

cursors, Operations involving cursors, dynamic statements, security & intergrity security specification in SQL.

UNIT - III

RELATIONAL DATABAWSE DESIGN :

Relational Algebra, Traditional Set Operations, Attributes Names for Derived Relations, special relational operations, further normalization, functional dependence. First, second and third normal forms, BCNF Forms, relations with more than one candidate key, Good and bad decompositions, fourth normal form, fifth normal form, De-normalization.

UNIT - IV

Introduction to RDBMS Software - Oracle

(a) **Introduction** : Introduction to personnel and Enterprises Oracle, Data Types, Commercial Query Language, SQL, SQL * PLUS.

(b) **DDL and DML** : Creating Table, Specify Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting, Deleting and Updating Rows in as Table, Where Clause, Operators, ORDER BY, GROUP Function, SQL Function, JOIN, Set Operation, SQL Sub Queries. Views : What is Views, Create, Drop and Retrieving data from views.

UNIT - V

(a) **Security** : Management of Roles, Changing Password, Granting Roles & Privilege, with drawing privileges.

(b) **PL/SQL** : Block Structure in PL/SQL, Variable and constants, Running PL/SQL in the SQL*PLUS, Data base Access with PL/SQL, Exception Handling, Record Data type in PL/S!L, Triggers in PL/SQL.

MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

B.A. Part-II
Paper-I
ADVANCED CALCULUS

UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests. Cauchy's integral test. Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series. Leibnitz's theorem. Absolute and conditional convergence.

UNIT-II Continuity, Sequential continuity, Properties of continuous functions, Uniform continuity, Chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.

UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.

UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis. Marcel Dekkar. Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals, Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis. S.Chand and Company, New Delhi.

B.A. Part-II
Paper-II
DIFFERENTIAL EQUATIONS

UNIT-I Series solutions of differential equations- Power series method. Bessel and Legendre functions and their properties-convergence, recurrence and generating relations, Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.

UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.

UNIT-IV Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.

UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extemals, Functionals dependent on higher order derivatives. Functionals dependent on more than one independent variable. Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.

Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.

Sufficient conditions for an Extremum- Jacobi and Legendre conditions. Second Variation. Variational principle of least action.

REFERENCES :

1. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand. Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi. 1977.
6. Jane Cronin, Differential equations. Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations. McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications. Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vots. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications. Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.

प्रपत्र

विषय / संकाय / प्रश्नपत्र का नामः **B.A. Part-II (Mathematics)**

Paper-I (ADVANCED CALCULUS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Paper-II (DIFFERENTIAL EQUATIONS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Paper-III (MECHANICS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Prof.H.K.Pathak Prof.B.S.Thakur Prof.M.A.Siddiqui Dr.S.K.Bhatt Dr.R.K.Mishra Dr.A.K.Mishra S.K.Gupta Sangeeta Pandey

MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

B.A. Part-II
Paper-I
ADVANCED CALCULUS

UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests. Cauchy's integral test. Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series. Leibnitz's theorem. Absolute and conditional convergence.

UNIT-II Continuity, Sequential continuity, Properties of continuous functions. Uniform continuity, Chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.

UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.

UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis. Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences. Series and Improper Integrals. Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis. S.Chand and Company, New Delhi.

B.A. Part-II
Paper-II
DIFFERENTIAL EQUATIONS

UNIT-I Series solutions of differential equations- Power series method. Bessel and Legendre functions and their properties-convergence, recurrence and generating relations. Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.

UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.

UNIT-IV Partial differential equations of second and higher orders, Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.

UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extemals, Functionals dependent on higher order derivatives, Functionals dependent on more than one independent variable, Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.

Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.

Sufficient conditions for an Extremum- Jacobi and Legendre conditions, Second Variation. Variational principle of least action.

REFERENCES :

1. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand. Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications, Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vots. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.

प्रपत्र

विषय / संकाय / प्रश्नपत्र का नामः **B.A. Part-II (Mathematics)**

Paper-I (ADVANCED CALCULUS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Paper-II (DIFFERENTIAL EQUATIONS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Paper-III (MECHANICS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Prof.H.K.Pathak Prof.B.S.Thakur Prof.M.A.Siddiqui Dr.S.K.Bhatt Dr.R.K.Mishra Dr.A.K.Mishra S.K.Gupta Sangeeta Pande

MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

B.A. Part-II
Paper-I
ADVANCED CALCULUS

UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests. Cauchy's integral test. Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series. Leibnitz's theorem. Absolute and conditional convergence.

UNIT-II Continuity, Sequential continuity, Properties of continuous functions. Uniform continuity, Chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.

UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.

UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis. Marcel Dekkar. Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals. Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis. S.Chand and Company, New Delhi.

B.A. Part-II
Paper-II
DIFFERENTIAL EQUATIONS

UNIT-I Series solutions of differential equations- Power series method. Bessel and Legendre functions and their properties-convergence, recurrence and generating relations. Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.

UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.

UNIT-IV Partial differential equations of second and higher orders, Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.

UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extemals, Functionals dependent on higher order derivatives. Functionals dependent on more than one independent variable, Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.

Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.

Sufficient conditions for an Extremum- Jacobi and Legendre conditions, Second Variation. Variational principle of least action.

REFERENCES :

1. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman. (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand. Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations. Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications, Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vots. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.

B.A. Part-II
Paper-III
MECHANICS

STATICS

UNIT-I Analytical conditions of Equilibrium, Stable and unstable equilibrium. Virtual work. Catenary.

UNIT-II Forces in three dimensions, Poinsot's central axis, Null lines and planes.

DYNAMICS

UNIT-III Simple harmonic motion. Elastic strings. Velocities and accelerations along radial and transverse directions, Projectile. Central orbits.

UNIT-IV Kepler's laws of motion. velocities and acceleration in tangential and normal directions, motion on smooth and rough plane curves.

UNIT-V Motion in a resisting medium, motion of particles of varying mass, motion of a particle in three dimensions, acceleration in terms of different co-ordinate systems.

REFERENCES :

1. S.L. Loney, Statics. Macmillan and Company, London.
2. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
3. S.L. Loney, An Elementary Treatise on the Dynamics of a particle and of rigid bodies. Cambridge University Press, 1956.

प्रपत्र

विषय / संकाय / प्रश्नपत्र का नामः **B.A. Part-II (Mathematics)**

Paper-I (ADVANCED CALCULUS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Paper-II (DIFFERENTIAL EQUATIONS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Paper-III (MECHANICS)
प्रश्नपत्र का पाठ्यक्रम यथावत है।

Prof.H.K.Pathak Prof.B.S.Thakur Prof.M.A.Siddiqui Dr.S.K.Bhatt Dr.R.K.Mishra Dr.A.K.Mishra S.K.Gupta Sangeeta Pandey

संशोधित पाठ्यक्रम

बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी.

भाग – दो, आधार पाठ्यक्रम

प्रश्न पत्र – प्रथम (हिन्दी भाषा) (पेपर कोड – 0171) पूर्णांक– 75

खण्ड – क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे – अंक–35

1. महात्मा गांधी – चोरी और प्रायश्चित
2. आचार्य नरेंद्र देव – युवकों का समाज में स्थान
3. वासुदेव शरण अग्रवाल – मातृभूमि
4. हरि ठाकुर – डॉ. खूबचंद बघेल
5. पं. माधवराव सप्रे – सम्भाषण–कुशलता

खण्ड–ख हिन्दी भाषा और उसके विविध रूप अंक–16

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड–ग हिन्दी की व्याकरणिक कोटियॉं अंक–24

संज्ञा, सर्वनाम, विशेषण, किया विशेषण,

समास, संधि एवं संक्षिप्तियां

अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन–

इकाई– 1 चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा

इकाई– 2 युवकों का समाज में स्थान : आचार्य नरेन्द्र देव / वित एवं वाणिज्य की भाषा, मशीनी भाषा

इकाई– 3 मातृभूमिः वासुदेवशरण अग्रवाल / संज्ञा सर्वनाम, विशेषण, किया विशेषण

इकाई– 4 डॉ. खूबचंद बघेल : हरि ठाकुर/समास, संधि,

इकाई– 5 सम्भाषण–कुशलता : पं. माधवराव सप्रे, / अनुवाद – अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियॉं

मूल्यांकन योजना –

प्रत्येक इकाई से एक–एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक इकाई को दो–दो खण्डों (कमश' 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं शेष पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न–पत्र के पूर्णांक 75 होंगे।

पाठ्यकम संशोधन का औचित्य : विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ–साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सके तथा व्याकरिणक एवं भाषा विषयक प्रस्तावित पाठ्यकम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सके।

अध्यक्ष– हिंदी अध्ययन मंडल

बी. ए. भाग 2 B. A. Part II

राजनीति विज्ञान Political Science

प्रथम प्रश्नपत्र : राजनीतिक चिन्तन Paper I : Political Thought

इकाई 1 : प्लेटो : आदर्श राज्य – न्याय, शिक्षा, साम्यवाद, दार्शनिक शासक ।

अरस्तू : राज्य, दासप्रथा, नागरिकता , क्रान्ति ।

Unit 1 : Plato : Ideal State : Justice, Education, Communism , Philosopher King.

Aristotle : State, Slavery, Citizenship , Revolution.

इकाई 2 : मैकियावेली : युग का शिशु, धर्म व नैतिकता, राजा के कर्तव्य और आचरण।

हॉब्स : सामाजिक समझौता सिद्धान्त – लेवियाथन । लॉक : सामाजिक समझौता सिद्धान्त ।

रुसो : सामाजिक समझौता सिद्धान्त , सामान्य इच्छा ।

Unit 2 : Machiavelli : Child of his times, Religion and Morality, Duties and Conduct of King. Hobbes : Social Contract Theory: Leviathan. Locke : Social Contract Theory. Rousseau : Social Contract Theory and General Will.

इकाई 3 : बेंथम : उपयोगितावाद । मिल : उपयोगितावाद में संशोधन, स्वतंत्रता और प्रतिनिधि शासन ।

ग्रीन : राजनीतिक विचार । मार्क्स : राजनीतिक विचार ।

Unit 4 : Bentham : Utiliterianism. Mill : Amendment in Utiliterianism. Liberty and Representative Government. Green : Political Thoughts. Marx : Political Thoughts.

इकाई 4 : आदर्शवाद, व्यक्तिवाद, उदारवाद, समाजवाद, फासीवाद : विशेषताएं और आलोचना ।

Unit 4 : Idealism, Individualism, Liberalism, Socialism, Fascism : Features and Criticism.

इकाई 5 : मनु और कौटिल्य : सप्तांग सिद्धान्त, राजा और राजपद, प्रशासकीय व्यवस्था, राज्यमण्डल ।

गांधी : सत्य, अहिंसा, सत्याग्रह एवं राजनीतिक विचार । अम्बेडकर : राजनीतिक एवं सामाजिक विचार

दीनदयाल उपाध्याय : एकात्ममानववाद ।

Unit 5 : Manu and Kautilya : Saptang Theory, King and Kingship, Administrative System, Rajyamandal.

Gandhi : Truth , Non violence , Satyagrah and Political thoughts.

Ambedkar : Political and Social thoughts.

Deen Dayal Upadhyay : Akatmamanavvad.

बी.ए.द्वितीय वर्ष
प्रथम प्रश्न पत्र राजनीतिक चिन्तन

क्र	पुस्तक का नाम	लेखक का नाम
1.	राजनीतिक चिन्तन की रूपरेखा	ओ.पी. गावा
2.	राजनीतिक चिन्तन का इतिहास	जीवन मेहता
3.	राजनीतिक चिन्तन का इतिहास	बी.एल. फाडिया
4.	पाश्चात्य एवं आधुनिक राजनीतिक चिन्तन का इतिहास	प्रभू दत्त शर्मा
5.	पाश्चात्य राजनीतिक चिन्तन	जे.पी. सूद
6.	भारतीय राजनीतिक चिन्तन	वी.पी. वर्मा
7.	भारतीय राजनीतिक चिन्तन	अवस्थी एवं अवस्थी
8.	भारतीय राजनीतिक चिन्तन	ओ.पी. गावा
9.	पालाटकल थाट	सा.एल. बपर
10.	हिस्ट्री ऑफ पालीटिकल थियरी	जार्ज एच सेबाइन
11.	रिसेन्ट पालीटिकल थॉट	फान्सीस डब्लू कोकर
12.	मास्टर ऑफ पालीटिकल थॉट	माईकल बी. फास्टर
13.	ग्रेट पालीटिकल थॉट	विटियम इवेस्टीन

Reference:-

- W.A. Dunning: **A History of Political Theories,** (Vols. I, II & III), New York: Mcmillan, 1930
- G.H. Sabine: **A History of Political Theory** (English & Hindi), New Delhi: Oxford & IBH Publishing Co., 1963
- C.L. Wayper: **Political Thought** (English & Hindi), Bombay: B.I. Publications Pvt. Ltd., 1974
- E. Barker: **Greek Political Theory: Plato and His Predecessors,** London: Methuen & Co. Ltd., 1918
- **Political Thought in England,** London: Thornton Butterworth Ltd., 1928
- Gettell: **History of Political Thought** (English & Hindi)
- K.P. Jaiswal: **Hindu Polity** (English & Hindi), Banglore: Banglore Printing & Publishing Co., 1955
- V.P. Verma: **Modern Social and Political Thought of India,** Agra: L.N. Agrawal Educational Publishers, 1961
- N.C. Bandopadhyaya: **Development of Hindu Polity and Political Theory,** New Delhi: Munshiram & Manoharlal, 1980
- Arvind Sharma, **Modern Hindu Thought: The Essential Texts,** New Delhi: OUP, 2002
- John Dunn, Western Political Theory in the Face of the Future, New York: Cambridge University Press, 1993
- Jonathan Wolff, An Introduction to Political Philosophy, Revised Edition, Oxford: OUP, 2006

- Mark N. Hagopian, Ideals and Ideologies of Modern Politics, New York& London: Longman, 1985
- John Elster (Ed.) Karl Marx: A Reader, New York: OUP, 1977
- Thomas Sowell, Marxism: Philosophy and Economics, New York: Quill, 1985
- Brian R. Nelson, **Western Political Thought**, Delhi NCR: Pearson Education Ltd., 1996
- Vishwanath Mishra, **Rajavidya evam Rajanitishashtra**, Sagar: Vishwavidyalaya Prakashan, 2007

Brian R. Nelson, **Western Political Thought**, Delhi NCR: Pearson Education Ltd., 1996

बी. ए. भाग 2 B. A. Part II

राजनीति विज्ञान Political Science

द्वितीय प्रश्नपत्र : तुलनात्मक शासन एवं राजनीति Paper II : Comparative Government and Politics

इकाई 1 : ब्रिटिश संविधान : विकास, विशेषताएं, कार्यपालिका , व्यवस्थापिका, न्यायपालिका ।

Unit 1 : British Constitution : Evolution , Salient Features, Executive, Legislature and Judiciary.

