SUBJECT: PHYSICS (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

Mathematical Physics: Dimensional analysis, Vector algebra and vector calculus, Linear algebra, Matrices, Linear differential equations, Elementary probability theory, Binomial, Poisson and normal distributions, Fourier series, Fourier and Laplace transforms, Elements of complex analysis.

Classical Mechanics: Newton’s law, central forces, Kepler’s law and planetary, motion, Lagrange and Hamilton’s formalisms, Special theory of relativity – Lorentz transformations, time dilation, Length contraction, Relativistic kinematics, Variation of mass with velocity, Mass – Energy equivalence, Relation between energy and momentum.


Quantum Mechanics: Physical basis of quantum mechanics, Wave – Particle duality, De-Broglie hypothesis, Wave packet and group velocity, Heisenberg’s uncertainty principle, Schrodinger equation (time dependent and time independent), Eigen value problems such as particle-in-a-box, Harmonic oscillator etc.

Thermodynamics and Statistical Physics: Law of thermodynamics and their consequences, Macro state and microstates, Phase space, Probability ensembles, Partition function, Free energy, Calculation of thermodynamic quantities, Classical and quantum statistics, Degenerate Fermi gas, Black body radiation and Planck’s distribution law, Bose- Einstein condensation, First and second order phase transitions.

Atomic and Molecular Physics: Quantum states of an electron in an atom, Electron spin, Spectra of one-and manyelectron atoms, Relativistic corrections for energy levels of hydrogen, Hyperfine structure and isotopic shift, Width of spectral lines, LS & JJ coupling, Zeeman, Paschen Back and Stark effect, X-ray spectroscopy, Electron spin resonance, Nuclear magnetic resonance, lasers.


Nuclear and Particle Physics: Basic nuclear properties, Size, Shape, Charge distribution, Spin and Parity, Mass defect, Binding energy, semi-empirical mass formula, Liquid drop model, Nature of nuclear force, Nuclear shell model, Alpha decay, Beta decay, Gama decay, Laws of radioactivity, Nuclear reactions, Compound nuclei and direct reactions, Controlled and uncontrolled chain reaction, critical mass, fission and fusion, Nuclear reactor, Elementary particles.

Electronics: Semiconductor devices & physics P-N-Jn.depletion region, barrier potential, Transistors, Bipolar junction Transistors, Field effect transistors, UJT,SCR, Rectifier circuits, Logic gates and symbols, Boolean algebra & Karnaugh map, DeMorgan’s theorem, Basic digital logic circuits, Optoelectronic devices including solar cells; photonic devices;
Photo detectors and LEDs, Digital techniques and applications (Registers Counters, Comparators and similar circuits); ICs; modulation & demodulation, AM,PM,FM; A/D and D/A convertors; Sensors.

TEXT & REFERENCE BOOKS:
1. Mathematical Physics: Mary L B
2. Statistical Physics: TMH-1988; F.Reif
3. Introduction to Modern Physics:H.S.Mani & G.K.Mehta
4. Introduction to Solid State Physics: C.Kittel
5. Solid State Electronic Devices:B.G.Streetmann
6. Electronics Fundamental & Applications:J.D.Ryder
SUBJECT: CHEMISTRY (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

INORGANIC CHEMISTRY
Main Group Elements: S-N compounds Sulphur-phosphorus compounds: Molecular sulphides such as P4S3, P4S7, P4S9 and P4S10. Phosphours-nitrogen compounds: Phosphazines. Other P-N compounds. Boron-nitrogen compounds:


PHYSICAL CHEMISTRY
Quantum Mechanics: Introduction to Classical Mechanics: The blackbody radiation, photoelectric effect, Compton Effect and atomic spectra. Failure of classical mechanics to explain these phenomena. Quantum mechanical explanations.


Spectroscopy: Energy levels in molecules, rotational, vibrational, electronic NMR and ESR spectroscopy.

ORGANIC CHEMISTRY


**REFERENCE BOOKS:**
3. Gurdeep Raj, "Advanced Physical Chemistry"
SUBJECT: MATHEMATICS (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test general awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

Linear Algebra: Finite dimensional vector spaces; Linear transformations and their matrix representations, rank; systems of linear equations, eigen values and eigen vectors, minimal polynomial, Cayley-Hamilton Theroem, diagonalisation, Hermitian, Skew-Hermitian and unitary matrices; Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, self-adjoint operators.

Complex Analysis: Analytic functions, conformal mappings, bilinear transformations; complex integration; Cauchy’s integral theorem and formula; Liouville’s theorem, maximum modulus principle; Taylor and Laurent’s series; residue theorem and applications for evaluating real integrals.

Real Analysis: Sequences and series of functions, uniform convergence, power series, Fourier series, functions of several variables, maxima, minima; Riemann integration, multiple integrals, line, surface and volume integrals, theorems of Green, Stokes and Gauss; metric spaces, completeness, Weierstrass approximation theorem, compactness; Lebesgue integral, Fatou’s lemma, dominated convergence theorem.

Ordinary Differential Equations: First order ordinary differential equations, existence and uniqueness theorems, systems of linear first order ordinary differential equations, linear ordinary differential equations of higher order with constant coefficients; linear second order ordinary differential equations with variable coefficients; method of Laplace transforms for solving ordinary differential equations, series solutions; Legendre and Bessel functions and their orthogonality.

Algebra: Normal subgroups and homomorphism theorems, automorphisms; Group actions, Sylow’s theorems and their applications; Euclidean domains, Principle ideal domains and unique factorization domains. Prime ideals and maximal ideals in commutative rings; Fields, finite fields.


Probability and Statistics: Probability space, conditional probability, Bayes theorem, independence, Random variables, joint and conditional distributions, standard probability distributions and their properties, expectation, conditional expectation, moments; weak and strong law of large numbers, central limit theorem; Sampling distributions; Testing of hypothesis, standard parametric tests based on normal, Chi-Square, t, F - distributions; Linear regression; Interval estimation.

