

**Syllabus for written Recruitment Examination for the post of
Post Graduate Assistant in Tamil Nadu Higher Secondary Educational Service.**

பாடத்திட்டம் : தமிழ் - (Subject Code P01)

பிரிவு 1 – மொழி ஆராய்ச்சியின் தோற்றம் – மொழி இனங்கள் – திராவிட மொழிகள் – வடமொழி திராவிட மொழிகளுக்கிடையே உள்ள வேறுபாடுகள்.

தமிழின் தொன்மை – உயர் தனிச் செம்மொழி – காலந்தோறும் தமிழ் – தொல்காப்பியர் காலத் தமிழ் – பல்லவர், பாண்டியர், சோழர் காலத் தமிழ்.

பிரிவு-2 சொற்றொடர் அமைப்பு – சொற்பொருள் மாற்றம் – பேச்சுத் தமிழும், எழுத்துத் தமிழும் – கடன் வாங்கல் கலைச் சொல்லாக்கம்..

பிரிவு 3 – எழுத்து – சொல் இலக்கணம் – யாப்பு, அணி இலக்கணம்.

பிரிவு 4 – அகம் – புறம் – முதல் கரு.. உரிப்பொருள்கள், தொல்காப்பியம் – புறப்பொருள் வெண்பா மாலை நம்பியகப் பொருள்

பிரிவு 5 – மெய்ப்பாடு – எண் வகை – விளக்கம் – பொருள்கோள் விளக்கம் – இறைச்சி – உள்ளுறை விளக்கம்

பிரிவு 6 – சங்க இலக்கியம் – சங்கம் பற்றிய குறிப்புகள் பாட்டும் – தொகையும் தொகுப்பு முறை – சங்க இலக்கியச் சிறப்புகள் – ஓளவையார் – பரணர், கபிலர், நக்கீரர் – செய்யுள் யாத்த அரசர்கள் – பெண்பாற் புலவர்கள்.

பிரிவு 7 – ஐம்பெருங் காப்பியங்கள் – ஐஞ்சிறு காப்பியங்கள் பதினெண்கீழ்க் கணக்கு நூல்கள் – நீதி நூல்களின் சிறப்பு

பிரிவு 8 – பக்தி இலக்கியம் – தேவாரம் – திவ்வியப் பிரபந்தம் – திருமந்திரம் – திருப்புகழ் – பட்டினத்தார் – தாயுமானவர் – அருணகிரிநாதர்.

கம்பராமாயணம் – மகாபாரதம் – பெரிய புராணம் – திருவிளையாடற் புராணம் – தல புராணங்கள். சிற்றிலக்கியங்கள் – 96 வகை பிரபந்தங்கள் – கலம்பகம் – தூது – உலா – பிள்ளைத்தமிழ் – பள்ளு – குறவஞ்சி முதலியன சமயங்கள் வளர்த்த தமிழ் – இசுலாம் – கிருத்துவம் – சித்தர்கள் – சமயச் சீர்திருத்தம்.

பிரிவு 9 – தமிழில் உரைநடை – தமிழ் நூல்கள் பதிப்பு முயற்சி,, இலக்கிய ஆராய்ச்சி – புனை கதைகள் – நாவல் – சிறுகதைகள்..

பிரிவு 10 – நாடக இலக்கியம் – முத்தமிழ் – நாடக இலக்கியங்களின் தோற்றம் – நாடக வகைகள் – மனோன் மணியம் – சங்கரதாஸ் சுவாமிகள் – ஓளவை சண்முகம் – பம்மல் சம்பந்த முதலியார் – மனோகர் – சோ.

இலக்கியத் திறனாய்வு – தேவையா ?

நன்மை – தீமைகள் – திறனாய்வு வகைகள் உணர்ச்சி

கற்பனை – கருத்து – வடிவம்.

பிரிவு-11 படைப்பாற்றல் – கவிதை, கதை, கட்டுரை, நாடகம் எழுதும் ஆற்றலைச் சோதித்தல்.