इकाई 2 : संयुक्त राज्य अमेरिका का संविधान : विशेषताएं, कार्यपालिका , व्यवस्थापिका, न्यायपालिका , शक्ति पृथक्करण व नियंत्रण संतुलन का सिद्धान्त ।

Unit 2 : Constitution of United States of America : Salient Features, Executive, Legislature and Judiciary. Theory of Separation of Powers and checks and balances.

इकाई 3 : स्विटजरलैण्ड का संविधान : विशेषताएं, कार्यपालिका , व्यवस्थापिका, न्यायपालिका , प्रत्यक्ष प्रजातन्त्र। Unit 3 : Constitution of Switzerland : Salient Features, Executive, Legislature and Judiciary. Direct Democracy.

इकाई 4 : चीन का संविधान :विशेषताएं, कार्यपालिका , व्यवस्थापिका, न्यायपालिका, साम्यवादी दल ।

Unit 4 : Constitution of China : Salient Features, Executive, Legislature and Judiciary. Communist Party.

इकाई 5 : तुलनात्मक राजनीति : अर्थ, परिभाषा, । ईस्टन का व्यवस्था सिद्धान्त, आमण्ड का संरचनात्मक–प्रकार्यात्मक उपागम । राजनीतिक विकास, राजनीतिक समाजीकरण, राजनीतिक संस्कृति की अवधारणा।

Unit 5 : Comparative Politics : meaning , Definition. System Theory of David Easton, Structural -functional Approach of Almond. Concept of Political Development, Political Socialisation, Political Culture

बी.ए. द्वितीय वर्ष
प्रश्न पत्र
तुलनात्मक शासन एवं राजनीति

सन्दर्भ ग्रन्थ सूची:–

क्र	पुस्तक का नाम	लेखक का नाम
1.	तुलनात्मक राजनीति एवं राजनीतिक संस्थाए	सी बी गेना
2.	तुलनात्मक राजनीति	जे.सी. जौहरी
3.	तुलनात्मक राजनीति	पी.डी शर्मा
4.	तुलनात्मक राजनीति	एस.आर. महेष्वरी
5.	तुलनात्मक राजनीति संस्थाएं और प्रक्रियांए	तपन बिस्वाल
6.	कम्परेटीव गर्वनेमेंट	एस.ई. फाईनर

Reference :-

- Anup Chand Kapur, K.K. Mishra **Select Constitutions** (U.K., U.S.A., France, Canada, Switzerland, Japan, China, India), S. Chand & Company Ltd., New Delhi, 2001.
- B.C. Rai, **The World Constitution: A Comparative Study** (U.S.A., U.K., Soviet Union, Switzerland, Japan, France, Australia, Canada, India, Pakistan), Prakashan Kendra, Lucknow, 2001
- G. Almond et.al., **Comparative Politics Today : A World View**, 7th Edition, New York/London, Harper Collins, 2000
- R. Hague & M. Harrop, **Comparative Government and Politics: An Introduction,** 5th Edition, New York, Palgrave, 2001
- A Bobler and J. Seroka (eds.); **Contemporary Political System: Classification and Typologies,** Boulder Colorado, Lyne Reinner Publishers, 1990.
- Richa Sakma, **Russian Politics and Society,** London: Routledge, 1996.
- Anuradha Chenoy, **The Making of New Russia,** New Delhi, Har-Anand Publications, 2000
- Shashi Kant Jha & Bhaswati Sarkar (eds.) **Amidst Turbulence & Hope, Transition Russia and Eastern Europe,** New Delhi, 2002
- Thomas F. Remington, **The Russian Parliament: Institutional Evolution in a Transitional Regime,** 1989-1999, Yale University Press, 2002
- Gabrial A. Almond and G. Bingham Powell (eds.) **Comparative Politics Today: A World view,** Harper Collins Publishers, 2002

- **The Russian Constitution,** Text as adopted in 1993
- J. C. Johri, **'New Comparative Government'**, Lotus Press Publisher, 2008.
- Vidya Bhushan and Vishnu Bhagwan, **World Constitutions,** New Delhi

REVISED SYLLBUS

B.A. Part- II (Economics)

Subject : Macro Economics, Paper-I (Code: 0181)

UNIT 1

National Income: Concept and measurement of national income, Economic welfare and national income, Social accounting. Circular flow of income, National income accounting, Green accounting Classical theory of employment, Say's law of market Keynesean theory of employment.

UNIT 2

Consumption Function - Average and marginal propensity to consume, Keynes's psychological law of consumption. Determinants of the consumption function. The saving function. The investments multiplier and its effectiveness, The investment Function - marginal efficiency of capital, Autonomous and induced investment. Saving and investment equality.

UNIT 3

Nature and Characteristics of trade cycle, Theories of trade cycle: Hawtrey's monetary theory, Hayek's over investment theory, Keynes's view on trade cycles, Schumpeter's theory of innovation, Samuelson and Hicks multiplier accelerator model, Control of trade cycle.

UNIT 4

International Trade - Inter-regional and international trade, Comparative advantage cost theory, Opportunity cost theory and Heckscher Ohlin theory, International trade and economic development, Tariffs & import quotas, Concept of optimum tariff. Balance of trade & balance of payment., Concept & components of BOP, Equilibrium & disequilibrium in BOP, Relative merits & demerits of devaluation, Foreign trade multiplier.

UNIT 5

Functions and objectives of international monetary fund, World Bank and World Trade Organization, International monetary reforms and India, Foreign trade in India recent change in the composition and direction of foreign trade, India's balance of payment, Export promotion and import substitution in India. Multinational Corporation and India.

BASIC READING LIST -

- Ackley, G. (1976) – " Macro Economics; Theory and Policy," Mcmillan Publishing Company, Newyork.

- Day, A.C.L. (1960) – "Outline of Monetary Economics," Oxford University Press Oxford.

- Gupta, S.B. (1994)- "Monetary Economics," S. Chand and Co., Delhi

- Heijdra, B.J. and F.V. Ploeg (2001) – "Foundations of Modern Macro-economics," Oxford University Press, Oxford.

- Lewis, M.K. and P.D. Mizan (2000) –" Monetary Economics, " Oxford University Press, New Delhi.

- Shapiro, E. (1996) – "Macroeconomic Analysis," Galgotia Publications, New Delhi .

READING LIST - - Ackley, G. (1976)," Macroeconomics : Theory and Policy", Macmillan Publishing Company, New York. -

Day, A.C.L. (1960) –" Outline of Monetary Economics," Oxford University Press Oxford.

- Gupta, S.B. (1994)- "Monetary Economics," S. Chand and Co., Delhi

- Heijdra, B.J. and F.V. Ploeg (2001) –" Foundations of Modern Macro-economics, " Oxford University Press, Oxford.

- Lewis, M.K. and P.D. Mizan (2000) - Monetary Economics, Oxford University Press, New Delhi.

- Shapiro, E. (1996) – "Macroeconomic Analysis," Galgotia Publications, New Delhi.

- Dillard, D. (1960)- "The Economics of John Mayanand Keynes, "Crossby Lockwood and Sons, London.

- Hanson, A.H. (1953), "A Guide to Keynes, " McGraw Hill, New York.

- Higgins, B. (1963), "Economic Development; Principles, Problems and Policies, " Central Book Depot, Allahbad.

- Keynes, J.M. (1936), "The General Theory of Employment, Interest and Money," Macmillan, London.

- Kindleberger, C.P. (1958), "Economic Development," McGraw Hill Book company, New York.

Powelson, J.P.C. (1960), " National Income and Flow of Funds Analysis," McGraw Hill, New York.

==*==

REVISED SYLLBUS

B.A. Part- II (Economics)

Subject : Money, Banking and Public Finance, Paper-II (Code: 0182)

UNIT 1

Basic concepts : Money - meaning and functions, Gresham's law; Quantity theory of money- Cash transaction and cash balance approaches; Value of Money, Inflation, deflation and reflation, types, causes and effects on different sectors of the economy; Demand pull and cost push inflation; Measures to control inflation. Phillips curve, Concept of demonetization.

UNIT 2

Commercial banking- meaning and types; Functions of commercial banks, The process of credit creation, purpose and limitations; Liabilities and assets of banks; Evolution of commercial banking in India after independence; A critical appraisal of the progress of commercial banking after Nationalization, Functions of a central bank; Quantitative and qualitative methods of credit control; Bank rate policy; Open market operations; Variable reserve ratio and selective methods. Role and functions of the Reserve bank of India; Objectives and limitations of monetary policy with special reference to India.

UNIT 3

Meaning and scope of public finance; Distinction between private and public finance; public goods v/s private goods; The Principle of maximum social advantage; Role of the government in economic activities ; Public expenditure - Meaning, classification and principles of public expenditure; Trends in public expenditure and causes of growth of public expenditure in India.

UNIT 4

Sources of Public revenue; taxation - Meaning, Canons and classification of taxes; Division of tax burden. The benefit and ability to pay approaches; Impact and incidence of taxes; Taxable capacity; Effects of taxation; Characteristics of a good tax system; Equity and Justice in Taxation, Major trends in tax revenue of the Central and State Government in India.

UNIT 5

Public debt and financial administration: Sources of public borrowing, Effects of public debt. Methods of debt redemption. The public budget- Kinds of budget, Economic and functional classification of the budget; Preparation and passing of budget in India.

READING LIST -

- Ackley G. (1978), "Macroeconomics : Theory and Policy," Macmillan Publishing Co., New York.
- Bhargavas B.H. (1981), "The Theory and Working of Union Finance in India," Chaitanya Publishing House Allaybad.
- Gupta, S.B. (1994)," Monetary Economics", S. Chand & Company, New Delhi.
- Houghton. E.W. (Ed.) (1988), "Public Finance." Pengum, Battinore - Jha R. (1998), Modorn Public Economics. Routledge, London.
- Mithani, D.M. (1981), "Modern Public Finance," Himalaya Publishing House, Mumbai.
- Musgrave, R.A. and P.B. Musgrave (1976)," Public Finance in Theory and Practice", McGraw Hill, Kogakusha, Tokyo.
- Shapiro, E. (1996), "Macroeconomics Analysis," Galgotia Publications, New Delhi.

ADDITIONAL READING LIST

- Day, A.C.L. (1960), "Outline of Monetary Economics, " Oxford University Press, Oxford.
- De Kock, M.H. (1960)," Central Banking." Staples Press, London.
- Due, J.E. (1963), "Government Finance," Irwin, Homewood.
- Government of India, "Economic Survey" (Annual), New Delhi
- Halm, G.N. (1955), "Monetary Theory," Asia Publishing House, New Delhi

इतिहास अध्ययनशाला
पं.रविशंकर शुक्ल विश्वविद्यालय, रायपुर
केन्द्रीय अध्ययन मण्डल की बैठक (इतिहास)

विषय– इतिहास
संकाय– सामाजिक विज्ञान
कक्षा का नाम – बी.ए. द्वितीय वर्ष

प्रश्न पत्र – प्रथम
प्रश्न पत्र का नाम –भारत का इतिहास 1206 ई. से 1761 ई. तक

नवीन संशोधित पाठ्यक्रम

इकाई–1

1. सल्तनत कालीन एवं मुगल कालीन इतिहास के स्त्रोत
2. दास वंश– ऐबक, इल्तुतमिश, बलबन
3. खिलजी वंश– अलाउद्दीन खिलजी–सैनिक उपलब्धियां, राजस्व व्यवस्था एवं बाजार नियंत्रण
4. तुगलक वंश– मोहम्मद बिन तुगलक,

इकाई–2

5. मुगल साम्राज्य की स्थापना – बाबर एवं हुमायूँ
6. शेरशाह सूरी का प्रशासन
7. अकबर की राजपूत नीति
8. मुगल शासकों की धार्मिक नीति – अकबर से औरंगजेब तक

इकाई–3

9. मुगल प्रशासन
10. मध्यकालीन सामाजिक एवं आर्थिक दशा
11. भक्ति आंदोलन
12. सूफीवाद

इकाई–4

13. मध्यकालीन साहित्य, कला एवं स्थापत्य
14. विजयनगर राज्य
15. बहमनी राज्य
16. शिवाजी का प्रशासन

इकाई–5

17. पेशवा– बालाजी विश्वनाथ, बालाजी बाजीराव
18. पानीपत का तृतीय युद्ध– कारण एवं परिणाम
19. मराठों के अधीन छत्तीसगढ़ – बिम्बाजी भोसले
20. छत्तीसगढ़ में मराठा प्रशासन

इतिहास अध्ययनशाला
पं.रविशंकर शुक्ल विश्वविद्यालय, रायपुर
केन्द्रीय अध्ययन मण्डल की बैठक (इतिहास)

विषय– इतिहास　　प्रश्न पत्र – द्वितीय
संकाय– सामाजिक विज्ञान
कक्षा का नाम – बी.ए. द्वितीय वर्ष　　प्रश्न पत्र का नाम –विश्व का इतिहास 1890 ई. से 1964 ई. तक

नवीन संशोधित पाठ्यक्रम

इकाई–1
1. विलियम द्वितीय की विश्व राजनीतिक
2. अफ्रीका का विभाजन
3. जापान का आधुनिकीकरण– मेईजी पुनर्स्थापना एवं जापान का आधुनिकीकरण
4. रूस–जापान युद्ध : कारण एवं परिणाम

इकाई–2
5. चीन अफीम युद्ध एवं चीन की क्रांति, साम्यवाद
6. पूर्वी समस्या –बर्लिन कांग्रेस, युवा तुर्क आंदोलन
7. बाल्कन युद्ध : कारण एवं परिणाम
8. प्रथम विश्व युद्ध : कारण एवं परिणाम

इकाई–3
9. वर्साय की संधि
10. रूस की क्रांति 1917 ई.
11. फासीवाद – मुसोलिनी
12. नाजीवाद –हिटलर

इकाई–4
13. जापान का सैन्यवाद
14. राष्ट्रसंघ : स्थापना एवं विल्सन के 14 सूत्र
15. द्वितीय विश्वयुद्ध : कारण एवं परिणाम
16. संयुक्त राष्ट्र संघ – स्थापना एवं संगठन, उपलब्धियां

इकाई–5
17. शीत युद्ध
18. गुट निरपेक्ष आंदोलन एवं पंचशील सिद्धान्त
19. विश्व शांति की चुनौती– कोरिया एवं फिलीस्तीन समस्या
20. एक ध्रुवीय विश्व