REFERENCE BOOKS:
1. Mathematical Analysis by Rudin, M
2. Discrete Mathematics by Truss, Pearson Education
SUBJECT: INFORMATION TECHNOLOGY  
(Ph.D. ENTRANCE EXAM) 
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


Object Oriented Concept and Programming Using C++:Basic Concept of OOP Benefit of OOP Object Oriented language Structure of C++ Program Compiling and Linking Operators and expressions Looping Concepts Arrays and Structure, Functions Class Object Constructor and Destructors Polymorphism Factsion Overloading Operators Overloading Inheritance pointer and Virtual Function Life I/O and Templates.


Database Management System :Type of Data Models , DBMS, Architecture, Object Orientated Database Relationship Model , Storage and File Organization The Relational Data Model database Design Data Replication and Query Processing and Recovery, Security Management, Parallel and Distributed Database.


REFERENCE BOOKS :
1. Computer System Architecture - M. Morris Mano
2. Oops With C++ - E. Balagurusamy
4. Management And Strategy - Tarun Dhar Diwan
5. Object Oriented Interface and Data Base - Prentice Hall of India
6. Software Engineering By Roger Pressmen
7. Software Engineering By Pankaj jalote
8. Data Communication & Networking - Behrou A. Forougan
9. Computer Networks - Andrew s. Tenenbaum
10. Internet & Internet Engineering - Dahiel , Minoli TMH
SUBJECT: MANAGEMENT (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test generic awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


SUGGESTED READINGS:
4. Robbins S.P., Organisational Behaviour, New Delhi, PHI.
5. Luthans Fred: Organizational Behaviuor, TMH New Delhi
7. Management And Strategy - Tarun Dhar Diwan

Managerial Economics-Overview of Micro-Economics: Basic Concepts of Demand and Supply; Demand Analysis; Production Function; Cost-Output Relations; market Structures; Pricing theories; Overview of macro-Economics; National Income Concepts; Budgeting.

SUGGESTED READINGS:
3. Chopra, O.P., Managerial Economics, New Delhi, Tata Mcgraw Hill.

Quantitative Techniques Overview of Probability: Types of Probability distributions (e.g. Binomial, Poisson, Normal and Exponential). Co-relation & Regression Analysis; Overview of Sampling: Sampling distributions; Tests of Hypothesis; Large and small samples. Univariate and Bivariate Data Analysis: t-test, z-test, Chi-square tests; ANOVA.

SUGGESTED READINGS:
6. C.R.Kothari Research Methodology,
Strategic Management- Overview of Strategic Management: Concept of Corporate Strategy; BCG Model; GE-9 Cell Model ; Value Chain Analysis;SWOT & TOWS Analysis; Porter’s Generic Strategies; Competitor Analysis. Overview of Strategy Formulation and Implementation at Corporate and Business level. Strategic Control.

SUGGESTED READING
7. Strategic management and business policy, C Appa Rao
8. Management And Strategy - Tarun Dhar Diwan

Ethics in Business Overview of Ethical issues in Business: Value Based Organizations; Ethical Issues on Individual in Organizations; Gender Issues; Ecological Consciousness; Environmental Ethics; Social Responsibilities of Business; Corporate Governance and Ethics; Benefits of Corporate Social Responsibility.

SUGGESTED READING
1. Laura P. Hartman & Joe DesJardins, Business Ethics:
2. Business Ethics and values, Francis Cherunilum

Human Resource management Overview of HRM: Concepts and Perspectives in HRM; HRM in Changing Environment, Overview of HR Planning: Objectives Process and Techniques; Job Analysis ;Recruitment and Selection, Induction;Training and Development; Performance & Potential Appraisal, Overview of Industrial Relations: Wage Policy and Determination; Trade Unions; Dispute Resolution and Grievance Management; Labour Welfare .Overview of e-HRM.

SUGGESTED READING


SUGGESTED READINGS:

Pricing Methods and Strategies. Overview of Promotional Management: Promotion Mix; Advertising; Personal selling; Supply Chain Management; Viral & Niche Marketing; Customer Relation management. Overview of e-Marketing: Uses of Internet as Marketing Medium; Issues in Branding, Market Development, advertising and Retailing on Internet.

SUGGESTED READINGS:

Production Management: Overview of Production management: Demand Forecasting for Operations; Production Scheduling; Work Measurement; time and Motion Study; Statistical Quality Control; Facility Location; Layout Planning. Overview of Operations Research: Linear programming; Transportation model; Inventory control; Queuing theory; Decision theory; PERT/CPM.

SUGGESTED READINGS:
1. Adam, E E & Ebert, RJ. Production & Operation Management, New Delhi, PHI.
3. Buffa, E.S. Modern Production Management, John Wiley (New York.)
5. Mayor R, Production and Operation management,
6. Telsong, Industrial & Production Management

Information System-Overview of MIS: Application of Information Systems in management; MIS and Decision Making; System Analysis and Design. Overview of Database Management System; Overview of E-Commerce:

SUGGESTED READINGS:
1. Laudon, Kenneth C, & Jane P. Laudon, Management Information System : Organisation and Technology, PHI Publication
6. Mensching James R., & Dennis A. Adams, Managing an Information System, Prentice Hall, New Jersey,
SUBJECT: COMMERCE (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test general awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


Business Statistics & Data Processing: Data types, Data collection and analysis, Sampling, need, errors, & method of sampling, Normal Distribution, Hypothesis testing, Analysis and Interpretation of data. Correlation and Regression, small sample tests - t-test, F-test and chi-square test.


Marketing Management: The evolution of marketing concepts, Concepts of Marketing, Marketing mix, Marketing environment, Product decision, Pricing decision, Distribution decision.