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Syllabus: English (Subject Code: P02)

Unit-I – MODERN LITERATURE (1400-1600)

Poetry

For Detailed Study

Chaucer	:	Prologue to the Canterbury Tales
Spenser	:	Faerie Queene - <i>Book-I</i>

For Non-detailed Study

Spenser	:	Prothalamion and Epithalamion
Wyatt, Surrey:		Selections in Peacock's English verse, <i>Vol-I</i>
Ballads	:	Peacock - <i>Vol-II</i>

Prose

For Detailed Study

Bacon - Essays -		Of Truth, Of Adversity, Of Studies, Of Revenge, Of Ambition, Of Friendship
Sidney	:	Apologie For Poetrie

For Non-detailed Study

The Bible	:	The Book of Job.
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Drama

For Detailed Study

Marlowe	:	Dr. Faustus
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For Non-Detailed Study

Kyd	:	The Spanish Tragedy
Ben Jonson	:	The Alchemist

Unit-II - MODERN LITERATURE (1600-1798)

Poetry

For Detailed study

Donne	:	Canonisation, The Ecstasie
Milton	:	Paradise Lost, <i>Book-IX</i>
Pope	:	The Rape of the Lock.

For Non-detailed Study

Milton	:	Samson Agonistes
Gray, Collins & Blake:		Peacock's English Verse - <i>Vol-III</i>
Herbert	:	1. Affliction 2. The Pulley
Marvell	:	To His Coy Mistress

Prose

For Detailed Study

Johnson	:	Life of Milton
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For Non-Detailed Study

Bunyan	:	The Pilgrim's Progress
Fielding	:	Tom Jones

DramaFor Detailed Study

Dryden	:	All for Love
Sheridan	:	The School for Scandal

For Non-detailed Study :

Congreve	:	The way of the World
Goldsmith	:	She stoops to conquer

*Unit-III - MODERN LITERATURE (1798 - 1832)***Poetry**For Detailed Study

Wordsworth	:	Immortality Ode, Tintern Abbey
Coleridge	:	Ode to Dejection, Kubla Khan
Keats	:	Ode on a Grecian Urn, Ode to Autumn.
Shelley	:	Ode to the West Wind

For Non-Detailed Study

Wordsworth	:	Prelude - <i>Book-I</i>
Shelley	:	Adonais

ProseFor Detailed Study

Lamb	:	Essays of Elia Christ's Hospital, The South Sea House, Dream children, New Year's Eve
Hazlitt	:	My First Acquaintance with Poets.

For Non-Detailed Study

Shelley	:	A Defence of Poetry
Wordsworth	:	Preface to the Lyrical Ballads (1850)
Jane Austen	:	Emma
Emily Bronte:	:	Wuthering Heights

*Unit-IV - MODERN LITERATURE (1832 to the present day)***Poetry**For Detailed Study:

Arnold	:	Dover Beach, The Scholar Gypsy
Browning	:	Andrea Del Sarto
Tennyson	:	Morte D' Arthur
W.B.Yeats	:	Byzantium
Eliot	:	The Waste land

For Non-Detailed Study:

Hopkins : The Wreck of the Deutschland
 The selections from
 (i) Owen (ii) W.H.Auden (iii) Stephen Spender in the Faber
 Book of Modern Verse.

ProseFor Detailed Study:

Carlyle : The Hero as a Man of Letters
 (from "On Heroes and Hero Worship")
 Mathew Arnold: The Study of Poetry
 T.S.Eliot : Tradition and Individual Talent

For Non-detailed Study:

Dickens : Great Expectations
 George Elliot : Middle March
 Hardy : Jude the Obscure
 Virginia Woolf : To the Light House
 Graham Greene : The Power and the Glory

*Unit-V - SHAKESPEARE***Drama**For Detailed Study

Macbeth, The Tempest

For Non-Detailed Study

Henry-IV *Part-I*: Measure for Measure
 Antony and Cleopatra

A general knowledge of the other plays, poems and sonnets of Shakespeare is expected of the candidates.

