Admissions 2016
Postgraduate Admissions Test Syllabus
POSTGRADUATE PROGRAMMES

Candidates can refer to the various syllabi, depending on the course they have applied for, as indicated in their application forms.

There will be negative marking for all multiple choice questions.

COMPULSORY FOR ALL M.A. / M.Sc. PROGRAMMES

GENERAL ENGLISH

Question Paper Format:
1. Comprehension (Unseen Passage)
2. Vocabulary: Pair of words often confused on word substitutes
3. Grammar: Propositions, tenses, structural items, voices etc., reported speech, phrasal verbs, word formation.
4. Compositions: Expansion of a proverb or paragraph writing (150-200 words).
5. Spelling.

M.A. in ENGLISH LANGUAGE AND LITERATURE

QUESTION PAPER FORMAT:
› Five short answer type: Comprehension of unseen passage, prose, poetry (100 words).
› Long Answer (essay) type: Testing the knowledge and understanding of literary background (400 words).
› Set on major literary forms (150 words).
› Multiple choice type: a) Vocabulary testing b) Common literary terms c) Rewriting a passage: to correct grammatical mistakes - in verbs, spelling or of a similarly type.

Prescribed texts:
› A short history of English Literature by Evans.
› A background to the study of English Literature - for Indian students by B. Prasad, Macmillan.

M.A. in ECONOMICS

The test is designed to ensure that selected candidates are able to cope with the requirements of the M.A. (Economics) programme at the university. This programme is designed to enable students to handle issues within an analytical frame, argue logically and articulate their views clearly. They are also expected to undertake processing of data to derive meaningful conclusions and to make empirical judgments consistent with social realities and ethical values.

QUESTION PAPER FORMAT:
The question paper of two hours duration and carrying 75 marks, is divided into three sections:

Section A- Objective type questions
Section B- Short answer questions
Section C- One essay type question
Level and coverage of questions is comparable to those of a good undergraduate programme in economics. Topics covered are as follows:

1. Economic Theory:
Consumer behaviour: preference ordering, utility, budget sets and demand functions; Theory of the firm; Costs, supply and factor demand; Market structure: pricing and production under perfect and imperfect competition, General equilibrium and welfare; Taxation; Elements of national income accounting; Level of economic activity under classical assumptions; Keynesian theory of effective demand and employment; Monetary and fiscal policies; International trade.

2. Quantitative Methods:
Functions of one variable; Linear and quadratic equations; Derivatives and rules of differentiation; Measures of central tendency and dispersion; Correlation and regression with two variables; Index numbers; Elements of probability theory; Random variables and common distributions.

3. Indian Economy and Development:
Basic issues and indicators of economic development; Economic growth; Aspects of development policy: Population growth and employment; Strategies and theories of development; Human values and economic development; Structure of the Indian economy; Human resource development; Persistence of poverty and inequality; New economic policy regime; Indian ethos and policies for all round development; Aspects of the International Economy.

M.Sc. in MATHEMATICS

M.Sc.(Mathematics) program is an intense 2 year PG program with avenues for obtaining anyone of the three possible specializations viz. Pure Mathematics, Applied Mathematics, and Computer Science if candidates wish to choose a specific domain of expertise. Applicants who wishes to enter this BSc-MSc Integrated Program at MSc level must satisfy the pre-requisite qualification criteria. Those who are found suitable will be tested for their competence in General English, Mathematics and Computer Science.

QUESTION PAPER FORMAT:
Test on Mathematics and Programming skills will be of 2 hours duration carrying 75 marks with the following pattern:

Section A- 40 multiple choice questions- 40 marks
Section B- 5 problem solving type questions- 5 marks each- internal choice - 25 marks
Section C- Short C-Programming Test- 10 Marks

Viva voce: 30 marks- Those who are qualified in English and Written Test will undergo a technical Viva voce.

The candidate must be familiar with the following topics of Mathematics and Computer Science.