Banking & Financial Institutions: Importance of Banking to Business, Types of Banks & Their functions Development Banking: IDBI, IFCI, SFCs, UTI, SIDBI.

REFERENCE BOOKS:
SUBJECT: HISTORY (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)
वास्तुकला की संस्थाएँ। कार्यकर्ता के वर्मण, पाल और सेन, रायकूट, प्रतिहार कलचुरि के बैद्य, पर्मार गुजरात के बालुक्य, चोल, शेर होस्टा, पांडव, प्रशासन तथा स्थानीय सरकार कला तथा वास्तुकला का विकास, धार्मिक पंथ (समुद्रदाय) मंदिर और मठ संस्था, अग्रहाय, शिक्षा तथा साहित्य, अर्थव्यवस्था तथा समाज, श्रीलंका और दक्षिण-पूर्व एशिया से संबंध।

खण्ड-ब

मध्यकालीन भारतीय इतिहास
स्थूल पुरातत्व, पुराणशास्त्र, संक्षिप्त सामग्री और स्मारक। इतिवृत।
साहित्यक प्रथा- फारसी, संस्कृत और क्षेत्रीय भाषायें। पुरा भारत सामग्री
विदेशी यात्री- युवत।

राजनीतिक विकास
संवीन- गौरी, तरुंग, खिलजी, तुगलक, तैयार और लोदी।
मुगल साम्राज्य की नीति-वार, हुमायूं और सुल्तान, अकबर से औरंगजेब तक राज्य विस्तार।
मुगल साम्राज्य का पतन-राजनीतिक, भारतीय लोगों का अर्थ और मुगल साम्राज्य का विवाह
विजय नगर और बहमनी राज्य- उत्तर, विस्तार और विवाह
मराठा आंदोलन - विजय द्वारा स्वराज की नीति, पेशेवरों के अर्थी इसका विस्तार, मराठा राज्य में पतन के कारण।

प्रशासन
संवीन के अर्थी प्रशासन- अर्थमण्डल, नीति, राजयोग, राजकोष और सैनिक।
शेषराय के प्रशासन सुधार, मुगल प्रशासन-भू-राजयोग और आधा के अर्थ स्वरूप,
राजमार्ग और ब्रह्मजीवन।

दक्षिण में प्रशासन पद्धति-विवाहनगर, बहमनी राज्य तथा मराठा।

आर्थिक पक्ष
कृषि उत्पादन- ग्रामीण अर्थव्यवस्था, कृषि वर्ग।
शहरी केन्द्र और जनसंख्या।
उद्योग-सूरत वस्त्र-उद्योग, हलसिल, कृषि आधारित उद्योग, संगठन, कारखाना,
प्रौढोमियों।
व्यापार और वाणिज्य- राजय की नीतियाँ, आंतरिक और वाणिज्य व्यापार।
यूरोपीय सुधार, व्यापार केन्द्र और विस्तार, परिवहन और संचार।
विभाग व्यापार, वाणिज्य और उद्योग, हुंडवार (बिनय महत) और कीमा।

सामाजिक धार्मिक आंदोलन
सूरत्सक उनके धार्मिक संघ, विवाहार और पद्धतियाँ, प्रथम सुफ्री धर्म।
भक्ति सम्प्रदाय- देव और उनके शाखायें, गैरवाद और उनके शाखायें।
मध्यकालीन संस्कृति- उत्तर और दक्षिण उनका सामाजिक राजनीतिक और धार्मिक जीवन पर प्रभाव।
भिक्षु आंदोलन - गुरुमानक देव और उनके उपदेश और साधना, आदि पनेरा, खालसा।

सामाज
मुगल-शासन- शासक वर्ग, प्रमुख धार्मिक वर्ग, व्यापारी और व्यवसायिक वर्ग,
ग्रामीण समाज- छोटे सामाज, ग्राम कर्मचारी, कृषि और गैर- कृषि वर्ग शिल्पकार।
महिलाओं की रिहायत

सांस्कृतिक जीवन
शैक्षणिक पद्धति और उनकी अभिप्रेता।
साहित्य-फारसी, संस्कृत तथा क्षेत्रीय भाषाएँ।
ललित कलाएँ-विज्ञानके के प्रमुख स्कूल, संस्कृत।
उत्तर तथा दक्षिण भारत का वास्तुविद्या राजस्थान भारतीय इतिहास वास्तुकला।

खण्ड-स

आधुनिक भारत का इतिहास
स्थूल तथा इतिहासशास्त्र
पुराण-भारत सामग्री, जीवनी तथा संस्थान सामाज-पर्याय।
मीमिठक साक्ष्य, सूजनात्मक साहित्य तथा चित्रकला।
आधुनिक भारतीय इतिहासशास्त्र की समस्यायें- सामाजिकवादी, राष्ट्रवादी, मार्क्सवादी तथा मध्यवर्ती।
**ब्रिटिश शक्ति का उदय**
17वीं और 18वीं शताब्दी में भारत में यूरोपीय व्यापारी पुरुषगाली, दया, ब्रांसीसी तथा ब्रिटिश।
भारत में ब्रिटिश शासन की स्थापना तथा दिवस।
भारत की प्रमुख शक्तियाँ के साथ ब्रिटिश संबंध और उनका आधुनिकीकरण- बंगला, अवध, हैदराबाद, मैसूर, मराठा तथा सिक्ख।

**कम्पनी तथा राजा (काउन) का प्रशासन**
इंग्लैंड की कम्पनी के अधीन मध्य तथा प्रारंभक दौंगे का विकास (1773-1853) कम्पनी तथा काउन के अधीन पर्याप्त शक्ति, सिविल सेवा, व्यापारिक, पुलिस सेवा तथा सेवा।