बी.ए. द्वितीय वर्ष , इतिहास
प्रश्न पत्र– प्रथम
भारत का इतिहास 1206 ई. से 1761 ई. तक

इकाई–1

1. सल्तनत कालीन एवं मुगल कालीन इतिहास के स्त्रोत
2. दास वंश– ऐबक, इल्तुतमिश, बलबन
3. खिलजी वंश– अलाउद्दीन खिलजी–सैनिक उपलब्धियां, राजस्व व्यवस्था एवं बाजार नियंत्रण
4. तुगलक वंश– मोहम्मद बिन तुगलक

इकाई–2

5. मुगल साम्राज्य की स्थापना – बाबर एवं हुमायूँ
6. शेरशाह सूरी का प्रशासन
7. अकबर की राजपूत नीति
8. मुगल शासकों की धार्मिक नीति – अकबर से औरंगजेब तक

इकाई–3

9. मुगल प्रशासन
10. मध्यकालीन सामाजिक एवं आर्थिक दशा
11. भक्ति आंदोलन
12. सूफीवाद

इकाई–4

13. मध्यकालीन साहित्य, कला एवं स्थापत्य
14. विजयनगर राज्य
15. बहमनी राज्य
16. शिवाजी का प्रशासन

इकाई–5

17. पेशवा– बालाजी विश्वनाथ, बालाजी बाजीराव
18. पानीपत का तृतीय युद्ध– कारण एवं परिणाम
19. मराठों के अधीन छत्तीसगढ़ – बिम्बाजी भोसले
20. छत्तीसगढ़ में मराठा प्रशासन

संदर्भ ग्रन्थ सूची:-

1. श्रीवास्तव ए.एल — भारत का इतिहास (अग्रेजी अनुवाद)
2. श्रीवास्तव ए.एल — दिल्ली सल्तनत (अग्रेजी अनुवाद)
3. श्रीवास्तव ए.एल — मुगलकालीन भारत (अग्रेजी अनुवाद)
4. हबीबुल्लाह — भारत में मुस्लिम शासन की बुनियाद
5. मजूमदार, राय चौधरी एवं दत्त — भारत का वृहत् इतिहास खंड–2
6. पंजाबी बी. के. — भारत का इतिहास (1206–1761)
7. हबीब एवं निजामी — दिल्ली सल्तनत
8. वर्मा हरिशचंद — मध्यकालीन भारत (750–1540)
9. शर्मा कालूराम एवं व्यास प्रकाश — मध्यकालीन भारतीय संस्कृति
10. सक्सेना आर.के. — दिल्ली सल्तनत
11. राधेशरण — भारत की सामाजिक एवं आर्थिक संरचना और संस्कृति के मूल तत्व (आदिकाल से 1950 ईस्वी तक)
12. पाण्डेय ए.बी. — पूर्व मध्यकालीन भारत
13. पांडेय ए.बी. — उत्तर मध्यकालीन
14. ईश्वरी प्रसाद — मुगलकालीन भारत
15. श्रीवास्तव एच.एस. — मुगलकालीन शासन व्यवस्था
16. सरदेसाई जी.एस. — मराठों का नवीन इतिहास खंड–2
17. सरकार जे.एन. — शिवाजी और उनका युग
18. त्रिपाठी आर.पी. — मुगल साम्राज्य का इतिहास और पतन
19. मित्तल ए.के. — यूनिफाइड इतिहास (प्रारंभ से 1761 ई.)
20. मित्तल ए.के — यूनिफाइड इतिहास प्राचीन काल से 1950 ईस्वी तक
21. Dey, U.N. — Mughal Government
23. Habib & Nizami — Comprehensive History of India
24. Majumdar, R. C. & Dutt — An Advanced History of India Vol-II
25. Mehta — Advanced Study in the Medival History of India
26. Pandey A.B. — Early Medieval India
27. Pandey A.B — Medieval India
28. Prasad Ishwari — Medieval India
29. Sarkar, J.N. — Shivaji and his Time
30. Satish Chandra — Madhyakalin Bharat
31. Niraj Shrivastav — Madhyakalin Bharat Prashasan,Samaj ,Sanskriti
32. पी.एल. मिश्र — मराठाकालीन छत्तीसगढ़
33. भगवान सिंह वर्मा — छत्तीसगढ़ का इतिहास

बी.ए. द्वितीय वर्ष इतिहास
प्रश्न पत्र – द्वितीय
विश्व का इतिहास 1890 ई. से 1964 ई. तक

इकाई–1

1. विलियम द्वितीय की विश्व राजनीतिक
2. अफ्रीका का विभाजन
3. जापान का आधुनिकीकरण– मेईजी पुनर्स्थापना एवं जापान का आधुनिकीकरण
4. रूस–जापान युद्ध : कारण एवं परिणाम

इकाई–2

5. चीन अफीम युद्ध एवं चीन की क्रांति, साम्यवाद
6. पूर्वी समस्या –बर्लिन कांग्रेस, युवा तुर्क आंदोलन
7. बाल्कन युद्ध : कारण एवं परिणाम
8. प्रथम विश्व युद्ध : कारण एवं परिणाम

इकाई–3

9. वर्साय की संधि
10. रूस की क्रांति 1917 ई.
11. फासीवाद – मुसोलिनी
12. नाजीवाद –हिटलर

इकाई–4

13. जापान का सैन्यवाद
14. राष्ट्रसंघ : स्थापना एवं विल्सन के 14 सूत्र
15. द्वितीय विश्वयुद्ध : कारण एवं परिणाम
16. संयुक्त राष्ट्र संघ – स्थापना एवं संगठन, उपलब्धियां

इकाई–5

17. शीत युद्ध
18. गुट निरपेक्ष आंदोलन एवं पंचशील सिद्धान्त
19. विश्व शांति की चुनौती– कोरिया एवं फिलीस्तीन समस्या
20. एक ध्रुवीय विश्व

संशोधित

बी. ए. भाग–2

हिन्दी साहित्य

प्रथम प्रश्न पत्र

अर्वाचीन हिन्दी काव्य (पेपर कोड– 0173) पूर्णांक– 75

प्रस्तावना– आधुनिक काव्य आधुनिकता की समस्त विशेषताओं को समेटे हुए है। स्वतंत्रता प्राप्ति के पूर्व की भाव– भाषा, शिल्प, अन्तर्वस्तु सम्बन्धी समस्त विकास धारा यहां सजीव रूप में देखी जा सकती है। इसे अनदेखा करना मनुष्य की विकास यात्रा को नजर अंदाज करना है। इस यात्रा के साक्षात्कार के लिए आधुनिक काव्य का अध्ययन अपेक्षित ही नहीं अपितु अनिवार्य हैं।

पाठ्य विषय–

1. मैथिलीशरण गुप्त – भारत– भारती की कविताएँ
2. सूर्यकान्त त्रिपाठी निराला –
   (1) सखि बसन्त आया।
   (2) वर दे, वीणा वादिनी वर दे।
   (3) हिन्दी के सुमनों के प्रति पत्र।
   (4) तोड़ती– पत्थर।
   (5) राजे ने अपनी रखवाली की।
3. सुमित्रानंदन पंत –
   (1) बादल।
   (2) परिवर्तन 2 पद (1.खोलता इधर जन्मलोचन
   2. आज का दुख कल का आल्हाद)
   (3) ताज।
   (4) झंझा में नीम।
   (5) भारत माता।
4. माखन लाल चतुर्वेदी –
   (1) बलि पंथी से ।
   (2) साँझ और ढोलक की थापें।
   (3) मैं बेच रही हूँ, दही।
   (4) उलाहना।
   (5) निः शस्त्र सेनानी।
5. स. ही. वात्स्यायन अज्ञेय –
   (1) सबेरे उठा तो धूप खिली थी।
   (2) साम्राज्ञी का नैवेद्य दान।
   (3) घर।
   (4) चांदनी जी लो।
   (5) दूर्वांचल।

द्रुतपाठ हेतु निम्न कवियों का अध्ययन किया जाएगा, जिन पर लघुउत्तरीय प्रश्न पूछे जायेंगे–

1. अयोध्या सिंह उपाध्याय "हरिऔध"।
2. सुभद्रा कुमारी चौहान। 3. श्रीकांत वर्मा।

अंक विभाजन–	व्याख्याएं (3)	– 21 अंक
	आलोचनात्मक प्रश्न (2)	– 24 अंक
	लघुउत्तरीय प्रश्न (5)	– 15 अंक
	वस्तुनिष्ठ (15)	– 15 अंक
	कुल अंक	75 अंक

इकाई विभाजन–

इकाई– 1 व्याख्या
इकाई– 2 गुप्त, निराला
इकाई– 3 पंत, चतुर्वेदी, अज्ञेय
इकाई– 4 दुतपाठ के कवि एवं आधुनिक काव्य धारा का इतिहास
(राष्ट्रीय काव्य धारा, छायावाद, प्रगतिवाद, प्रयोगवाद, नई कविता)
इकाई– 5 वस्तुनिष्ठ (सम्पूर्ण पाठ्यक्रम से)

संशोधित

बी. ए. भाग–2

हिन्दी साहित्य

द्वितीय प्रश्न पत्र

हिन्दी निबंध तथा अन्य गद्य विधाएँ(पेपर कोड– 0174) पूर्णांक– 75

पाठ्य विषय–

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक नाटक, पांच प्रतिनिधि निबंध और पाँच एकांकी का निर्धारण किया गया है।

नाटक– अंधेरी नगरी– भारतेन्दु हरिश्चन्द्र

निबंध– 1. कोध – आचार्य रामचन्द्र शुक्ल।
2. बसन्त – डॉ. हजारी प्रसाद द्विवेदी।
3. उस अमराई ने राम– राम कही है – डॉ. विद्यानिवास मिश्र।
4. काव्येषु नाट्यम रम्यम् – बाबू गुलाब राय।
5. बेईमानी की परत – हरिशंकर परसाई

एकांकी– 1. औरंगजेब की आखिरी रात – डॉ. रामकुमार वर्मा
2. स्ट्राईक – भुनेश्वर
3. एक दिन – लक्ष्मीनारायण मिश्र
4. दस हजार – उदयशंकर भट्ट
5. मम्मी ठकुराईन – डॉ. लक्ष्मीनारायण लाल

द्रुत पाठ के लिए तीन गद्यकारों का अध्ययन किया जायेगा, जिन पर लघुउत्तरीय प्रश्न पूछे जायेंगे।
1. राहुल सांकृत्यायन 2. महादेवी वर्मा 3. हबीब तनवीर

अंक विभाजन– व्याख्याएं (3)	– 21 अंक
आलोचनात्मक प्रश्न (2)	– 24 अंक
लघुउत्तरीय प्रश्न (5)	– 15 अंक
वस्तुनिष्ठ (15)	– 15 अंक
कुल अंक	75 अंक

इकाई विभाजन–
इकाई– 1 व्याख्या
इकाई– 2 अंधेरी नगरी एवं कोध, वसन्त, उस अमराई ने राम– राम कही हैं।
इकाई– 3 औरंगजेब की आखिरी रात, स्ट्राईक, एक दिन, दस हजार, मम्मी ठकुराईन
इकाई– 4 द्रुतपाठ के गद्यकार– राहुल सांकृत्यायन, महादेवी वर्मा, हबीब तनवीर।
इकाई– 5 वस्तुनिष्ठ (समग्र पाठ्य विषय से)

Revised syllabus

SOCIOLOGY 2018-2019

B.A. PART-II
PAPER – I
SOCIOLOGY OF TRIBAL SOCIETY
(Paper Code-0185)

UNIT-I **Tribes:** Concepts, Characteristics, Tribes and Schedule Tribes, Distinction between Tribe and Caste.

UNIT-II **Classification of Tribal people**: Food gatherers and hunters, Shifting cultivates, Nomads, Peasant settled Agriculturists and Artisans.

UNIT-III **Socio-cultural Profile**: Kinship, Marriage, Family, Religion and belief cultural traditions.

UNIT-IV **Tribal sensitization:** Tribal Mobility, Schemes of Tribal Development ,Various Tribal Movements.

UNIT-V **Problems of Tribal People**: Poverty, Illiteracy, Indebtedness, Agrarian issues, Exploitation study of tribal communities in Chhattisgarh with special reform to Particularly Venerable Tribal Groups (PVTG).

ESSENTIAL READINGS :-

1 Vidyarthi, L.P. 1965. Cultural Counters of Tribal Bihar, Punthi Pustak, Culcutta.
2 Bose, N.K. 1971. Tribal Life in India, National Book Trust, New Delhi.
3 Das, R.K. 1988. The Tribal Social Structure, Inter India Publications, New Delhi.
4 Dubey, S.C.. 1977. Tribal Heritage of India, Ethnicity, Identity and Interaction, Vol.1, Vikash Publishing House, Delhi.
5 Elwin, Varrier. 1989. The Tribal World of Verrier Elwin: An Autobiography, Oxford, New Delhi.
6 Russell, R.V. and Hira Lal. 1916. The Tribes and Castes of Central Province of India, 4 Vols. Cosmo Publications, New Delhi.

प्रपत्र –3

Class : B.A. Part-II

Faculty : Social Science

Subjects : Sociology

Paper : First (Paper code-0185)

वर्तमान पाठ्यकम	नवीन संशोधित पाठ्यकम	नवीन संशोधित पाठ्यकम का औचित्य
Society in India (Paper code-0185)	Sociology of Tribal Society	1. यह प्रश्न पत्र पहले बी.ए. भाग तीन का प्रथम पेपर Sociology of Tribal Society था जिसे अब बी.ए. भाग दो का प्रथम पेपर रखा गया जिससे पाठ्यकम में कमानुसार निरंतरता बनी रहे। 2. छत्तीसगढ़ जनजातीय बाहुल्य राज्य है लगभग 32% जनसंख्या जनजातियों की है अतः इनके बारे में अध्ययन अध्यापन अति आवश्यक है।

SOCIOLOGY

B.A. PART-II

PAPER-II

CRIME AND SOCIETY

(Paper Code-0186)

UNIT-I Concept and types of Crime

Early Explanation- Classical, Positives, Psychological.

UNIT-II Social Structure and Anomie

Criminality-Suicide

Organized crime , White collar crime

Causes, Consequences and remedies of Terrorism

UNIT-III Indian Social Problems

Nature of Social change and crime in India, Social Diso-Denization. Alcoholize. Drug Addiction, Beggary.

UNIT-IV Punishment- Objectives and Forms

Major theories pf Punishment

Modern correctional concepts Probation, Parole and Open prison

UNIT-V Correctional Process-

Role of Police and Judiciary in India, Development of Jail reforms in India sociology of Prison

Revised syllabus
SOCIOLOGY 2018-2019
B.A. PART-II
PAPER-II
CRIME AND SOCIETY
(Paper Code-0186)

UNIT-I **Concept of Crime**: Meaning, Characteristics and Types.