Mathematics: Calculus, Differential Equations, Probability Theory, Real Analysis, Group Theory, Ring Theory, Linear Algebra, Complex Analysis, Discrete Mathematics, and Numerical Analysis. The detailed syllabus is as follows:

Calculus: Higher Order Partial Derivatives, Differentiability, Gradient, the Chain Rule, Directional Derivative, Total Differential and Approximation, Constrained Extrema and Lagrange Multipliers, Double and Triple Integration.

Differential Equations: Classification of Ordinary and Partial Differential Equations, Types of Solutions, Existence and Uniqueness of Solution for an Initial Value Problem, Bernoulli Equation, Exact Differential Equations and Integrating Factors, Cauchy-
Euler Equation, Method of Variation Of Parameters, Method of Undetermined Coefficients, Wronskian, Method of Separation of Variables for solving Boundary Value Problems


Group Theory: Groups, Subgroups, Cyclic Groups, Normal and Quotient Subgroups, Permutation Groups, Homomorphism, Automorphism, Cayle's and Sylow's Theorem.

Ring Theory: Rings, Integral Domain, Division Rings, Ideals, Quotient Rings, Euclidean Rings, Polynomial Rings, Field of Quotients, Polynomials over Rational Fields.

Linear Algebra: Vector Spaces, Linear Independence and Dependence, Bases and Dimension, Linear Transformations, Systems of Linear Equations, Eigenvalue and Eigenvector Theory.


Computer Science:

C Language Programming: A minimal exposure to programming is expected from the students. Nevertheless, those qualified for the M.Sc. (Maths) programme and desirous of opting for computer science specialization will be tested in fundamentals of Computer Science and Programming once they are enrolled for the course.

M.Sc. in PHYSICS

QUESTION PAPER FORMAT

The question paper of two hours duration and carrying 75 marks, is divided into three sections:

Written Test: Objective Type questions- 70 % weightage
Paper 1: General English (as already explained above)
Paper 2: Subject Paper will contain two sections A & B.
Section A- 25 marks - to test the basic understanding in Mathematics, Electronics, Chemistry & Computer Science at the under graduate level
Section B- 50 marks - to test the depth of knowledge in the under graduate level physics
Technical Interview: 30% weightage - Subject to qualification in the written test
Final Personality Interview: Subject to clearing the Technical Interview

Admission Test syllabus for Written Test (Paper-2) & Technical Interview

SECTION A - 25 MARKS

Mathematics: Calculus of single and multiple variables, partial derivatives, Matrices and determinants, Algebra of complex numbers; Taylor expansion, Fourier series; Vector algebra, Vector Calculus, Multiple integrals, Divergence theorem, Green's theorem, Stokes' theorem. First order equations and linear second order differential equations with constant coefficients.

Integral Calculus: Integration as the inverse process of differentiation, definite integrals and their properties, Fundamental theorem of integral calculus. Double and triple integrals, change of order of integration. Calculating surface areas and volumes using double integrals and applications. Calculating volumes using triple integrals and applications. Vector Calculus: Scalar and vector fields, gradient, divergence, curl and Laplacian. Scalar line integrals and vector line integrals, scalar surface integrals and vector surface integrals, Green's, Stokes and Gauss theorems and their applications.

Linear Algebra: Vector spaces, Linear dependence of vectors, basis, dimension, linear transformations, matrix representation with respect to an ordered basis, Range space and null space, rank-nullity theorem; Rank and inverse of a matrix, determinant, solutions of systems of linear equations, consistency conditions. Eigenvalues and eigenvectors. Cayley-Hamilton theorem. Symmetric, skew-symmetric, hermitian, skew-hermitian, orthogonal and unitary matrices.