**स्वतंत्रता व्यापार**
संविधानसम्मत भारतीय समाज-
इसी धर्म से संपन्न, भिन्न भारतीय सामाजिकता तथा आधिकारिक पद्धतियों तथा धार्मिक विश्वासों की समीक्षा, शेषांतर तथा अन्य गतिविधियाँ।

**संग्रहालय भारतीय समाज**
इसी धर्म से संपन्न, भिन्न भारतीय सामाजिकता तथा आधिकारिक पद्धतियों तथा धार्मिक विश्वासों की समीक्षा, शेषांतर तथा अन्य गतिविधियाँ।

**राष्ट्रीय आंदोलन**
भारतीय राष्ट्रवाद का उदय, राष्ट्रवाद के सामाजिक तथा आधिकारिक आधार। 1857 का विद्रोह तथा भिन्न-भिन्न सामाजिक वां जनजातियों तथा किसान आंदोलन। भारतीय राष्ट्रीय कांग्रेस की विवाहवाद तथा कार्यक्रम 1885-1920 स्वदेशी आंदोलन का प्रतीतियाँ। भारत तथा विदेश में भारतीय कांग्रेसों की विवाहवाद एवं कार्यक्रम। वास्तविक राजनीति। दलित वर्ग का आंदोलन। सामाजिक राजनीति तथा पाकिस्तान का उदय। भारतीयता तथा विवाहवाद की ओर।

**स्वतंत्रता भारत (1947-1984)**
विवाहवाद के बाद पुनर्वास।
भारतीय राज्यों का एकीकरण: केंद्रीय कांपार।

**इतिहास में अनुसारांकन**
इतिहास की अवधारणा, इतिहास के क्षेत्र तथा मूल्य, इतिहास में कार्य कारण संबंध, इतिहास में वस्तुमिल्लता तथा अभिविलय, इतिहास और उसके सहायक विज्ञान, अनुसंधान का क्षेत्र- प्रतापित।

अनुसंधान क्षेत्र में स्वतंत्र- प्राथमिक/द्वितीयक
अनुसंधान के अनुसंधानकारी क्षेत्र में आधुनिक इतिहास लेखन
SUBJECT: POLITICAL SCIENCE (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

1. Overview of Indian Political Thought, Genesis and development.
2. The Indian Renaissance- Raja Ram Mohan Roy, Balgangadhar Tilak, Vivekanand.
5. Political ideas of Pandit Jawahar Lal Nehru.
6. Dr. Bhimrao Ambedkar.
7. Political System, Approach and Analysis (David Easton)
8. Why’s and where fore’s of Marxian approach.
9. Political Elites (View of Pareto, Mosca, Michels, Laswell)
10. Political Socialization (Views of Apter, Almond and Powell)
11. Political Communication (views of Norbert Weiner and Karl Deutsch)
12. Meaning, Nature and Scope of International Politics
13. The concept of Non-Alignment :Bases, Role and Relevance
14. Regional Cooperation SAARC, ASAEAN.
15. Disarmament and Arms Control, CTBT, NPT
17. Globalization- Meaning, Nature, its advantages and disadvantages, role of the WTO.
20. New Public Administration -Trends
21. Financial Administration
22. Financial Administration- Importance and Aims
24. Political Thought of Plato
25. Political Thought of Aristotle
27. Bentham, J.S. Mill, Hegal, Green, Marx

1. भारतीय राजनीतिक विचारों का परिदृश्य, उत्पत्ति तथा विकास
2. भारतीय पुनर्जीवनण- राजाराममोहन रॉय, बालगंगद्हर तिलक, वीवेकानंद
3. महात्मा गांधी के विचारों पर प्रभाव
4. रत्न, धर्म, शांति, प्रेम, अहिंसा, अस्तेय, स्वदेशी, रोटी के लिए श्रम, भ्रष्टाचार, सविनय अव्भा आंदोलन
5. पंडित जवाहरलाल नेहरु के राजनीतिक विचार
6. डा. भीमराव आंबेडकर
7. राजनीतिक व्यवस्था, उपादेय एवं विश्लेषण (डेविड इंस्टन)
8. मार्क्सवादी उपादेय के कारण तथा परिपक्वता
9. राजनीतिक अभिजात्य (पेरेटो, मोस्का, मिन्जेल्स, लास्चेल के विचार)
10. राजनीतिक संचार (एप्टर, ओल्मोंड तथा पैवेल के विचार)
11. राजनीतिक संचार (लॉर्ड वीमन तथा काल्प ह्युस्ट के विचार)
12. अंतर्राष्ट्रीय राजनीति का अर्थ, प्रकृति तथा विलास
13. गृहमंत्रिपेश्ता- आधार, भूमिका तथा महत्व
14. क्षेत्रीय सहभागिता- साक्ष, अधिस्थान
15. नि:शरणक्षण तथा शरण पर नियंत्रण- सीटीबीटी, एजपीटी
16. दक्षिण-उत्तर संवाद तथा दक्षिण-दक्षिण संवाद तथा इनके महत्वपूर्ण मुद्दे
17. भूमंडलीकरण- अर्थ, प्रकृति, लाभ, हानियां, डेटाबासीओंकी भूमिका।
18. लोक प्रशासन का विकास
19. लोक प्रशासन का अर्थ, प्रकृति एवं वित्तार
20. नवीन लोक प्रशासन- प्रवृत्तियां
21. वित्तीय प्रशासन- महत्व तथा उद्देश्य
22. शैक्षणिक आवश्यकता बजट तथा पार्श्वभूमियों बजट- प्रक्रिया, कठिनाईयां तथा महत्व
23. पैलेटो के राजनीतिक विवाद
24. अर्थों के राजनीतिक विवाद
25. मेकिक्यावली, हॉक्स, लोक, रूसो, मॉटस्क्यू
26. बेविया, जे.एस. निल, हीगल, पीन, माक्स

Constituent Assembly: Composition and working; Making of the Indian Constitution, Salient features of the Indian constitution

Preamble; Fundamental Rights and Duties; Directive Principles of State Policy, Amendment Procedure

Union Executive: President, Prime Minister and Council of Ministers

Union Legislature: Lok Sabha and Rajya Sabha; Union Judiciary: The Supreme Court of India

State Executive: Governor, Chief Minister and Council of Ministers

State Legislature: Vidhan Sabha and Vidhan Parishad

Judiciary: High Court and Subordinate Courts

Problem Areas
1. Increasing Demand for State Autonomy
2. Demand for the creation of new states
4. Inter state river water disputes
5. Factors influencing state politics in India

Main political issues since 1971 AD.
Nepal- The status of the roots of democracy.
Indo Pak Relation
II. The League of Nations: Role in protecting world peace, causes of failure of League of Nations.
III. The United Nations: Structure and Functions, Various organs of the UN Need of reforms in the UN structure.