School of Crime: Classical, Sociological and Psychological.

UNIT-II **Structure of Crime**: Anomie, Criminality and Suicide , Organized Crime , White Collar Crime and Cyber Crime

UNIT-III **Social Evils and Crime:** Alcoholism, Drug Addiction, Dowry and Beggary.

UNIT-IV **Punishment**: Meaning, Characteristics, Objectives and Types, Major Theories of Punishment.

UNIT-V **Correctional Process**: Role of Police and Judiciary in India, Development of Jail reforms in India and Modern correctional concepts- Probation , Parole and after care Programe.

ESSENTIAL READINGS :-

1. Mike, & Maguire. (2007). *The Oxford Hand Book of Criminology.* London: Oxford University Press.
2. Haster, S., & Eglin, P. (1992). *A Sociology of Crime.* London: Routledge Publishers.
3. Mead, G. H. (1934). *Mind Self and Society.* Chicago: Chicago University Press
4. Gottfredson, Michael, R., Hirschi, & Travis. (1990). *A General Theory of Crime.* London: Stanford University Press.
5. Sutherland, & Edwin, H. (1924). *Principles of Criminology.* Chicago: Chicago University Press.
6. Sutherland, Edward, H., & White, C. (1949). *Crime.* New York, Holt, Rinehart: Winston Press, New York.

B.A. /B.Sc. Part II

PAPER - I
ECONOMIC AND RESOURCES GEOGRAPHY
Max. Marks: 50
(Paper Code-0187)

Unit I Meaning, scope and approaches to economic geography; Main concepts of economic geography; Resource: concept and classification; Natural resources: soil, forest and water.

Unit II Mineral resources: iron ore and bauxite; Power resources: coal, petroleum and hydro electricity; Resource conservation; Principal crops: wheat, rice, sugarcane and tea

Unit III Agricultural regions of the world (Derwent Whittlesey); Theory of agricultural location (Von Thunen); Theory of industrial location (Weber); Major industries: iron and steel, textiles, petrochemical and sugar; industrial regions of the world.

Unit IV World transportation: major trans-continental railways, sea and air routes; International trade: patterns and trends; Major trade blocks: LAFTA, EEC, ASEAN; Effect of globalization on developing countries.

Unit V Conservation of resources; evolution of the concept, principles, philosophy, and approach to conservation, resources conservation and practices. Policy making and sustainable development.

Books Recommended:

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark,G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava,* Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff , New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

PAPER - II

GEOGRAPHY OF INDIA

Max. Marks: 50
(Paper Code-0188)

Unit I Physical Features: Structure, Relief, Climate, Physiographic Regions, Drainage, Climate-origin and mechanism of monsoon, and regional and Seasonal variation.

Unit II Natural Resources: Soils - types, their distribution and characteristics. Water Resources (major irrigation and hydel power projects); Forests-types, distribution, economic significance and conservation. Mineral and Power resources-Iron-ore, Manganese, Copper, Coal, Petroleum and Natural gas, Non conventional sources of energy.

Unit III Cultural Features : Population - Growth, Density and Distribution. Agriculture - Major crops, impact of Green Revolution and Agricultural regions.

Unit IV Industries Localization, Development & Production - Iron and steel, Cotton Textile, Cement, Sugar, Transport, Foreign Trade. Industrial Region.

Unit V Detailed Study of the following regions of India : Kashmir Valley, North- East Region, Chhota Nagpur Plateau, Thar Desert, Islands of India.

Books Recommended:

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): An Introduction to South Asia. Methuen, London
3. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): Development in South Asia. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): Geology of India and Burma, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat kee Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
10. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhougolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): India, Pakistan and Sri Lanka. Methuen, London, 7th edition.
14. Sukhwal, B.L. (1987): India: Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

PAPER - II

GEOGRAPHY OF INDIA

Max. Marks: 50
(Paper Code-0188)

Unit I Physical Features: Structure, Relief, Climate, Physiographic Regions, Drainage, Climate-origin and mechanism of monsoon, and regional and Seasonal variation.

Unit II Natural Resources: Soils - types, their distribution and characteristics. Water Resources (major irrigation and hydel power projects); Forests-types, distribution, economic significance and conservation. Mineral and Power resources-Iron-ore, Manganese, Copper, Coal, Petroleum and Natural gas, Non conventional sources of energy.

Unit III Cultural Features : Population - Growth, Density and Distribution. Agriculture - Major crops, impact of Green Revolution and Agricultural regions.

Unit IV Industries Localization, Development & Production - Iron and steel, Cotton Textile, Cement, Sugar, Transport, Foreign Trade. Industrial Region.

Unit V Detailed Study of the following regions of India : Kashmir Valley, North- East Region, Chhota Nagpur Plateau, Thar Desert, Islands of India.

Books Recommended:

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): An Introduction to South Asia. Methuen, London
3. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): Development in South Asia. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): Geology of India and Burma, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat kee Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
10. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhougolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): India, Pakistan and Sri Lanka. Methuen, London, 7th edition.
14. Sukhwal, B.L. (1987): India: Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

बी.ए./बी.एस.सी. –द्वितीय वर्ष
प्रश्न पत्र–प्रथम
आर्थिक एवं संसाधन भूगोल

(कोड क्रमांक 0187)

अधिकतम अंक: 50

इकाई–1 : आर्थिक भूगोल का अर्थ, विषय क्षेत्र एवं उपागम; आर्थिक भूगोल की आधारभूत संकल्पनाये; संसाधन : संकल्पनायें एवं वर्गीकरण; प्राकृतिक संसाधन : मिट्टी, वन एवं जल ।

इकाई–2 : खनिज संसाधन : लौह अयस्क एवं बाक्साईट; शक्ति संसाधन कोयला, पेट्रोलियम एवं जल विद्युत; संसाधन संरक्षण ; प्रमुख फसलेः गेहूँ, चाँवल, गन्ना, एवं चाय ।

इकाई–3 : विश्व के कृषि प्रदेश (व्हिटलसी के अनुसार); कृषि अवस्थिति के सिद्धान्त (वॉन थ्यूनेन); औधोगिक स्थानीयकरण का सिद्धान्त (वेबर); प्रमुख उद्योग : लौह एवं इस्पात, वस्त्र उद्योग, शैलरासायनिक एवं शक्कर; विश्व के औद्योगिक प्रदेश ।

इकाई–4 : विश्व परिवहन : प्रमुख ट्रांस महाद्वीपीय रेलवे, समुद्र एवं वायु मार्ग; अंतर्राष्ट्रीय व्यापार प्रतिरुप एवं प्रवृत्तियाँ; प्रमुख व्यापार संघ : लैटिन अमेरिकी स्वतंत्र व्यापार संघ (LAFTA), यूरोपीय साझा बाजार (EEC), दक्षिणी–पूर्वी एशियाई राष्ट्रों का संघ (ASEAN), विकासशील देशों पर भूमण्डलीकरण का प्रभाव ।

इकाई–5 : संसाधनों का संरक्षण; संकल्पनाओं का उद्‌भव, सिद्धात, दर्शन एवं संरक्षण के उपागम, संसाधन संरक्षण एवं प्रवृत्तियाँ, अक्षय विकास एवं नीति निर्माण ।

Books Recommended:

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark,G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava,* Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff , New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.

16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

बी.ए. / बी.एस.सी. द्वितीय वर्ष
प्रश्न पत्र–तृतीय
प्रायोगिक भूगोल

अधिकतम अंक : 50

खण्ड–अ. मानचित्र की व्याख्या, प्रक्षेप और सांख्यिकीय विधियां । (25 अंक)

इकाई –1 मानचित्र – बिन्दु विधि, छाया विधि, सममान रेखा मानचित्र (मानचित्र निर्माण)

इकाई –2 प्रक्षेप – परिभाषा एवं प्रकार शंक्वाकार, खमध्य बेलनाकार प्रक्षेप.

इकाई –3 मौसम मानचित्र की व्याख्या एवं मौसम संबंधी उपकरणों का उपयोग.

इकाई –4 सांख्यिकीय विधियां – विचलन– चतुर्थांक माध्य विचलन, मानक विचलन, चतुर्थक विचलन, सापेक्षिक परिवर्तनशीलता, प्रसरण गुणंक।

खण्ड–ब. सर्वेक्षण (15 अंक)

इकाई –5 प्रिज्मीय सर्वेक्षण– पूर्णवृत दिक्मान, समानीत दिक्मान एवं प्रिज्मीय कम्पास सर्वेक्षण की विधियॉं।

प्रायोगिक पुस्तिका और मौखिक परीक्षा (10 अंक)

Books Recommended:

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi: .
2. Davis, R.E. and Foote, F.S. (1953): Surveying, 4th edition, McGraw Hill Publication, New York
3. Kanetker, T.P. and Kulkarni, S.V.(1967): Surveying and Levelling, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai.
5. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi
6. Punmia, B.C.(1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition
8. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
9. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3rd. edition.
10. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London
11. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
12. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
13. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

बी.ए. / बी.एस.सी. द्वितीय वर्ष
प्रश्न पत्र–तृतीय
प्रायोगिक भूगोल

अधिकतम अंक : 50

खण्ड–अ. मानचित्र की व्याख्या, प्रक्षेप और सांख्यिकीय विधियां । (25 अंक)

इकाई –1 मानचित्र – बिन्दु विधि, छाया विधि, सममान रेखा मानचित्र (मानचित्र निर्माण)

इकाई –2 प्रक्षेप – परिभाषा एवं प्रकार शंक्वाकार, खमध्य बेलनाकार प्रक्षेप.

इकाई –3 मौसम मानचित्र की व्याख्या एवं मौसम संबंधी उपकरणों का उपयोग.

इकाई –4 सांख्यिकीय विधियां – विचलन– चतुर्थांक माध्य विचलन, मानक विचलन, चतुर्थक विचलन, सापेक्षिक परिवर्तनशीलता, प्रसरण गुणंक।

खण्ड–ब. सर्वेक्षण (15 अंक)

इकाई –5 प्रिज्मीय सर्वेक्षण– पूर्णवृत दिक्मान, समानीत दिक्मान एवं प्रिज्मीय कम्पास सर्वेक्षण की विधियॉं।

प्रायोगिक पुस्तिका और मौखिक परीक्षा (10 अंक)

Books Recommended:

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi: .
2. Davis, R.E. and Foote, F.S. (1953): Surveying, 4th edition, McGraw Hill Publication, New York
3. Kanetker, T.P. and Kulkarni, S.V.(1967): Surveying and Levelling, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai.
5. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi
6. Punmia, B.C.(1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition
8. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
9. Sharma, J. P. (2001): *Prayogik Bhugol*., Rastogi Publication, Meerut 3rd. edition.
10. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London
11. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
12. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
13. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

बी.ए. / बी.एस.सी. द्वितीय वर्ष
प्रश्न पत्र– द्वितीय
भारत का भूगोल

(कोड क्रमांक 0188)

अधिकतम अंक: 50

इकाई –1 भौगोलिक स्वरूप – संरचना, उच्चावच जलवायु, भू–आकृतिक प्रदेश, अपवाह, जलवायु–मानसून की उत्पत्ति एवं विकास प्रक्रिया तथा पादेशिक एवं मौसमी विविधता।

इकाई –2 प्राकृतिक संसाधन – मिट्टियाँ, प्रकार, वितरण एवं विशेषताएँ, जल संसाधन, सिंचाई और बहुउददेशीय परियोजनाएं, वन–प्रकार, वितरण आर्थिक महत्व एवं संरक्षण । खनिज एवं शक्ति के संसाधन – लौह अयस्क, मैग्नीज, तांबा, कोयला, प्रेट्रोलियम और प्राकृतिक गैस, गैर पारंपरिक उर्जा . (सौर उर्जा, पवन उर्जा ज्वारीय उर्जा, भूतापीय उर्जा)।

इकाई –3 सांस्कृतिक तत्व, जनसंख्या वृद्धि , घनत्व और वितरण, कृषि प्रमुख खाद्य फसलें, हरित क्रांति का प्रभाव, कृषि प्रदेश,।

इकाई –4 उद्योग–स्थानीकरण, औद्योगिक विकास और उत्पादन – लौहा और इस्पात उद्योग, सूती वस्त्र उद्योग, सीमेंट, चीनी ,यातायात और व्यापार, औद्योगिक प्रदेश ।

इकाई –5 भारत के निम्न प्रदेशों का विस्तृत अध्ययन कश्मीर घाटी, उत्तर पूर्वी प्रदेश, छोटा नागपुर का पठार, थार मरूस्थल भारत के द्वीप समूह।

Books Recommended:

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): An Introduction to South Asia. Methuen, London
3. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): Development in South Asia. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): Geology of India and Burma, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat kee Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
10. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhougolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): India, Pakistan and Sri Lanka. Methuen, London, 7th edition.
14. Sukhwal, B.L. (1987): India: Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.