Electronics: Boolean algebra: Binary number systems; conversion from one system to another system; binary addition and subtraction. Logic Gates AND, OR, NOT, NAND, NOR exclusive OR; Truth tables; combination of gates; de Morgan's theorem; Zener diode and its applications, BJT: characteristics in CB, CE, CC modes. Single stage amplifier, two stage R-C coupled amplifiers. Simple Oscillators: OR, AND and applications: Inverting and non-inverting amplifier. 8085 or 8086 Microprocessor architecture and knowledge of assembly language programming.

Chemistry: Periodic Table: Periodic classification of elements and periodicity in properties; general methods of isolation and purification of elements. Chemical Bonding and Shapes of Compounds: Types of bonding-ionic and covalent bonding, M.O. and V.B. approaches for diatomic molecules, VSEPR theory and shape of molecules, hybridisation; Chemical Thermodynamics: Reversible and irreversible processes; First law and its application to ideal and nonideal gases; Thermochemistry; Second law; Entropy and free energy, Criteria for spontaneity. Chemical and Phase Equilibria: Law of mass action; Kc, Kp, K1 and K2; Effect of temperature on K; Ionic equilibria in solutions; pH and buffer solutions; Chemical Kinetics: Reactions of various order; Basis of Organic Reactions Mechanism: Elementary treatment of SN1, SN2, E1 and E2 reactions; Acids and Bases: Arrhenius, Lowry-Bronsted concepts of acids and bases - Strengths of acids and bases.

Computer Science: Basic knowledge of computer systems, software and programming; Number systems. Basic electronic gates. Algorithmic approach to solve problems. Fundamentals of C language.

SECTION B (PHYSICS) - 50 MARKS

Mechanics and General Properties of Matter: Newton's laws of motion and applications, Velocity and acceleration in Cartesian, polar and cylindrical coordinate systems, uniformly rotating frame, centrifugal and Coriolis forces, Motion under a central
Lasers: Quantum theory of radiation; Einstein A and B coefficients, Essential elements of a laser; laser operation; characteristics of laser light.
QUESTION PAPER FORMAT: The question paper is of two hours duration carrying 75 marks, it is divided into three parts:

Section – A: (25 marks maximum) Objective type – 25 questions
Section – B: (6×5=30 marks) Short answer type. 6 questions out of 8 questions- Global choice.
Section – C: (1×20=20 marks) Essay type – long answer type- One out of two questions

GENERAL CHEMISTRY:

ANALYTICAL CHEMISTRY:

INORGANIC CHEMISTRY:
Coordination chemistry: Werner’s theory - Nomenclature of coordination compounds - Isomerism – EAN (effective atomic number) rule - Crystal field theory - Applications of crystal field theory. Periodicity: Basic trends - First and second row anomalies. Nuclear chemistry: Composition of the nucleus - radioactive decay modes - law of radioactive, natural and artificial disintegration series - Nuclear reactions, Applications of radioisotopes as tracers; Counting statistics - Counting techniques.

ORGANIC CHEMISTRY:

PHYSICAL CHEMISTRY:

BIOCHEMISTRY:
Carbohydrates: Introduction, classification, nomenclature, monosaccharides-structure and reactions, disaccharides, oligosaccharides, polysaccharides; Aminoacids and Proteins.
SPECTROSCOPY:
- **UV-Vis spectroscopy**: Theory-instrumentation – Woodward-Fieser rules for calculation of λmax of dienes, Fieser-Kuhn rules for determining λmax and λmin of polyenes;
- **Infrared spectroscopy**: Theory-instrumentation - Sampling techniques; Analysis of IR spectral data - identification of functional groups.

INDUSTRIAL CHEMISTRY:
- **Surface coatings**: Paints and varnishes - Pigments: classification and applications.
- **Petroleum Refining**: Occurrence - composition - processing - applications; Fuels from petroleum - raw materials (chemicals) from petroleum for industrial applications.
- **Polymers**: Importance of polymers - basic concepts - Types of polymers - Structure and properties. Polymer processing, classification based on methods of preparation.
- **Dyes**: Definition - classification based on method of application, color and structure - Classification based on chemical constitution - Methods of application.
- **Fertilizers**: Classification - organic fertilizers, inorganic/commercial fertilizers.