Humanitarian role.

IV. UN’s role in Disarmament

- Nature of social Research: Importance and uses, Difference between Pure and applied research, Identification of Research problem, Research Design.
- Hypothesis, Concepts and Variables, Typologies, Hypotheses Formulation and testing, Sampling Methods. Tools and Techniques of Data collection
- Observation: Characteristics of observation, Kinds of observation, Merits and Demerits, Questionnaire, scheduled and interviews.
- Sampling and survey techniques.
- Nature of study : Case study, techniques, Role and importance of case studies, Pilot studies and panel studies.


Relationship between international law and national law - Codification and Progressive Development of International law.


1. Foreign policy: Meaning, nature and determinants
2. Determinants of Indian Foreign Policy: Internal and external
3. Principles and objectives of Indian Foreign Policy.
   1. विदेशी पॉलिसी : अर्थ, प्रकृति और नियामक तत्त्व
   2. भारतीय विदेशी नीति के नियामक तत्त्व : आवश्यक एवं बाह्य
   3. भारतीय विदेशी नीति के सिद्धांत एवं उद्देश्य

1. Indian and the USA
2. India and Russia
3. India and China
   1. भारत और संयुक्त राज्य अमेरिका
   2. भारत एवं रूस
   3. भारत एवं चीन

1. Nature of Indian Federal System
2. Center State Relations in India : Legislative, Administrative and Financial
   1. भारतीय संघीय व्यवस्था की प्रकृति,
   2. केन्द्र राज्य संबंध : विधायी, वित्तीय एवं प्रशासनिक

1. Emerging trends in Indian federal system
   1. भारतीय संघीय व्यवस्था की उत्कृष्ट प्रकृतियाँ,
   2. स्वतंत्र भारत में स्वतंत्र व्यवस्थान का विकास, 73 एवं 74वाँ संविधान संशोधन
Finance and local self Govt.: Bureaucracy and local self Govt; women’s reservation in a Panchayat and its effects. Local autonomy and its importance

Reorganization of States (1956) and Formation of Bihar, Division of Bihar. Determinants and Characteristics of Bihar Politics, Party System and Main Political Parties in Bihar.

Administration in Bihar: Secretariat, Chief Secretary, Secretary, Commissioner


Types of Diplomacy, Functions & Duties of a diplomat, Diplomatic procedure, Diplomatic Language.


SUBJECT: HINDI (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)
This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)
will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

1. हिन्दी भाषा का विकास एवं भाषा विवरण
अपभ्रंश (अवहट्ट सहित) और पुरातन हिन्दी का सम्बन्ध, काव्यभाषा के रूप में अवधि का उदय और विकास, काव्यभाषा के रूप में ब्रजभाषा का उदय और विकास, साहित्यिक हिन्दी के रूप में इसकी बोली का उदय और विकास, मानक हिन्दी का भाषा वैज्ञानिक विवरण (स्पष्ट), हिन्दी की बोधिवाद- वर्णक्रम तथा संस्करण, देवनागरी लिपि का विकास और उसका मानकक्रमकरण।
हिन्दी प्रसार के आंदोलन, प्रमुख व्यक्तियों तथा संस्थाओं का योगदान, राजभाषा के रूप में हिन्दी।
हिन्दी भाषा-प्रयोग के विविध रूप- बोली, मानकभाषा, सम्प्रभुभाषा, राजभाषा और राष्ट्रभाषा, संवार माध्यम और हिन्दी।
हिन्दी का भाषिक स्तर्पूर्ण- हिन्दी की यात्रिक व्यवस्था- खंड, खंडवेत्यर। हिन्दी शब्द रचना-उपसर्ग, प्रत्यय, समास। सूरतव्या-विंग, वचन और कारक व्यवस्था के संदर्भ में हिन्दी के संज्ञा, सर्वनाम, विशेषण और क्रियारूप। हिन्दी वाक्य-संस्तर्का, पदक्रम और अन्तित।

2. हिन्दी साहित्य का इतिहास
हिन्दी साहित्य का इतिहास- दर्शन, हिन्दी साहित्य के इतिहास- लेखन की पद्धतियाँ।
हिन्दी साहित्य के प्रमुख इतिहास बन्ध, हिन्दी के प्रमुख साहित्यिक केन्द्र, संस्थाएं एवं पत्र-पत्रिकाएं, हिन्दी साहित्य के इतिहास का काल-विवाहजन और नामकरण।