जोड़ा जिनका विवरण निम्न है।

इकाई II

(1) अशोक का द्वितीय अभिलेख
(2) अशोक का बारहवां अभिलेख
(3) हेलियोडोरस का बेसनगर अभिलेख
(4) गौतमी पुत्र सातकर्णी का नासिक अभिलेख
(5) खारवेल का हाथिगुंफा अभिलेख
(6) रूद्र दामन का जूनागढ़ अभिलेख

इकाई III

(1) समुद्र गुप्त का प्रयाग प्रशस्ति अभिलेख
(2) पुलकेशिन द्वितीय का एहोल लेख
(3) हर्ष का बांसखेड़ा अभिलेख
(4) महारानी वासटा का लक्ष्मण मंदिर अभिलेख
(5) जाजल्ल देव प्रथम का रतनपुर अभिलेख

इकाई IV

इतिहास की पुर्नरचना में मुद्रा का महत्व, मुद्रा का उद्भव एवं प्राचीनता, मुद्रा निर्माण तकनीक तथा आहत सिक्के

इकाई V

कुषाण कालीन सिक्के, जनपदीय सिक्के (तक्षाशिला, कौशाम्बी, एरण), गुप्त कालीन मुद्रायें, समुद्रगुप्त, चन्द्रगुप्त द्वितीय एवं कुमारगुप्त की स्वर्ण रजत एवं ताम्र मुद्रायें स्थानीय मुद्रायें (शरभपुरीय, नलवंशीय एवं कलचुरी राजवंश)।

- **बी.ए. तृतीय वर्श के प्रायोगिकीय का पाठ्यकम यथावत रहेगा।**

नोट– बी.ए. प्रथम, द्वितीय एवं तृतीय वर्ष के सभी सातों प्रश्न पत्र का पॉचों इकाईयों का सत्यापित संशोधित एवं टंकित पाठ्यकम अंग्रेजी में अनुवाद के साथ केन्द्रीय अध्ययन मंड़ल कार्यवृत्त रजिस्ट्रर में साथ संलग्न किया गया है।

(प्रो.दिनेश नंदिनी परिहार)
अध्यक्ष
केन्द्रीय अध्ययन मंडल

(डॉ. अनुप परसाई)
सदस्य
केन्द्रीय अध्ययन मंडल

(डॉ. नितेश कुमार मिश्र)
सदस्य
केन्द्रीय अध्ययन मंडल

बी.ए. द्वितीय वर्ष
B.A. Part II Paper I
प्रथम प्रश्न–पत्र
प्राचीन भारतीय सामाजिक तथा आर्थिक संस्थाएं (पेपर कोड 0134)
Ancient Indian Social and Economic Institution

पूर्णांक 75

उद्देश्य : इस पाठ्यक्रम का उद्देश्य प्राचीन भारत की सामाजिक तथा आर्थिक संस्थाओं का सामान्य ज्ञान कराना है।

इकाई– 1 (1) वर्णाश्रम व्यवस्था (Varna System)
(2) आश्रम व्यवस्था (Ashramas)
(3) पुरूषार्थ चतुष्टय (Purushartha Chatushthaya)
(4) पंचमहायज्ञ (Pancha mahayagya)

इकाई– 2 (1) संस्कार (Sanskaras)
(2) विवाह तथा उसके प्रकार (Marriage and their types)
(3) परिवार की उत्पत्ति तथा महत्व, संयुक्त परिवार, पिता,माता, तथा पुत्र की स्थिति, पुत्रों के प्रकार
(Origin of Family and its Significance, Joint Family, position of Father, Mother and Sons; Types of Son)

इकाई– 3 (1) नारियों की स्थिति (Position of Women)
(2) शिक्षा–उद्देश्य, आदर्श, उपलब्धियाँ तथा प्रमुख शिक्षा केन्द्र
(Objectives of Education, Model, Achievements and Important education Centres)

इकाई– 4 (1) वैदिक काल से 600 ई.पू. तक प्राचीन भारत की आर्थिक दशा
(Economic Condition of Ancient India from Vedic age to 600 B.C.)
(2) श्रेणियों का संगठन और कार्य (Organisation and working of Guilds)
(3) 600 ई.पू. से 319 इ. तक प्राचीन भारत की आर्थिक दशा
(Economic Condition of Ancient India from 600 B.C. to 319 A.D.)

इकाई– 5 (1) 319 ई से 1200 ई. तक प्राचीन भारत की आर्थिक दशा
(Economic Condition of Ancient India from 319A.D. to 1200 A.D.)
(2) आंतरिक और बाह्य व्यापारिक मार्ग (Domestic and International trade routes)

सहायक ग्रंथ :

1. मनोरमा जौहरी – प्राचीन भारतीय वर्णाश्रम व्यवस्था
2. जयशंकर मिश्र – भारत की सामाजिक इतिहास
3. के.सी.जैन – प्राचीन भारतीय सामाजिक तथा आर्थिक संस्थाएं
4. राजबली पाण्डेय – हिन्दू संस्कार
5. हरिदत्त वेदालंकार – हिन्दू परिवार मीमांसा
6. ए.एस.अल्तेकर – प्राचीन भारत में नारियों की स्थिति
7. आर.एस.शर्मा – प्राचीन भारत में शूद्रों की स्थिति
8. ए.एस.अल्तेकर – प्राचीन भारतीय शिक्षण पद्धति
9. रमेशचन्द्र मजुमदार (अनु.कृष्णदत्त बाजपेयी) – प्राचीन भारत में संगठित जीवन
10. मोतीचन्द्र – सार्थवाह
11. कृष्णदत्त बाजपेयी – भारतीय व्यापार का इतिहास
12. कृष्णदत्त बाजपेयी – प्राचीन भारत का विदेशों में सबंध
13. आर.एस.शर्मा – पूर्व मध्यकालीन भारत में सामाजिक परिवर्तन
14. डॉ. चन्द्रदेव सिंह – प्राचीन भारतीय समाज और चिन्तन
15. सुस्मिता पाण्डेय – समाज, आर्थिक व्यवस्था एवम् धर्म
16. P.N. Prabhu - Hindu Social Organization
17. S.K. Maity - The Economics life of Northem India in the Gupta Period.
18. L.Gopal - Economic life of Northem Indian
19. D.R. Das - Econimics History of the Dean
20. शिव स्वरूप सहसा – प्राचीन भारतीय सामाजिक, आर्थिक संस्थाए

बी.ए. द्वितीय वर्ष
द्वितीय : प्रश्न–पत्र
B.A. Part II Paper II
प्राचीन भारतीय राजनय तथा प्रशासन (पेपर कोड 0205)
Ancient Indian Polity and Administration

पूर्णांक : 75

इकाई– 1 राज्य की उत्पत्ति, प्रकार, स्वरूप तथा कार्य।
(Origin, types, form, and function of State)

इकाई– 2 राजपद, मंत्रिपरिषद्–संगठन एवं कार्य, सप्तांग सिद्धांत।
(Kingship; organisation and working of Council of Ministers; Theory of Saptanga)

इकाई– 3 गणराज्य : संगठन, शासन, पद्धति, गुण–दोष
(Republics: organisation, government, system, Pros & Cons)

इकाई– 4 अंतर्राष्ट्रीय संबंध, मण्डल सिद्धांत, षाडगुण्य सिद्धांत, दूत व्यवस्था, गुप्तचर व्यवस्था।
(International Relation, Principle of Mandala, Principle of Shadgunya, Ambassadors, Espionage)

इकाई– 5 विभिन्न राजवंशों की प्रशासन व्यवस्था :
मौर्य, गुप्त, हर्ष कालीन वंश की प्रशासन, राष्ट्रकूट एवं चोलवंश।
(Administrative system of various Dynasties: Mauryas, Guptas, period of Harsha, Rashtrakutas and Cholas)

अनुशंशित पुस्तके :

1. अनंत सदाशिव अल्तेकर – प्राचीन भारतीय शासन पद्धति (Ancient Indian Administration)
2. काशी प्रसादा जायसवाल – हिन्दू राजतंत्र, भाग 1, 2 (Hindu Polity)
3. डॉ. रवींन्द्रनाथ अग्रवाल – मध्यप्रदेश क्षेत्र के अंतर्राज्यीय संबंधों का अध्ययन
4. सत्यकेतु विद्यालंकर – प्राचीन भारतीय शासन व्यवस्था एवं राज्य शास्त्र
5. मनोरमा जौहरी – प्राचीन भारत में राज्य और शासन व्यवस्था
6. हरिशचन्द्र शर्मा – प्राचीन भारतीय राजनीतिक विचारक एवं संस्थाएं
7. राधाकृष्ण चौधरी – प्राचीन भारतीय राजनीति एवं शासन व्यवस्था

बी.ए./बी.एस.सी. –द्वितीय वर्ष
प्रश्न पत्र–प्रथम
आर्थिक एवं संसाधन भूगोल

(कोड क्रमांक 0187)

अधिकतम अंक: 50

इकाई–1 : आर्थिक भूगोल का अर्थ, विषय क्षेत्र एवं उपागम; आर्थिक भूगोल की आधारभूत संकल्पनाये; संसाधन : संकल्पनायें एवं वर्गीकरण; प्राकृतिक संसाधन : मिट्टी, वन एवं जल ।

इकाई–2 : खनिज संसाधन : लौह अयस्क एवं बाक्साईट; शक्ति संसाधन कोयला, पेट्रोलियम एवं जल विद्युत; संसाधन संरक्षण ; प्रमुख फसलेः गेहूँ, चाँवल, गन्ना, एवं चाय ।

इकाई–3 : विश्व के कृषि प्रदेश (व्हिटलसी के अनुसार); कृषि अवस्थिति के सिद्धान्त (वॉन थ्यूनेन); औधोगिक स्थानीयकरण का सिद्धान्त (वेबर); प्रमुख उद्योग : लौह एवं इस्पात, वस्त्र उद्योग, शैलरासायनिक एवं शक्कर; विश्व के औद्योगिक प्रदेश ।

इकाई–4 : विश्व परिवहन : प्रमुख ट्रांस महाद्वीपीय रेलवे, समुद्र एवं वायु मार्ग; अंतर्राष्ट्रीय व्यापार प्रतिरुप एवं प्रवृत्तियाँ; प्रमुख व्यापार संघ : लैटिन अमेरिकी स्वतंत्र व्यापार संघ (LAFTA), यूरोपीय साझा बाजार (EEC), दक्षिणी–पूर्वी एशियाई राष्ट्रों का संघ (ASEAN), विकासशील देशों पर भूमण्डलीकरण का प्रभाव ।

इकाई–5 : संसाधनों का संरक्षण; संकल्पनाओं का उद्भव, सिद्धात, दर्शन एवं संरक्षण के उपागम, संसाधन संरक्षण एवं प्रवृत्तियाँ, अक्षय विकास एवं नीति निर्माण ।

Books Recommended:

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark,G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava*, Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff, New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

बी.ए./बी.एस.सी. द्वितीय वर्ष
प्रश्न पत्र– द्वितीय
भारत का भूगोल

(कोड क्रमांक 0188)

अधिकतम अंक: 50

इकाई –1 भौगोलिक स्वरूप – संरचना, उच्चावच जलवायु, भू–आकृतिक प्रदेश, अपवाह, जलवायु–मानसून की उत्पत्ति एवं विकास प्रक्रिया तथा पादेशिक एवं मौसमी विविधता।

इकाई –2 प्राकृतिक संसाधन – मिट्टियाँ, प्रकार, वितरण एवं विशेषताएँ, जल संसाधन, सिंचाई और बहुउद्देशीय परियोजनाएं, वन–प्रकार, वितरण आर्थिक महत्व एवं संरक्षण । खनिज एवं शक्ति के संसाधन – लौह अयस्क, मैग्नीज, तांबा, कोयला, पेट्रोलियम और प्राकृतिक गैस, गैर पारंपरिक उर्जा , (सौर उर्जा, पवन उर्जा ज्वारीय उर्जा, भूतापीय उर्जा)।

इकाई –3 सांस्कृतिक तत्व, जनसंख्या वृद्धि , घनत्व और वितरण, कृषि प्रमुख खाद्य फसलें, हरित क्रांति का प्रभाव, कृषि प्रदेश,।

इकाई –4 उद्योग–स्थानीकरण, औद्योगिक विकास और उत्पादन – लौहा और इस्पात उद्योग, सूती वस्त्र उद्योग, सीमेंट, चीनी ,यातायात और व्यापार, औद्योगिक प्रदेश ।

इकाई –5 भारत के निम्न प्रदेशों का विस्तृत अध्ययन कश्मीर घाटी, उत्तर पूर्वी प्रदेश, छोटा नागपुर का पठार, थार मरुस्थल भारत के द्वीप समूह।

Books Recommended:

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): An Introduction to South Asia. Methuen, London
3. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): Development in South Asia. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): Geology of India and Burma, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat kee Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
10. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhougolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): India, Pakistan and Sri Lanka. Methuen, London, 7th edition.
14. Sukhwal, B.L. (1987): India: Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

बी.ए / बी.एस.सी. द्वितीय वर्ष
प्रश्न पत्र–तृतीय
प्रायोगिक भूगोल

अधिकतम अंक : 50

खण्ड–अ. मानचित्र की व्याख्या, प्रक्षेप और सांख्यिकीय विधियां । (25 अंक)

इकाई –1 मानचित्र – बिन्दु विधि, छाया विधि, सममान रेखा मानचित्र (मानचित्र निर्माण)

इकाई –2 प्रक्षेप – परिभाषा एवं प्रकार शंक्वाकार, खमध्य बेलनाकार प्रक्षेप.

इकाई –3 मौसम मानचित्र की व्याख्या एवं मौसम संबंधी उपकरणों का उपयोग.

इकाई –4 सांख्यिकीय विधियां – विचलन– चतुर्थांक माध्य विचलन, मानक विचलन, चतुर्थक विचलन, सापेक्षिक परिवर्तनशीलता, प्रसरण गुणंक।

खण्ड–ब. सर्वेक्षण (15 अंक)

इकाई –5 प्रिज्मीय सर्वेक्षण– पूर्णवृत दिक्मान, समानीत दिक्मान एवं प्रिज्मीय कम्पास सर्वेक्षण की विधियॉं।

प्रायोगिक पुस्तिका और मौखिक परीक्षा (10 अंक)

Books Recommended:

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi: .
2. Davis, R.E. and Foote, F.S. (1953): Surveying, 4th edition, McGraw Hill Publication, New York
3. Kanetker, T.P. and Kulkarni, S.V.(1967): Surveying and Levelling, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai.
5. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi
6. Punmia, B.C.(1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition
8. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
9. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3rd. edition.
10. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London
11. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
12. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
13. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

PAPER - I
ECONOMIC AND RESOURCES GEOGRAPHY
Max. Marks: 50
(Paper Code-0187)

Unit I Meaning, scope and approaches to economic geography; Main concepts of economic geography; Resource: concept and classification; Natural resources: soil, forest and water.

Unit II Mineral resources: iron ore and bauxite; Power resources: coal, petroleum and hydro electricity; Resource conservation; Principal crops: wheat, rice, sugarcane and tea

Unit III Agricultural regions of the world (Derwent Whittlesey); Theory of agricultural location (Von Thunen); Theory of industrial location (Weber); Major industries: iron and steel, textiles, petrochemical and sugar; industrial regions of the world.

Unit IV World transportation: major trans-continental railways, sea and air routes; International trade: patterns and trends; Major trade blocks: LAFTA, EEC, ASEAN; Effect of globalization on developing countries.

Unit V Conservation of resources; evolution of the concept, principles, philosophy, and approach to conservation, resources conservation and practices. Policy making and sustainable development.

Books Recommended:

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark,G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava,* Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff , New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

PAPER - II

GEOGRAPHY OF INDIA

Max. Marks: 50

(Paper Code-0188)

Unit I	Physical Features: Structure, Relief, Climate, Physiographic Regions, Drainage, Climate-origin and mechanism of monsoon, and regional and Seasonal variation.
Unit II	Natural Resources: Soils - types, their distribution and characteristics. Water Resources (major irrigation and hydel power projects); Forests-types, distribution, economic significance and conservation. Mineral and Power resources-Iron-ore, Manganese, Copper, Coal, Petroleum and Natural gas, Non conventional sources of energy.
Unit III	Cultural Features : Population - Growth, Density and Distribution. Agriculture - Major crops, impact of Green Revolution and Agricultural regions.
Unit IV	Industries Localization, Development & Production - Iron and steel, Cotton Textile, Cement, Sugar, Transport, Foreign Trade. Industrial Region.
Unit V	Detailed Study of the following regions of India : Kashmir Valley, North- East Region, Chhota Nagpur Plateau, Thar Desert, Islands of India.