**M.Sc. in BIOSCIENCES**

**QUESTION PAPER FORMAT**: The question paper is of two hours duration carrying 75 marks, it is divided into three parts:

- **Section A**: (25 marks maximum) Objective type – 25 questions
- **Section B**: (6x5=30 marks) Short answer type. 6 questions out of 8 questions - Global choice.
- **Section C**: (1x20=20 marks) Essay type - long answer type - One out of two questions

**BOTANY**:
- **Cryptogams and Phanerogams**: Important features (habit, morphology and reproduction) and General classification of Virus, Bacteria, Algae and Fungi. Common Viral, fungal and Bacterial diseases in Plants, Animals and Man. Economic importance of Bacteria, Algae and Fungi.

Evolutionary trends among Bryophytes, Pteridophytes and Gymnosperms and their economic importance systems of classification, Binomial nomenclature and modern trend in taxonomy. Economic importance of Brassicaceae, Melliaceae, Regumineae, Solanaceae and Poaceae.

**Plant Anatomy**: Types of meristamatic and other tissue systems in Plants Anatomy of root, stem and leaf in Dicots and monocots. Micro and Macro Sporogenesis, Endosperm, Polyembryony and embryogenesis in Dicots and Morocots.

**Plant Physiology**: Osmosis, Active Transport, Physiology of Photosynthesis Respiration, Transpiration and translocation, flowering, growth dormancy and Mineral nutrition in plants.

**ZOOLOGY**:
- **Non-Chordates & Chordates**: Classification of Non-Chordates, Prochordates and Chordates Nutrition, Locomotion and reproduction in Protozoa Protozoan and Helminthes Parasites of Man, Comparative anatomy of Chordates, flight adaptations and migration in Birds. Poisonous and Non-Poisonous snakes of India. Dentition in Mammals, Apiculture, Sericulture, Pearl, Prawn and Fish culture techniques.


**CELL BIOLOGY, GENETICS & EVOLUTION**:
- Structure of cell, Cell organelles, Types of Chromosomes Mitosis and Meiosis, Gametogenesis, mechanism of fertilization, cleavage patterns, Gastrulation, Plaenentation and Menstruation in Mammals, Extra foeta membranes. Mendel’s laws of inheritance, Multiple alleles, linkage and crossing over, sex determination. Sex-linked inheritance Mutations, Operon concept, genetic code Eagenics, Principles of Plant and Animal Breeding; Evidences of evolution Darwin’s and Lamarckian Theories of Evolution, Darwin’s and Lamarckian Theories of Evolution origin and evolution of Man, Isolation and Speculation.

**ENVIRONMENTAL BIOLOGY**:

**MICROBIOLOGY**:
- Classification and characteristics of microorganisms Physiology and Cultivation of microbes. Microbes in water, soil, air food and seucage.

Air, Water, Soil, food and Vector bore diseases prophylactic measures Antigen, Antibody reactions and Principles of immunization.

**BIOCHEMISTRY & BIOTECHNOLOGY**:
- Classification of enzymes, coenzymes and vitamins, structure functions and classification of carbohydrates, proteins and lipids and their energy metabolism.

Plant and Animal tissue culture techniques, Micro-Propagation, Monoclonal Antibodies, Protoplast culture, DNA sequencing, Recombinant DNA, Applied aspects of Biotechnology in Agriculture, Animal Husbandry, Medicine, disease, diagnosis and Therapy.