आदिकाल: हिन्दी साहित्य का आरंभ कब और कैसे ? राष्ट्र-साहित्य, आदिकालीन हिन्दी का जन साहित्य, सिद्ध और नाथ साहित्य, अमीर खुसरो की हिन्दी कविता, विवाहपति और उनकी पदवी, आध्यात्मिक बाद तथा लौकिक साहित्य।
मध्यकाल: भक्त-आदोलन के उदय के सामाजिक-सांस्कृतिक क्रियाकलाप, प्रमुख लिखित एवं समग्र सम्राज्य, वैभव भक्त की सामाजिक-सांस्कृतिक पृष्ठभूमि, आल्फार सन्त, प्रमुख सम्राज्य और आचार, भक्त आदोलन का अखिल भारतीय स्वरूप और उसका अल्प-प्राप्तिक वैश्विक।
हिन्दी लता काव्य : सल्तन काव्य का वैज्ञानिक आधार, प्रमुख लिखित लता कवि कवीर, नानक, दादू, रेदास, सल्तन काव्य की प्रमुख विशेषताएं, भारतीय धर्म साधना में सल्तन कवियों का स्थान।
हिन्दी सूफी काव्य : सूफी काव्य का वैज्ञानिक आधार, हिन्दी के प्रमुख सूफी कवि और कवि- मुल्तन दादू (बन्दरां), कुलवन (भिजरावती), मंडन (भुज्जानली) बलिक मुहम्मद जायसी (पद्मावत), सूफी प्रेमालयकों का स्वरूप, हिन्दी सूफी काव्य की प्रमुख विशेषताएं।
हिन्दी कृष्ण काव्य : विविध सम्राज्य, वल्लभ सम्राज्य, अद्भुत, प्रमुख कृष्ण-भक्त कवि और कवि, सूरदास (सुरसागर), बन्दरां (जस पंचायती), श्रमणीतं पत्रमरी, शीतल पत्रमर्या और
हिन्दी कृष्ण काव्य- मौर्य और रसशास।
हिन्दी नाम काव्य : विविध सम्राज्य, समस्फूर्ति शाखा के कवि और कवि, तुलसीदास की प्रमुख कृतियाँ, कवि का रूप और उनका महत्त्व।
रीति काल : सामाजिक-सार्वजनिक कृतिक परिप्रेक्ष्य, रीतिकाल के मूल स्रोत, रीतिकाल की प्रमुख प्रत्येकताओं, रीतिकालीन कथितियों का आवार्य, रीतिमुक्त काव्यास, रीतिकाल के प्रमुख कवि : केशवदास, मतिराम, भूपण, विहारीलाल, देव, घनानंद और पद्माकर, रीतिकाल में लोकजीवन।

आधुनिक काल : हिंदी ग्रंथ का उद्भव और विकास।
भारतेन्दु पूर्व हिंदी ग्रंथ, १८५७ की राज्य कालित और सार्वजनिक पुरुषजीवन, भारतेन्दु और उनका मण्डल, १९वीं शताब्दी के उत्तरार्ध की हिंदी पत्रकारिता।

खिड़कीय युग : महावीर प्रसाद खिड़की और उनका युग, हिंदी नवजागरण और सत्संगीत, वैदिक साहित्य का ग्रंथ, राज्य काव्यास, राज्य काव्यास के प्रमुख कवि, साक्षात्कार और उसके प्रमुख कवि।

छायावाद और उसके बाद : छायावादी कवि की प्रमुख विशेषताएं, छायावाद के प्रमुख कवि : प्रसाद, लिराला, पनत और महादेवी, उत्तर छायावादी कवि और उसके प्रमुख कवि, प्रतिष्ठित कवि और उसके प्रमुख कवि, प्रयोगमूल और नई कविता, नई कविता के कवि, सामाजिक कविता, सामाजिक साहित्यक कविता।

3. हिंदी साहित्य की ग्रंथ विभागः
हिंदी उपन्यास : प्रेमचंद पूर्व उपन्यास, प्रेमचंद और उनका युग, प्रेमचंद के परवर्ती प्रमुख उपन्यासकार : भैरो, अनंत, हजारी प्रसाद खिड़की, वक्तापत्र, अमृतलाल नागर, फरीदलाल रेखा, भूमि साहित्य, चूड़ा चोली, नरेश सेहता, श्रीलाल शुक्ल, राजी गांधु रा, रंगेय राघव, नलिन भानुप्रीति।
हिंदी कहानी : वीरवी सदी की हिंदी कहानी और प्रमुख कहानी आदिवास।
हिंदी नाटक : हिंदी नाटक और रंगमंच, विकास के चरण और प्रमुख नाट्यकथिताओं : अंंगेर नयारी, चंद्रशंकर, अंंधायुग, आदि-अधूरे, आदि सदी, हिंदी एकादी।
हिंदी निबंध : हिंदी निबंध के प्रकार और प्रमुख निबंधकार - रामचंद्र शुक्ल, हजारी प्रसाद खिड़की, वक्तापत्र राघव, विद्यानिधान भिंत्र, हारिश्चंकर परसाई।
हिंदी आलोचना : हिंदी आलोचना का विकास और प्रমुख आलोचक - रामचंद्र शुक्ल, नन्दवल्लार वाजपेयी, हजारी प्रसाद खिड़की, रामचंद्र शर्मा, ह. नानक, ह. नानक सिंह, विजयदेव नारायण साही।
हिंदी की अन्य ग्रंथ विभागः: रेखाघाट, सर्पमार, नारा-साहित्य, आलमकथा, जीवनी और रिपोर्टेज।

4. भारतीय एवं पाश्चात्य कव्यशास्त्र तथा हिंदी आलोचना
कव्य लक्षण, कव्य हेतु और कव्य प्रयोजन। प्रमुख सिद्धांत : रस, अलंकार, रीति, धार्मि, वक्रोक्ति और औषधि- सामाजिक परिवार।
भरत गुप्त का रस सूत्र और उसके प्रमुख व्याख्याकार।
रस के अवयव, व्याख्या।
साधारणकरण एवं सहदेव का अवधारणा।
शब्द शक्तियाँ और धार्मि का व्याख्या।
अलंकार - वश, शेष, वक्रोक्ति, उपसना, रूपक, उपशेष, संवेद, ब्राह्मणाल, अतिथियोक्ति, अतीप्ति, समालोक्ति, सत्युप्ति, विशेषोक्ति, इत्यादि, उदाहरण, प्रतिविद्युपग, विद्युण्य, अर्थार्थवाच, विभावाचा, अर्थावग तथा विरोधावग।
रीति, गुण, दोष।
पदों और अर्थसः का अनुकरण सिद्धांत तथा अर्थसः का विचरन सिद्धांत।
व्युहसर्व तथा कालावधि सिद्धांत।
का अवधारणा।
कालरित कालजना और फंदसी।
आई.एफ. रिश्वद्वारा भूमि सिद्धांत तथा काल-भाषा सिद्धांत।
टी.एस. लिपाई - निर्वाचितक का सिद्धांत, वास्तविक तथा-सम्बन्धी, परम्परा की अवधारणा।
भिक्षक, फलकारी, कलपना, प्रतीक और चित्र।