Books Recommended:

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): An Introduction to South Asia. Methuen, London
3. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): Development in South Asia. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): Geology of India and Burma, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat kee Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
10. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhougolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): India, Pakistan and Sri Lanka. Methuen, London, 7th edition.
14. Sukhwal, B.L. (1987): India: Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

B.A. /B.Sc. Part II

PAPER - III
PRACTICAL GEOGRAPHY
Max. Marks: 50

SECTION A

MAP INTERPRETATION, PROJECTIONS AND STATISTICAL METHODS (M.M. 25)

Unit I Distribution Maps: Dot Map, Choropleth Map and Isopleth Map.

Unit II Map Projections: Definition and classification; Conical, Zenithal, and Cylindrical Projections.

Unit III Interpretation of Weather Maps: Use of Meteorological Instruments.

Unit IV Statistical Methods: Quartile: Mean Deviation, Standard Deviation and Quartile Deviation; Relative Variability and Co-efficient of Variation.

SECTION B

SURVEYING (M.M. 15)

Unit V Surveying: Whole Circle Bearing and Reduced Bearing, Methods of Prismatic Compass Survey.

PRACTICAL RECORD AND VIVA VOCE (M.M. 10)

Books Recommended:

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi: .
2. Davis, R.E. and Foote, F.S. (1953): Surveying, 4th edition, McGraw Hill Publication, New York
3. Kanetker, T.P. and Kulkarni, S.V.(1967): Surveying and Levelling, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai.
5. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi
6. Punmia, B.C.(1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition
8. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
9. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3rd. edition.
10. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London
11. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
12. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
13. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

B.Sc. II
BIOTECHNOLOGY

PAPER – I

MOLECULAR BIOLOGY & BIOPHYSICS

M.M. 50

UNIT-I

1. Nucleic Acid: Bases, Nucleosides and Nucleotides, DNA and RNA structure.
2. Plasmids.
3. Transposons: Repetitive elements, LINEs & SINEs, Structure of Gene.

UNIT-II

1. DNA Replication: Enzymes involved and mechanism of DNA Replication in Prokaryotes.
2. Mutation: Molecular level of Mutation, Types of Mutagens, Spontaneous and Induced Mutation.
3. DNA Repair: NER, BER and Mismatch Repair.

UNIT-III

1. Genetic Code: Features, Condon Assignment and Wobble hypothesis.
2. Transcription: Initiation, Elongation and Termination in Prokaryotes.
3. Translation: Initiation, Elongation and Termination Translation machinery in Prokaryotes. Operon-Concept of Operator, Regulator, Promoter gene, Inducer and Co-repressor.

UNIT –IV

1. Biophysics : Introduction, Scope and Application
2. Principle, Structure, Functions of the following:
   a. Microscopy b. Colorimeter and Spectroscopy c. Electrophoresis
   d. Centrifugation e. Chromatography.

UNIT –V

1. Radioisotopes techniques: Measurement of radioactivity, Ionization Chambers, Geiger Muller and Scintillation Counter.
2. Autoradiography and DNA Fingerprinting.
3. Biosensor.

List of Books

1. Gerald Karp - Cell and Molecular biology, 4th Edition (2005).
2. Lewis J.Klein Smith and Valerie M.Kish-Principles of cell and molecular biology-Third
3. Edition (2002)
4. P.K. Gupta- Cell and molecular biology, Second Edition (2003), Rastogi publications.
5. Richard M-Twyaman-Advanced Molecular Biology, First South Asian Edition (1998), VivaBooks Pvt. Ltd.
6. K. Wilson and J.Walker (2012) Principle and Techniques of Biotechnology and MolecularBiotechnology.
7. Upadhya and Upadhya : Biophysical Chemistry.
8. David, I. Nelson and Michael M.Cox :Lehniger : Principal of Biochemistry 4th Edition. W.H. Freeman and Company, New York.
9. Buchanan, Gruissemen& Jones (2015) Biochemistry & Molecular Biology of Plant, 2nd edition.

B.Sc. II
BIOTECHNOLOGY

PAPER II

RECOMBINANT DNA TECHNOLOGYAND GENOMICS

M.M. 50

UNIT-I

1. Recombinant DNA technology: General concept. Steps in gene cloning and application.
2. Host controlled Restriction Modification System. Ligases and Polymerases, Klenow fragment, Taq, Pfu polymerase and Nuclease (Endo, Exo and restriction endonuclease).
3. Modification Enzyme (Kinase, Phosphates and terminal deoxynucleotidyl transferase). Reverse Transcriptase.

UNIT –II

1. Vectors: Plasmid, Bacteriophages, Cosmid. SV40 and Expression vectors.
2. Gene Library: Genomic and cDNA library.
3. Selection and Screening of Recombinants: Genetic and Hybridization methods.

UNIT –III

1. PCR: Types of PCR, Steps (Denaturation, Annealing and Extension); Applications, Advantages and Limitation of PCR.
2. Molecular Marker-RFLP, RAPD and Micro array.
3. Human Genome Project.

UNIT-IV

1. Basic concept of Gene Transfer Methods: Microinjection, Electroporation, Lipofection and Microprojectile.
2. Gene Therapy: *In vivo* and *Ex vivo*. Germ line and Somatic gene therapy.
3. Basic idea of Stem cell technology: Types of stems cell cultures and their Significance.

UNIT-V

1. Introduction to Bioinformatics: History, Objective and Application.
2. Major Bioinformatics Resource – NCBI , Types of Databases (Primary and Secondary Databases) , BLAST and FASTA
3. Basic concept of Genomics and Proteomics

MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

B.Sc. Part-II
Paper-I
ADVANCED CALCULUS

UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests. Cauchy's integral test. Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem. Absolute and conditional convergence.

UNIT-II Continuity, Sequential continuity. Properties of continuous functions. Uniform continuity, Chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.

UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.

UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis. Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals, Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis, S.Chand and Company, New Delhi.

B.Sc. Part-II
Paper-II
DIFFERENTIAL EQUATIONS

UNIT-I Series solutions of differential equations- Power series method. Bessel and Legendre functions and their properties-convergence, recurrence and generating relations. Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values. Orthogonality of Bessel functions and Legendre polynomials.

UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.

UNIT-IV Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.

UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extemals, Functionals dependent on higher order derivatives. Functionals dependent on more than one independent variable. Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.

Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.

Sufficient conditions for an Extremum- Jacobi and Legendre conditions, Second Variation. Variational principle of least action.

REFERENCES :

1. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand, Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications. Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vots. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.

B.Sc. Part-II
Paper-III
MECHANICS

STATICS

UNIT-I Analytical conditions of Equilibrium, Stable and unstable equilibrium. Virtual work, Catenary.

UNIT-II Forces in three dimensions, Poinsot's central axis, Null lines and planes.

DYNAMICS

UNIT-III Simple harmonic motion. Elastic strings. Velocities and accelerations along radial and transverse directions, Projectile. Central orbits.

UNIT-IV Kepler's laws of motion. velocities and acceleration in tangential and normal directions, motion on smooth and rough plane curves.

UNIT-V Motion in a resisting medium, motion of particles of varying mass, motion of a particle in three dimensions, acceleration in terms of different co-ordinate systems.

REFERENCES :

1. S.L. Loney. Statics. Macmillan and Company, London.
2. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
3. S.L. Loney, An Elementary Treatise on the Dynamics of a particle and of rigid bodies. Cambridge University Press, 1956.

Subject: Physics **B.Sc. Part-II**

Paper-I: THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

UNIT	Current Course	New Proposed Course	Justification
I	The laws of thermodynamics : The Zeroth law, concept of path function and point function, various indicator diagrams, work done by and on the system, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, carnot theorem and the second law of thermodynamics. Different versions of the second law. Claussius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Entropy of the universe. Principle of increase of entropy. The thermodynamic scale of temperature, its identity with the perfect gas scale. Impossibility of attaining the absolute zero, third law of thermodynamics.	The laws of thermodynamics : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, ***Carnot's cycle,*** carnot theorem and the second law of thermodynamics. Claussius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. ***Concept of entropy,*** Entropy of the universe. ***Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram,*** Principle of increase of entropy. The thermodynamic scale of temperature, ***Third law of thermodynamics, Concept of negative temperature.***	**Some relevant topics are introduced.**
II	Thermodynamic relationships: Thermodynamic variables, extensive and intensive, Maxwell's general relationships, application to Joule-Thomson cooling and adiabatic cooling in a general system, Van der Waals gas, Clausius-Clapeyron heat equation. Thermodynamic potentials and equilibrium of thermodynamical systems, relation with thermodynamical variables. Cooling due to adiabatic demagnetization, production and measurement of very low temperatures. Blackbody radiation : Pure temperature dependence, Stefan-Boltzmann law, pressure of radiation, Special distribution of BB radiation, Wien's displacement law, Rayleigh-Jean's law, the ultraviolet catastrophy, Planck's quantum postulates, Planck's law, complete fit with	***Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy, Maxwell's thermodynamical equations and their applications, TdS equations, Energy and heat capacity equations Appplication of Maxwell's equation in*** Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.	**Unit is restructured for clarity**

	experiment.		
III	Maxwellien distribution of speeds in an ideal gas: Distribution of speeds and of velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions, mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure. Liquifaction of gases: Boyle temperature and inversion temperature. Principle of regenerative cooling and of cascade cooling, liquifaction of hydrogen and helium. Refrigeration cycles, meaning of efficiency.	Maxwellien distribution of speeds in an ideal gas: Distribution of speeds and of velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure. **Behavior of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO_2 Gas. Critical Constants.**	**This Unit is upgraded to cover Ideal and Real Gases.**
IV	The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space, canonical phase space, Gamma phase space and μ phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy. Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.	The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space, canonical phase space, Gamma phase space and μ phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy. Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.	**No change required**
V	Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose- Einstein and Fermi-Dirac Statistics Through Canonical partition function. Limits of B.E. and F-D statistics to M-B statistics. Application of BE statistics to black body	Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose- Einstein and Fermi-Dirac Statistics. Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.	**No change required**

	radiation, Application of F-D statistics to free electrons in a metal.		

TEXT AND REFERENCE BOOKS :

1. B.B. Laud, "Introduction to Statistical Mechanics" (Macmillan 1981)
2. F. Reif : "Statistical Physics" (Mcgraw-Hill, 1998).
3. K, Haung : "Statatistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics : R.K. Singh, Y.M. Gupta and S. Sivraman
5. Physics (Part-2) : Editor, Prof : B.P. Chandra, M.P. Hindi Granth Academy.
6. Heat and Thermodynamics: K.W. Zeemansky.
7. Thermal Physics: B.K. Agarwal.
8. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
9. Heat and Thermodynamics: Dayal, Verma and Pandey.
10. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

Subject: Physics

Paper-II: WAVES, ACOUSTICS AND OPTICS

UNIT	Current Course	New Proposed Course	Justification
I	Waves in media: Speed of transverse waves on a uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, typical measurements. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity, their measurements. Harmonics and the quality of sound; examples. Production and detection of ultrasonic and infrasonic waves and applications. Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedence matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.	Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications. Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.	**The change in Unit is due to repetition of topics already covered in detail in 12th syllabus**
II	Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto leneses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil imersion objectives, meniscus lens. Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces)	Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto leneses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil imersion objectives, meniscus lens. Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces)	**No change**
III	Interference of light: The principle of superpositions, two slit interference, coherence	Interference of light: The principle of superpositions, two slit interference, coherence requirement for the	**Unit is rearranged according to**

	requirement for the sources, optical path retardations, lateral shift of fringes, Rayleigh refractometer Localised fringes; thin films. Hadinger fringes: fringes of equal indination. Michelson interferometer, its application for precision defermination of wavelength, wavelength difference and the width of spectral lines, Twymann. Green interferometer and its uses, intensify distribution in multiple beam interference. Tolansky fringes, Fabry-Perot interferometer and etalon.	sources, optical path retardations, ***Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer.*** Rayleigh refractometer, Twymann. Green interferometer and its uses.	**relevant topics.**
IV	Fresnel half-period zones, plates, straight edge, rectilinear propagation, Fraunhefer diffraction : Diffraction at a slit, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, diffraction at a circular aperture and a circular disc, resolution of images, Rayleigh criterion, resolving power of telescope and microscopic systems. Diffraction gratings : Diffraction at N parallel slits, intensity distribution, plane diffraction grating, reflection grating and blazed gratings, Concave grating and different mountings, resolving power of a grating and comparison with resolving powers of prism and of a Fabry-Perot etalon. Double refraction and optical rotation : Refraction in uniaxial crystals, Phase retardation plates, double image prism. Rotation of plane of polarisation, origin of optical rotation in liquids and in crystals.	***Diffraction, Types of Diffraction,Fresnel's diffraction, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhefer diffraction due to a single slit and double slit,Diffraction at N-Parallel slit, Plane Diffraction grating,*** Rayleigh criterion, resolving power of ***grating*** , Prism, telescope. ***Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.***	**Unit is modified and rearranged according to relevant topics.**
V	Laser system : Purity of a spectral line, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby	Laser system: ***Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source,*** Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and, He-Ne laser and. Applications of laser : Application in	**No change required**

	and, He-Ne and Semiconductor lasers. Application of lasers : Application in communication, Holography and non linear optics. (Polarization P including higher order terms in E and generation of harmonics).	communication, Holography and Basics of non linear optics and Generation of Harmonic.	

TEXT AND REFERENCE BOOKS :

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev ; 'Optics' (Oxford University Press)
4. Sears : 'Optics'
5. Jenkins and White : 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud : Lasers and Non-linear Optics (Wiley Eastern 1985)
7. Smith and Thomson : 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses : Vol.-III, 'Waves and Oscilations'
9. I.G. Main, 'Vibratiens and Waves' (Cambridge University Press)
10. H.J. Pain : 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics : B.K. Mathur
12. B.Sc. (Part III) Physics : Editor : B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series : optics (English language boosoeiety and Jehu wiley, 1577)
14. Bern and Woif : 'Opties'.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowels.
19. Optics: P. K. Srivastav

PHYSICS

OBJECTIVES OF THE COURSE

The undergraduate training in physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi disciplinary skills, societal relevance, global interface, self sustaining and supportive learning.

It is desired that undergraduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

EXAMINATION SCHEME:

1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments one from each groups as listed in the list of experiments.
4. Practical examination will be of 4 hours duration- one experiment to be completed in 2 hours.