**FOOD AND NUTRITIONAL SCIENCES**

**QUESTION PAPER FORMAT**

The question paper has two sections with time duration of 2 hours:

- **Section A**: 50 marks - common to B.Sc Homescience, B.Sc. Biosciences and B.Sc. (M.P.C) students
- **Section B**: 25 marks - specific to B.Sc Homescience, B.Sc. Biosciences and B.Sc. (M.P.C) students

**For B.Sc. in Home Science students**

Food Science, Nutrition and Dietetics: Food as a source of nutrients, composition, properties, characteristics, and nutritive value of different foods (cereal grains, millets, pulses, nuts and oil seeds, fruits and vegetables, milk and milk products, meat, egg, poultry, fish, spices and condiments. Chemistry and biochemical roles of fat soluble vitamins, water soluble vitamins, inorganic elements. 1. Energy requirement: Basal metabolism, total energy requirements. 2. Study of Nutrients: (a) Carbohydrates, proteins, fats - chemistry, biochemistry and nutritional aspects such as digestion, absorption, metabolism, functions, sources and requirements. (b) Vitamins and minerals - functions, sources, requirements, and deficiencies. 3. Water balance. 4. Methods of assessing the nutritional status. 5. Principles involved in adoption of normal diet for formulating therapeutic diet - use of food exchange groups. 6. Diets during pregnancy, lactation, infancy, school age, adolescent, adulthood and old age. 7. Nutritional deficiency diseases. 8. Diet in diseases (metabolic disorders, febrile conditions, surgical & other stress conditions) - causes, symptoms, physiological changes and dietary management. 9. National and International agencies and programmes in the betterment of Nutritional status.

Prenatal development and care - postnatal care - neonate – 1st four weeks of life. 3. Infancy - 1 to 2 years: physical, motor, emotional and social development care during infancy; 4. Pre-school years (2 to 6 years); Physical growth and sequence, of motor skills, social behaviour, importance of children's motor activities, intellectual development, oral development; 5. Significance of preschool education; 6. Preschool education: Essentials, Programmes, values of play - parent education; 7. Child from 6 through 12 years: Aspects given under 4th topic; 8. Adolescence: Physical changes, needs, interests, problems and adjustments, social and personality development; 9. Adulthood: Vocational, Marital and Social adjustments; 10. Old Age: Areas of adjustments; Inter-generational conflict.

Home Management: 1. Principles of Home Management of resources; 2. Interior decoration and furnishing: Art elements, principles of design, colour, functions and types of lighting, selection, use and care of household equipments.


For B.Sc. in Biosciences students


V. Microbiology: Classification and characteristics of microorganisms Physiology and Culti vation of microbes. Microbes in water, soil, air food and seucage. Air, Water, Soil, food and Vector borne diseases prophylactic measures Antibiot, Antibody reactions and Principles of immunization.


Food Science, Nutrition and Dietetics:

Food as a source of nutrients, composition, properties, characteristics, and nutritive value of different foods (cereal grains, millets, pulses, nuts and oil seeds, fruits and vegetables, milk and milk products, meat, egg, poultry, fish, spices and condiments. Chemistry and biochemical roles of fat soluble vitamins, water soluble vitamins, inorganic elements. 1. Energy requirement: Basal metabolism, total energy requirements. 2. Study of Nutrients: (a) Carbohydrates, proteins, fats - chemistry, biochemistry and nutritional aspects such as digestion, absorption, metabolism, functions, sources and requirements. (b) Vitamins and minerals - functions, sources, requirements, and deficiencies. 3. Water balance. 4. Methods of assessing the nutritional status. 5. Principles involved in adoption of normal diet for formulating therapeutic diet - use of food exchange groups. 6. Diets during pregnancy, lactation, infancy, school age, adolescent, adulthood and old age. 7. Nutritional deficiency diseases. 8. Diet in diseases (metabolic disorders, febrile conditions, surgical & other stress conditions) - causes, symptoms, physiological changes and dietary management. 9. National and International agencies and programmes in the betterment of Nutritional status.

For B.Sc. in Mathematics / Physics / Chemistry students

The end of education is character
SRI SATHYA SAI BABA