स्वयंदतावाद और योकार्थवाद, संस्कारवाद, उत्तर संस्कारवाद, आधुनिकता, उत्तर आधुनिकता। समकालीन आलोचना की कपिलय
अवधारणाएँ : विज्ञान (आवरणी), अजनबीयन (एलियनेशन), विसंगति (एवसर्ट), अन्तर्विशेष (पैराडॉक्स), विकरण (डीकन्ट्रक्शन)
हिंदी आलोचना – रामचंद्र शुक्ल और उनके आलोचनात्मक प्रतिमान।

शुक्लोत्तर समीक्षा और समीक्षक – हजारी प्रसाद द्विवेदी, नन्दुलारे वाजपेयी, डॉ. रामचंद्र शर्मा, डॉ. नामचंद सिंह, विजयदेव नारायण
साही, समकालीन आलोचना।

5. प्रयोजन मूलक हिंदी

अनुवाद विज्ञान : अनुवाद का स्वरूप, क्षेत्र, प्रक्रिया एवं प्रविद्ध। हिंदी की प्रयोजनीयता में अनुवाद की भूमिका।

मीडिया लेखन : जनसंचार प्रोसोकी एवं यूजरियाँ, विभिन्न जनसंचार माध्यमों का स्वरूप– मुद्रण, श्रव्य, दृश्य-श्रव्य, इंटरनेट।

दृश्य-श्रव्य माध्यम : (फिल्म, टेलीविजन एवं वीडियो) दृश्य माध्यमों में भाषा की प्रकृति। दृश्य एवं श्रव्य सामग्री का सामस्याध्य पार्श्व
वाचन (वायस ऑवर) पटकथा लेखन।

हिंदी कम्प्यूटरिंग : कंप्यूटर : परिचय, उपपेक्षा, उपयोग तथा क्षेत्र, वेब परिशिष्ट का परिचय।

पत्रकारिता : वर्तमान एवं प्रगति, हिंदी पत्रकारिता का संक्षिप्त इतिहास, शीर्षक की संस्करण, लीड
इंडेक्स एवं सीरिज-संपादन, संपादन के आधारभूत तत्व।
SUBJECT: ENGLISH (Ph.D. ENTRANCE TEST)

SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

The paper will cover the study of English literature from Shakespeare to 1950. A first hand reading of the prescribed texts and critical ability is required to be tested.

I Literary Forms

Poetry : Lyric, Ode, Sonnet, Elegy, Satire, Epic
Drama : Tragedy, Comedy, Farce, Melodrama, One Act Play, Masque

II William Shakespeare

General Questions on the writer and a critical study of the following works Hamlet, The Tempest

III A critical study of the following poets with reference of the poems shown against each of them

Poetry
Milton : Sonnets
Pope : Essay of Man
Johnson : The Vanity of Human Wishes
Wordsworth : Tintern Abbey. Immortality Ode
Keats : Odes
Tennyson : Ulysses

Drama
Tragedy, Comedy, Farce, Melodrama, One Act Play, Masque

IV The works of the following novelists with special reference to the novels mentioned against each.

Dickens : Oliver Twist
Thomas Hardy : Tess of the D’urbervilles Poetics
Aristotle : Poesie
Longinus : On the Sublime
Dryden : Essay on Dramatic Poesie
Arnold : The Study of Poetry

V (a) A critical study of the 20th century writers and their works.

E.M. Forster : A Passage to India
D.H. Lawrence : Sons and Lovers
G.B. Shaw : Saint Joan
W.B. Yeats : Byzantium, The Second Coming, A Prayer to My Daughter
T.S. Eliot : The Waste Land

V (b) American Literature

Emerson : The American Scholar
Thoreau : Civil Disobedience
Hawthorne : The Scarlet Letter

RECOMMENDED BOOKS:-

2. American Literature - Meenakshi Raman
3. English Language Literature - P.D. Wadgaunkar
SUBJECT: SOCIOLOGY (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test general awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

1. **Nature of Sociology:** Definition, Basic Concept, Community, Institution, Culture, Social Structure, Structure and Role Their Interrelationship, Social Group.

2. **Social Institution:** Marriage, Family, Education, religion, Socialization, Theories of Socialization

3. **Social Stratification:** Social Differentiation, Forms of Stratification, Caste, Class, Gender, social mobility, Social Change

4. **Structural:** Radcliffe Brown, Levi Straus Functional- Durkheim, Malinowski, parsons, Interactionist - Social action, Max Weber, Pareto Bulmer Conflict - Karl Marx, Dahrendorf

5. **The Challenges of Globalization:** Globalization and Social Development, Globalization and Woman’s Development

6. **Meaning and Nature of Social Research:** The scientific methods, the Problem of the Study of Social Phenomena, Objectivity and Subjectivity Fact & value, Quantitative Methods - Survey, Research Design & its types, Techniques of Data Collection

7. **Qualitative Methods:** Statistics in Social Research, Measures of Central Tendency - Mean Median Mode, etc