   The distribution practical marks as follows:

Experiment	:	15+15=30
Viva voce	:	10
Internal assessment	:	10

5. The external examiner should ensure that at least 16 experiments are in working order at the time of examination and submit a certificate to this effect.

B.Sc. Part-II
Paper-I
THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

Unit-1 The laws of thermodynamics : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, carnot theorem, second law of thermodynamics. Claussius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Concept of entropy, Entropy of the universe. Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram, Principle of increase of entropy. The thermodynamic scale of temperature, Third law of thermodynamics, Concept of negative temperature.

Unit-2 Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy, Maxwell's thermodynamical equations and their applications, TdS equations, Energy and heat capacity equations Application of Maxwell's equation in Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

Unit-3 Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.

Behaviour of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO_2 Gas. Critical Constants.

Unit-4 The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space, γ phase space and μ phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy.

Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.

Unit-5 Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

TEXT AND REFERENCE BOOKS:

1. B.B. Laud, "Introduction to Statistical Mechanics" (Mcmillan 1981)
2. F. Reif : "Statistical Physics" (Mcgraw-Hill, 1998).
3. K, Haung : "Statatistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics: R.K. Singh, Y.M. Gupta and S. Sivraman.
5. Statistical Physics: Berkeley Physics Course, Vol. 5
6. Physics (Part-2): Editor, Prof. B.P. Chandra, M.P. Hindi Granth Academy.
7. Heat and Thermodynamics: K.W. Zeemansky.
8. Thermal Physics: B.K. Agarwal.
9. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
10. Heat and Thermodynamics: Dayal, Verma and Pandey.
11. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

Paper-II
WAVES, ACOUSTICS AND OPTICS

Unit-1 Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

Unit-2 Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens.

Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces).

Unit-3 Interference of light: The principle of superpositions, two slit interference, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer. Rayleigh refractometer, Twyman-Green interferometer and its uses.

Unit-4 Diffraction, Types of Diffraction, Fresnel's diffraction, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhofer diffraction due to a single slit and double slit, Diffraction at N-Parallel slit, Plane Diffraction grating, Rayleigh criterion, resolving power of grating , Prism, telescope.

Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

Unit-5 Laser system: Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and, He-Ne laser and. Applications of laser : Application in communication, Holography and Basics of non linear optics and Generation of Harmonic.

TEXT AND REFERENCE BOOKS:

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev; 'Optics' (Oxford University Press)
4. Sears: 'Optics'
5. Jenkins and White: 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud: Lasers and Non-linear Optics (Wiley Eastern 1985)
7. Smith and Thomson: 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses: Vol.-III, 'Waves and Oscillations'
9. I.G. Main, 'Vibrations and Waves' (Cambridge University Press)
10. H.J. Pain: 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics: B.K. Mathur
12. B.Sc. (Part III) Physics: Editor: B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series: optics (John wiley, 1971)
14. Born and Wolf : 'Optics'.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowels.
19. Optics: P. K. Srivastav.

PRACTICALS

Minimum 16 (Eight from each group)

Experiments out of the following or similar experiments of equal standard

1. Study of Brownian motion.
2. Study of adiabatic expansion of a gas.
3. Study of conversion of mechanical energy into heat.
4. Heating efficiency of electrical kettle with varying voltage.
5. Study of temperature dependence of total radiation.
6. Study of temperature dependence of spectral density of radiation.
7. Resistance thermometry.
8. Thermo emf thermometry.
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two-option system using a coloured dice.
11. Study of statistical distribution on nuclear disintegration data (GM counter used as a black box).
12. Speed of waves on a stretched strings.
13. Studies on torsional waves in a lumped system.
14. Study of interference with two coherent source of sound.
15. Chlandi's figures with varying excitation and loading points.
16. Measurements of sound intensities with different situations.
17. Characteristics of a microphone-loudspeakers system
18. Designing an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principle point of a combination of lenses.
21. Study of interference of light (biprism or wedge film).
22. Study of diffraction at a straight edge or a single slit.
23. Study of F-P etalon fringes.
24. Study of diffraction grating and its resolving power.
25. Resolving power of telescope system.
26. Polarization of light by reflection; also cos-squared law.
27. Study of optical rotation for any system.
28. Study of laser as a monochromatic coherent source.
29. Study of a divergence of laser beam.
30. Calculation of days between two dates of a year.
31. To check if triangle exists and the type of a triangles.
32. To find the sum of the sine and cosines series and print out the curve.

33. To solve simultaneous equation by elimination method.
34. To prepare a mark-list of polynomials.
35. Fitting a straight line or a simple curve
36. Convert a given integer into binary and octal systems and vice versa .
37. Inverse of a matrix.
38. Spiral array.

TEXT AND REFERENCE BOOKS

1. D.P. Khandelwal, Optics and Atomic physics (Himalaya Publishing house, Bombay 1988).
2. D.P. Khandelwal, A Laboratory Manual for Undergraduate Classes (Vani Publishing House, New Delhi).
3. S. Lipschutz and a Poe, Schaum's outline of theory and Problems of Programming with Fortran(McGraw-hill Book Company 1986).
4. C Dixon, Numerical Analysis .

B.Sc.–II (BOTANY) PAPER-I

(PLANT TAXONOMY, ECONOMIC BOTANY, PLANT ANATOMY AND EMBRYOLOGY)

UNIT-I

Bentham and Hooker system of classification.Binomial Nomenclature, International Code of Nomenclature for Algae, Fungi, and plants (IUCN), Typification, numerical Taxonomy and chemotaxonomy. Preservation of Plant material and Herbarium techniques.Important botanical gardens and herbaria of India, Kew Botanical garden, England.

UNIT-II

Systematic position, distinguishing characters and economic importance of the following families, Ranunculaceae, Magnoliaceae, Brassicaeae, Rosaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Malvaceae, Convolvulaceae, Orchidaceae, Acanthaceae, verbenaceae, Lamiaceae, Asteraceae, Fabaceae, Euphorbiaceae, Poaceae and Liliaceae.

UNIT-III

Economic Botany: Botanical name, family, part used and uses of the following economically important plants, fiber yielding plants; Cotton, jute, sun, hemp, coir.Timber yielding plants: Sal, Teak, Shisham and Pine.Medicinal plants: Kalmegh, Ashwangandha, Ghritkumari, Giloy, Brahmi, sarpgandha, ---of medicinal plants of C.G. Food plants: Pearl millet, Buck of wheat, Sorghum, Soyabean, gram, Ground nut, Sugarcane and Potato.Fruit plants: Pear, Peach, Litchi. Spices: Cinnamon, Turmeric, Ginger, Asafoetida and Cumin. Beverages : Tea, Coffee Rubber Cultivation of important flowers: Chrysanthemum, Dahelia, Biodiesel plants Jatropha, Pongamia Ethnobotany in context of Chhattisgarh.

UNIT-IV

Plant Anatomy: Root and shoot apical meristems theories of root and shoot apex organization, permanent tissues, anatomy of root, stem and leaf of dicot and monocot, secondary growth in root and stem, Anatomical anomalies in the primary structure of stems (Nyctanthes, Boerhaavia, Casuarina), Anamolous secondary growth in Dracaena, Bignonia, Laptadenia.

UNIT-V

Embryology: Flower as a reproductive organ, anther, microsporogenesis, types of ovules, megasporogenesis, development of male and female gametophyte, pollination, mechanisms, self incompatibility, fertilization, endosperm, embryo, polyembryonoy, apomixes and parthenocarpy.

Books Recommended:

Singh, Pandey,Jain. ***Diversity and Systematics of Seed Plants***, Rastogi Publications Merrut

Sharma OP, ***Plant Taxonomy,*** Tata Mc Graw Hill, New Delhi

Pandey BP, ***Taxonomy of Angiosperms,*** S. Chand Publishing, New Delhi

Pandey, BP, ***Plant Anatomy,*** S.Chand Publishing, New Delhi

Pandey, BP, ***Economic Botany,*** S.Chand Publishing, New Delhi

Bhojwani, SS and Bhatanagar SP, ***Embryology of Angiosperm***, Vikas Publication House, New Delhi

Singh, Pandey, Jain, ***Embryology of Angiosperms***, Rastogi Publication, Meerut

Sharma, V, Alum, A. ***Ethnobotany***, Rastogi Publications, Meerut

Tayal, MS ***Plant Anatomy***, Rastogi Publication, Meerut

B.Sc.-II (BOTANY) PAPER-II

(ECOLOGY AND PLANT PHYSIOLOGY)

UNIT-I

Introduction and scope of ecology, environmental and ecological factors, Soil formation and soil profile, Liebig's law of minimum, Shelford's law of tolerance, morphological and anatomical adapataions in hydrophytes, xerophytes and epiphytes.

UNIT-II

Population and community characteristics, Raunkiaer's life forms, population interactions (e.g. Symbiosis, Amensalism etc.), succession, ecotone and edge effect, ecological niches, ecotypes, ecads, keystone species

Concept of ecosystem, trophic levels, flow of energy in ecosystem, food chain and food web, concept of ecological pyramids

Biogeochemical cycles:carbon cycle, nitrogen cycle and phosphorus cycle

UNIT-III

Plant water relations: Diffusion, permeability, osmosis, imbibitions, plasmolysis, osmotic potential and water potential, Types of soil water, water holding capacity, wilting, Absorption of water, theories of Ascent of sap, Mineral nutrition and absorption, Deficiency symptoms, Transpiration, stomatal movement, significance of transpiration, Factors affecting transpiration, guttation.

UNIT-IV

Photosynthesis: Photosynthetic apparatus and pigments, light reaction mechanism of ATP synthesis. C3, C4 CAM pathway of carbon reduction, photorespiration, factors affecting photosynthesis.

Respiration: Aerobic and anaerobic respiration, Glycolysis, Kreb's cycle, factors affecting respiration, R.Q.

UNIT-V

Plant growth hormones: Auxin, Gibberellin, Cytokinin, Ethylene and Abscissic acid. Physiology of flowering, Florigen concept, Photoperiodism and Vernalization. Seed dormancy and germination, plant movement.

Books Recommended:

Koromondy, EJ. ***Concepts of Ecology,*** Prentice Hall, USA

Singh, JS Singh SP and Gupta SR. ***Ecology and Environmental Science and Conservation***, S. Chand Publishing, New Delhi

Sharma, PD. ***Ecology and Environment,*** Rastogi Publications, Merrut

Hopkins, WG and Huner, PA. ***Introduction to Plant Physiology,*** John Wiley and Sons.

Pandey SN and Sinha BK, ***Plant Physiology,*** Vikas Publishing, New Delhi

Taiz, L and Zeiger. E. ***Plant Physiology,*** 5th edition, Sinauer Associates Inc. M.A, USA

Srivastava, HS ***Plant Physiology and Biotechnology***, Rastogi Publications, Meerut

B.Sc. II (BOTANY)

Practical

1. Taxonomy: Detailed description and identification of locally available plants of the families as prescribed in the theory paper.
2. Economic Botany: Identification and comment on the plants and plant products belonging to different economic use categories
3. Preparation of Herbarium of local wild plants.
4. Quantitative vegetation analysis of a grassland ecosystem.
5. Anatomical characteristics of hydrophytes and xerophytes.
6. Demonstration of root pressure.
7. Demonstration of transpiration.
8. Demonstration of evolution of O_2 in photosynthesis, factors affecting of photosynthesis.
9. Comparison of R.Q. of different respiratory substrates.
10. Demonstration of fermentation.
11. Determination of BOD of a water body.
12. Demonstration of mitosis.

PRACTICAL SCHEME

TIME: 4 Hrs. **M.M. : 50**

1.	Anatomy	08
2.	Economic Botany	04
3.	Physiology	08
4.	Ecology	10
5.	Spotting	10
6.	Viva-Voce	05
7.	Project Work/ Field Study	10

MICROBIOLOGY

BSc-2nd

Paper- I: Molecular Biology and Genetic Engineering

UNIT-1: FUNDAMENTALS OF MOLECULAR BIOLOGY

History and scope of molecular biology, concept and mechanism of heredity. DNA as genetic material- experimental evidences. DNA replication- mechanism, process and enzymes/proteins involved in replication.

UNIT-2: CENTRAL DOGMA OF PROTEIN SYNTHESIS

Transcription- initiation, elongation, termination, RNA polymerases and sigma factor. Transcription inhibitors (antibiotics, drugs). Translation- initiation, elongation and termination. Factors involved in translation. Genetic code.

UNIT-3: MUTATION AND DNA REPAIR MECHANISM

Introduction and Types of Gene mutations- Base substitution, frame shift mutation (insertion, deletion, miss-sense, nonsense mutation.) mutagens – physical and chemical. Reverse mutation in bacteria. DNA repair mechanism (mismatch repair, photo-reactivation, excision and SOS repair). Beneficial and harmful effect of mutation.

UNIT-4: GENE REGULATION

Concept of gene- Cistron, Recon, Muton. Operon Concept- lac Operon, tryptophan Operon, His Operon. Activator, Co-activator and Repressor. Introduction to Bioinformatics- Elementary genome Database.

UNIT-5: GENETIC ENGINEERING

Basic concept of Genetic Engineering, DNA modifying enzymes Restriction endonuclease, DNA ligase, terminal transferase. Vectors- pBR322, pUC19, BAC and YAC. Phage based vectors, expression of vector. Transformation – physical and chemical method. Bacterial Host. Screening of recombinant vector Blue white Screening, Colony Hybridization.

Text Books Recommended:

1. Gene Cloning by T.A. Brown.
2. General Microbiology by Power and Daganiwala.
3. Zinssers Microbiology by KJ Wolfgang, McGraw- HJill Company.
4. Microbial Genetics by RM Stanley, F David and EC John.
5. Bacteriological Techniques by FJ Baker.
6. .Molecular Biology of the Cell; *3rd Edition;* Bruce Alberts ,et.al; Garland Publishing.
7. Cell biology; C.B. Powar; Himalaya Publishing House; Fifth edition
8. Cell & Molecular Biology; Gerald Karp; Fourth edition
9. A Textbook of Microbiology; Dubey&Maheshwari; S.chand& Sons.
10. Cell biology & Genetics; P. K. Gupta
11. Introduction to Bioinformatics; T K Atwood and D J Parry-Smith; Pearson Education Ltd

Paper- II: Bioinstrumentation and Biostatistics

UNIT-1: MICROSCOPY AND CENTRIFUGATION

Simple and compound light microscope, Bright field, Dark field, Phase contrast and Electron microscope. Centrifugation- principle and types of centrifuges (analytical and preparatory), types of centrifugation- differential and rate zonal centrifugation.

UNIT-2: pH metry and chromatography

Principle of pH meter, types of electrodes, factors affecting pH measurements, and application of pH meter. Chromatography- principle, types- paper, TLC and column chromatography, HPLC

UNIT-3: SPECTROPHOTOMETRY

Electromagnetic spectrum, Beers-Lamberts law, Types (Principles, working and application)- colorimeter, UV - Vis Spectrophotometry and IR- Spectrophotometry, Turbidometry.

UNIT-4: Electrophoresis and X-Ray Diffraction

Principle of electrophoresis, instrumentation and Application, types of Paper, Gel electrophoresis and Immunoelectrophoresis. X-ray diffraction- principle and application.

UNIT-5: Biostatistics

Data- Types, characteristics, presentation and distribution. Data analysis- central tendency (Mean, Median and Mode), Deviation (variance SD and SE). Concept of probability.

Text Books Recommended:

1. Introduction to Istrumental analysis by Robert Braun.
2. Instrumental Techniques by Upadhyay and Upadhyay.
3. Instrumental Methods of Chemical Analysis by BK Sharma.
4. Bio statistics; Sunder Rao
5. Statistical Methods; S. P. Gupta; Sultan Chand & Sons

PRACTICAL

M. M. 50

Determination of antibiotic resistance by plating method.
Assaying of microbial enzymes, Catalase, Proteases, Peroxidases, Cellulase, Cellobioases, Amylase, Diastase.
Exercise on paper, thin layer, column chromatography.
Exercise on paper and gel electrophoresis.
determination of pH of various water and soil sample.
testing of lambert beer's law.
Determination of lamda max of dye by spectrophotometer
Isolation of resistant bacteria from soil and water sample

Scheme of Practical Examination

Time - 4 hours M.M. 50

1. Exercise on spectrophotometer/ pH meter	10
2. Exercise on chromatography	10
3. Exercise on genetics	05
4. Spotting (1-5)	10
5. Viva-Voce	05
6. Sessional	10
	Total 50

Zoology
B.Sc. Part – II 2018-19
Paper – I
(Anatomy and Physiology)

Comparative Anatomy of various organ systems of vertebrates:

Unit: I

- Integument and its derivatives: structure of scales, hair and feathers
- Alimentary canal and digestive glands in vertebrates
- Respiratory organs : Gills and lung , air-sac in birds

Unit: II

- Endoskeleton: (a) Axial Skeleton- Skull and Vertebrae, (b) Appendicular Skeleton Limbs and girdles
- Circulatory System: Evolution of heart and aortic arches
- Urinogenital System: Kidney and excretory ducts

Unit: III

- Nervous System: General plan of brain and spinal cord
- Ear and Eye: structure and function
- Gonads and genital ducts

Unit: IV

- Digestion and absorption of dietary components
- Physiology of heart, cardiac cycle and ECG
- Blood Coagulation
- Respiration: mechanism and control of breathing

Unit: V

- Excretion: Physiology of excretion, osmoregulation
- Physiology of muscle contraction
- Physiology of nerve impulse, Synaptic transmission

Zoology
B.Sc. Part II 2018-19
Practical

The practical work in general shall be based on the syllabus prescribed and the students will be required to show the knowledge of the following:

- Study of the representative examples of the different chordates (Classified characters).
- Dissection of various systems of scoliodon-Afferent and Efferent branchial cranial nerves, internal ear.

Alternative methods: By Clay/Thermacol/ Drawing/ Model etc.)

- Simple microscopic technique through unstained or stained permanent mount.
- Study of prepared slides histological, as per theory papers.
- Study of limb girdles and vertebrae of Frog, Varanus, Fowl and Rabbit.
- Identification of species and individual of honey bee.
- Life cycle of honey bee and silkworm.
- Exercise based on Evolution and Animal behavior.

Scheme of Practical Exam **Time: 3:30hrs**

• Major dissection (Cranial nerves/efferent branchial vessel)	10
• Exercise based on evolution	05
• Exercise based on applied zoology	05
• Exercise based on animal behavior	04
• Spotting-8 (slides-4,bones-2,specimen-2)	16
• Viva	05
• Sessional marks.	05

NEW CURRICULUM OF B.Sc. PART II

CHEMISTRY

The new curriculum will comprise of three papers of 33, 33 and 34 marks each and practical work of 50 marks. The Curriculum is to be completed in 180 working days as per UGC norms and conforming to the directives of Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration and practical work of 180 hrs duration.

Paper – I
INORGANIC CHEMISTRY — 60 Hrs., Max Marks 33

UNIT-I

CHEMISTRY OF TRANSITION SERIES ELEMENTS

Transition Elements: Position in periodic table, electronic configuration, General Characteristics, *viz.*, atomic and ionic radii, variable oxidation states, ability to form complexes, formation of coloured ions, magnetic moment μ_{so} (spin only) and μ_{eff} and catalytic behaviour. General comparative treatment of 4d and 5d elements with their 3d analogues with respect to ionic radii, oxidation states and magnetic properties.

UNIT-II

A. Oxidation and Reduction: Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.

B. COORDINATION COMPOUNDS: Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelates, polynuclear complexes.

UNIT-III

COORDINATION CHEMISTRY

Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory, Crystal field splitting and stabilization energy, measurement of 10 Dq (Δ_o), CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of 10 Dq (Δ_o, Δ_t). Octahedral vs. tetrahedral coordination.

UNIT-IV

A. CHEMISTRY OF LANTHANIDE ELEMENTS

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

B. CHEMISTRY OF ACTINIDES

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the later actinides and the later lanthanides

UNIT-V

A. ACIDS BASES : Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases.

B. NON-AQUEOUS SOLVENTS

.Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide, HF, H_2SO_4 , Ionic liquids.

REFERENCE BOOKS

1. Basic Inorganic Chemistry, F. A. Cotton, G. Wilkinson and P. L. Gaus, Wiley
2. Concise Inorganic Chemistry, J. D. Lee, ELBS
3. Concepts of Models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D. E. Shriver, P. W. Atkins and C. H. Langford, Oxford.
5. Inorganic Chemistry, W. W. Porterfield, Addison – Wiley.
6. Inorganic Chemistry, A. G. Sharp, ELBS.
7. Inorganic Chemistry, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash.
9. Advanced Inorganic Chemistry, Agarwal and Agarwal
10. Advanced Inorganic Chemistry, Puri, Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbanic Rasayan, A. K. Shrivastav & P. C. Jain, Goel Pub
13. Uchchattar Akarbanic Rasayan, satya Prakash & G. D. Tuli, Shyamal Prakashan
14. Uchchattar Akarbanic Rasayan, Puri & Sharma
15. Selected topic in Inorganic Chemistry by Madan Malik & Tuli, S. Chand.

Paper – II
ORGANIC CHEMISTRY 60 Hrs., Max Marks 33

UNIT-I

CHEMISTRY OF ORGANIC HALIDES

Alkyl halides: Methods of preparation, nucleophilic substitution reactions – S_N1, S_N2 and S_N' mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.

Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution; SNAr, Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

UNIT-II

ALCOHOLS

A. Alcohols: Nomenclature, preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt-Blanc Reduction for the preparation of alcohols, Dihydric alcohols – methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$ and HIO_4] and pinacol-pinacolone rearrangement.

B. Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol.

PHENOLS

A. Structure and bonding in phenols, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.

B. Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesh reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

UNIT-III

ALDEHYDES AND KETONES

A. Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones.

Mechanism of nucleophilic addition to carbonyl groups: Benzoin, Aldol, Perkin and Knoevenagel condensation. Condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, Beckmann and Benzil- Benzilic rearrangement.

B. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen reduction, Wolf-Kishner reaction, $LiAlH_4$ and $NaBH_4$ reduction. Halogenation of enolizable ketones, An introduction to α,β-unsaturated aldehydes and

ketones.

UNIT-IV

A. CARBOXYLIC ACIDS

Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Hell-Volhard Zeilinsky reaction. Reduction of carboxylic groups, Mechanism of decarboxylation.

Di carboxylic acids: Methods of formation and effect of heat and dehydrating agents, Hydroxyacids.

B. CARBOXYLIC ACID DERIVATIVES

Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability of acyl derivatives. Physical properties, inter-conversion of acid derivatives by nucleophilic acyl substitution.

Mechanism of acid and base catalyzed esterification and hydrolysis.

UNIT-V

ORGANIC COMPOUNDS OF NITROGEN

A. Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.

B. Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann-Bromamide reaction, Reactions of amines, electrophilic aromatic substitution of aryl amines, Reaction of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, Azo coupling.

REFERENCE BOOKS

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Organic Chemistry, L. G. Wade Jr. Prentice Hall.
3. Fundamentals of Organic Chemistry, Solomons, John Wiley.
4. Organic Chemistry, Vol I, II, III S. M. Mukherjee, S. P. Singh and R. P. Kapoor, Wiley Easters (New Age).
5. Organic Chemistry, F. A. Carey, McGraw Hill.
6. Introduction to Organic Chemistry, Struiweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P. L. Soni.

8. Organic Chemistry, Bahl and Bahl.
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bahl and Bahl.
11. Carbanic Rasayan, R. N. Singh, S. M. I. Gupta, M. M. Bakidia & S. K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.

Paper – III
PHYSICAL CHEMISTRY 60 Hrs., Max Marks 34

UNIT-I

A. THERMODYNAMICS-I

Intensive and extensive variables; state and path functions; isolated, closed and open systems; Zeroth law of thermodynamics. First law: Concept of heat, work, internal energy and statement of first law; enthalpy, Relation between heat capacities, calculations of q, w, U and H for reversible, irreversible and free expansion of gases under isothermal and adiabatic conditions. Joule-Thompson expansion, inversion temperature of gases, expansion of ideal gases under isothermal and adiabatic condition

B. THERMO CHEMISTRY

Thermochemistry, Laws of Thermochemistry, Heats of reactions, standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions, Adiabatic flame temperature, explosion temperature.

UNIT-II

A. THERMODYNAMICS-II

Second Law of Thermodynamics: Spontaneous process, Second law, Statement of Carnot cycle and efficiency of heat engine, Carnot's theorem, thermodynamic state of temperature.

Concept of entropy: Entropy change in a reversible and irreversible process, entropy change in isothermal reversible expansion of an ideal gas, entropy change in isothermal mixing of ideal gases, physical signification of entropy, Molecular and statistical interpretation of entropy.

B. Gibbs and Helmholtz free energy, variation of G and A with pressure, volume, temperature, Gibbs-Helmholtz equation, Maxwell relations, Elementary idea of Third law of Thermodynamics, concept of residual entropy, calculation of absolute entropy of molecule.

UNIT III

A CHEMICAL EQUILIBRIUM

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Coupling of exergonic and endergonic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Thermodynamic derivation of relations between the various equilibrium constants Kp, Kc and Kx. Le Chatelier principle (quantitative treatment). Equilibrium between ideal gas and a pure condensed phase.

B IONIC EQUILIBRIA

Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

UNIT-IV

PHASE EQUILIBRIUM

A. Phase rule, Phase, component and degree of freedom, derivation of Gibbs phase rule, Clausius-Claperon equation and its applications to Solid-Liquid, Liquid-Vapor and solid-Vapor, limitation of phase rule, applications of phase rule to one component system: Water system and sulphur system.

Application of phase rule to two component system: Pb-Ag system, desilverization of lead, Zn-Mg system Ferric chloride-water system, congruent and incongruent, melting point and eutectic point.

Three component system: Solid solution liquid pairs.

B. Nernst distribution law, Henry's law, application, solvent extraction

UNIT V

PHOTOCHEMISTRY

Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry: Grothus-Drapper law, Stark-Einstein law, quantum yield, actinometry, examples of low and high quantum yields, Photochemical equilibrium and the differential rate of photochemical reactions, Quenching, Role of photochemical reaction in biochemical process.

Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), photosensitized reactions, energy transfer processes (simple examples), photostationary states, Chemiluminescence.

REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, McGraw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla,.
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.
9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

Paper –IV

LABORATORY COURSE

INORGANIC CHEMISTRY

Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

CO_3^{2-}, NO_2^-, S^{2-}, SO_3^{2-},$S_2O_3^{2-}$, CH_3COO^-, F^- ,Cl^- , Br^- , I^- , NO_3^- , BO_3^{3-}, $C_2O_4^{2-}$, PO_4^{3-}, NH_4^+ , K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}.

Mixtures should preferably contain one interfering anion, or insoluble component ($BaSO_4$, $SrSO_4$, $PbSO_4$, CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-}, NO_2^- and NO_3^-, Cl^-, Br^-, and I^-.

Volumetric analysis

(a) Determination of acetic acid in commercial vinegar using NaOH.

(b) Determination of alkali content-antacid tablet using HCl.

(c) Estimation of calcium content in chalk as calcium oxalate by permanganometry.

(d) Estimation of hardness of water by EDTA.

(e) Estimation of ferrous & ferric by dichromate method.

(f) Estimation of copper using thiosulphate.

- Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)

ORGANIC CHEMISTRY

- Detection of elements (X, N, S).
- Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates)
- Preparation of Organic Compounds:
  (i) m-dinitrobenzene, (ii) Acetanilide, (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylacohol, (v) azo dye.

PHYSICAL CHEMISTRY

Transition Temperature

- Determination of the transition temperature of the given substance by thermometric/ dialometric method (e.g. $MnCl_2.4H_2O/SrBr_2.2H_2O$).

Thermochemistry

- Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
- Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
- To determine the solubility of benzoic acid at different temperature and to determine ΔH of the dissolution process.
- To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base.
- To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

Phase Equilibrium

- To study the effect of a solute (e.g. NaCl, Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
- To construct the phase diagram of two component system (e.g. diphenylamine–benzophenone) by cooling curve method.
- Distribution of acetic/ benzoic acid between water and cyclohexane.
- Study the equilibrium of at least one of the following reactions by the distribution method:

  (i) $I_2(aq) + I^- \rightarrow I_3^-(aq)^{2+}$

  (ii) $Cu^{2+}(aq) + nNH_3 \rightarrow Cu(NH_3)n$

Molecular Weight Determination

Determination of molecular weight by Rast Camphor and Landsburger method.

Note: **Experiments may be added/ deleted subject to availability of time and facilities.**

Reference Books

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). 22
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011). Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York

Hrs.5 PRACTICAL EXAMINATION M.M.50

Three Experiments are to be performed.

1. Inorganic – Qualitative semimicro analysis of mixtures. **12 marks**

OR

One experiment from synthesis and analysis by preparing the standard solution.

2. (a) Identification of the given organic compound & determine its M.Pt./B.Pt.

6 marks

(b) Determination of Rf value and identification of organic compounds by paper chromatography. **6 marks**

3. Any one physical experiment that can be completed in two hours including calculations.

12 marks

4. Viva **10 marks**

5. Sessional **04 marks**

In case of Ex-Students one marks will be added to each of the experiment.