**REFERENCE BOOKS -**

1. Advanced Sociology - Manahan & Manahan
2. Elements of Social Research - Baghel & Pandey
3. Development of Sociology - G.R. Mohan
4. Sociology Thinkers - RavindraNath Mukharji
6. Social change in modern India - M.N. Srinivas
7. Social Change - William F. Ogburn
8. The Concept of Sociology - Farley E Eubank
SUBJECT: ECONOMICS (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


2. **National Income** -Concept and measurement

3. **Consumer behaviour** - Law of demand , Elasticity of demand, utility analysis and indifference -curve techniques

4. **Producer's behaviour** - Production Function, Laws of Returns, Returns, of Scale cost curves

5. **Price Theory** - Price determination under different maker condition, pricing of factors of production Keynesian and Modern theory of employment Banking objective and instruments of Central Banking , credit policies in a planned developing economy

6. **Types and principles of taxation**. Principles of Public expenditure, objective and instruments of budgetary and fiscal policy in a planned developing economy

7. **International trade**-Theory and policy of international trade , determination of exchange rates ,balance of payment

8. **International Monetary institutions** - I. B.R.D. and I.M.F. Characteristics of under developed economy, human and natural resources, primary, secondary and tertiary sectors in India, mixed economy in India

9. **Agricultural development**- Agricultural Policy. land reforms Green Revolution and its aftermath

10. **Industrial development** - Industrial Policy, Public. and private sectors, Regional distribution of Industries in India Pricing policies for agricultural and industrial outputs. Fiscal and momentary policy in India - Objectives, recent budgetary trends, bank nationalization in India. Reserve Bank and monetary policy in India Recent trends in Inida's foreign trade and balance of payments

11. **Indian Planning** - Objectives and strategies, planned growth and distributive justice eradication of poverty, problems of Indian planning.

**BASIC READING LIST:**

SUBJECT: SOCIAL WORK (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


Social Work Education: Content, Training, Supervision, Problems and Challenges.
Meaning and Characteristics of Society, Community, Social Group and Social Institution; Social Structure and Social Stratification; theories of Social change and Social Disorganisation.


Study of Group Process - Group Dynamics, Member's behavior, leadership and Role of the Worker in various settings.

Community organization as a Para-political process- Networking, conscientisation, planning and organizing, roles and strategies of social movements- types and role of NGOs.

Social Policy- Concept and Scope, Distinction between Social and Economic Policies, Place of Ideology and Values.


SUGGESTED READINGS:
2. History and Philosophy of Social Work in India- Prof A.R.Wadia
4. Community Organization- Dr(Prof.) Banmala
6. Social Problems in India- Ram Anuja
7. Social Justice and Development of Weaker Section- Bindheswar Pathak
SUBJECT: LIBRARY AND INFORMATION SCIENCE  
(Ph.D. ENTRANCE TEST)  
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


REFERENCE BOOKS
1. Classification , Krishan Kumar, Ess Publication
2. Descriptive Question NET/SLET ,SM Tripathi, Ess Publication
3. Cataloging , SS Agrawal, Hindi Gtanth Acdmi Bhopal
4. Pralekhan Aum Suchana Vigyan , SP Sood RB Publication Jaipur
5. Library Automation, A R. Nai Ess Publication
6. Library Management, Saxena Suchana aum Sandrabh Sava Ke Nven Ayam , S M Trapathi Ess Publication
SUBJECT: BOTANY (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)

1. **Microbiology** - Viruses and Bacteria Structure, classification and reproduction. General Account of infection, immunity and serology: Microbes in industry and agriculture.

2. **Pathology** - Knowledge of important plant disease in India caused by fungi. Modes of infection and methods of control.

3. **Plant Groups** - Structure, reproduction, life- history, classification, evolution, ecology and economic importance of algae, fungi, bryophytes, pteridophytes and gymnosperms.

4. **Morphology, anatomy and embryology of Angiosperms** - Tissues and tissue systems. Morphology and anatomy of stem, root and leaf (including development aspects and anomalous growth), Morphology of flower Structure of anther and ovule, fertilization and Development of seed.


6. **Cell Biology** - Cell as unit of structure and functions. Ultra structure function and interrelationships of plasma membranes endoplasmic reticulum, mitochondria, ribosomes chlorplasts and nucleus, Chromosomes- chemical and physical nature behaviour during mitosis and meosis.


10. **Economic Botany** - General account of important sources of food fiber, wood and drugs.

SUGGESTED READING MATERIAL:


SUBJECT: ZOOLOGY (Ph.D. ENTRANCE TEST)
SECTION I (30 MARKS)

This section will contain 30 questions with multiple choices to test genera awareness, research aptitude, reasoning, basics of computation, logic, data interrelation, presentation, analysis synthesis etc.

SECTION II (70 MARKS 35 QUESTIONS)

will contain of 35 questions (multiple choices) to assess the candidates capability of explaining concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form (70 marks)


5. Genetics - Mendelian laws of inheritance, linkage and crossing over, mutation aid evolution, cytoplasmic inheritance genes and diseases.


8. Physiology with special reference to mammals: Composition of blood, blood groups in man, coagulation, oxygen and carbon dioxide transport, nephron and urine formation, mechanism of conduction along axon and across synapse, neurotransmitters, Vision, Hearing and other receptors, mechanism of contraction of skeletal muscle, role, of salivary gland, liver, pancreases and intestinal glands indigestion. Absorption of digested food, roles of pituitary, thyroid, parathyroid, pancreas, adrenal testis, ovary and pineal body.
9. **Embryology:** Gametogenesis, fertilization, types of eggs, cleavage, development up to gastrulation in Branchiostoma, frog and thick, Metamorphosis in frog; Formation and fate of extra embryonic membranes in chick; formation of amnion, allanteis and classification of placenta in mammals, function, of placenta in mammals.

**SUGGESTED READING MATERIAL:**
5. E. Mayer. Elements of Taxonomy.