*Unit-VI AMERICAN LITERATURE***Poetry**Detailed study

Walt Whitman : Out of the Cradle Endlessly Rocking
 Emily Dickinson : Because I could not Stop for Death
 Robert Frost : Mending Wall, Birches, West Running Brook.
 Sylvia Plath : Daddy

Non-Detailed Study

Walt Whitman : Passage to India
 E.E.Cummings : The Cambridge Ladies
 Hart Crane : Poem: To Brooklyn Bridge.

Fiction

Mark Twain : The Adventures of Huckleberry Finn
 Melville : Moby Dick
 Hemingway : The Old Man and the Sea

ProseDetailed study

Emerson : The American Scholar

Faulkner : Nobel Prize Acceptance Speech.

Non-Detailed Study

Thoreau : Walden
James Thurcer : The Owl in the Attic

Drama

Detailed study

Eugene O' Neil : The Hairy Ape
Arthur Miller : The Death of a Salesman

Non-Detailed Study

Tennessee Williams : A Street Car named Desire
Edward Albee : Who's Afraid of Virginia Woolf?

Unit-VII INDIAN WRITING IN ENGLISH

Poetry

Detailed Study:

Tagore : Gitanjali
Aurobindo : Thought the Paraclete

Non-Detailed Study:

Poems of Sarojini Naidu and Toru Dutt from the Golden Treasury of Indian Poetry.
Poems of A.K.Ramanujam, R. Parthasarathy, Kamala Das and Nissim Ezekiel from "Ten Twentieth Century Indian Poets" ed. R.Parthasarathy.

Fiction

Mulk Raj Anand : Coolie
Raja Rao : Kantapura
R.K. Narayan : The English Teacher
Kamala Markandaya: A Handful of Rice.

Prose

Detailed Study:

Ananda Commarasamy Aurobindo: The Dance of Shiva (The Title Essay)

Non-Detailed Study:

Nehru : An Autobiography

Drama

Detailed Study:

Tagore : Muktha Dhara
Girish Karnad : Tughlaq

Non-Detailed Study:

Gurucharan Das : Larine Sahib

Commonwealth Literature

Poetry

Non-Detailed Study:

E.J. Pratt	:	The Dying Eagle
Judith Wright	:	Fire in the Murdering Hut, The Cedars
Wole Soyinka	:	The Telephone conversation
Abioseh Nicoll	:	The Meaning of Africa
A.D.Hope	:	Australia

Drama

Detailed Study

Wole Soyinka	:	The Lion and the Jewel
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Non-Detailed Study

Douglas Stewart	:	Ned Kelly
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Prose

Chinua Achebe	:	The Novelist as Teacher
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Fiction

Chinua Achebe	:	Things Fall Apart
Alan Paten	:	Cry, the Beloved Country

Unit-VIII -- APPROACHES TO LITERATURE

1. Modern Drama
2. Modern Fiction
3. Literary Movements
4. Literary Criticism and Theory
5. Feminism
6. Teaching of English in India
7. Journalism and Creative Writing in English
8. Post – Modernism

Unit-IX – HISTORY OF THE ENGLISH LANGUAGE

1. Origin of Language
2. Place of English in the Indo-European family
3. General Characteristics of Old and Middle English
4. The rise and growth of Modern English
5. Growth of Vocabulary Greek, Latin, French, Italian, Scandinavian and other foreign influences – Word Formation.
6. Change of Meaning
7. The Makers of English, The Bible, Spenser, Shakespeare, Milton and Dr.Johnson.
8. American English
9. Indian English
- 10.Characteristics of Modern English
- 11.Spelling Reform
- 12.The English Lexicon

Books for reference:

- 1) Henry Bradley: The Making of English
- 2) F.T.Wood : An outline History of the English Language
- 3) A.C.Baugh : A History of the English Language

LINGUISTICS

Definitions – The Nature and Scope of linguistics, Speech and Writing,
Form and Meaning
Words, Clause and Phrase – Concord Government– Sentence Pattern
Phonology
Morphology
Idiolect, Dialect
Transformational Generative Grammar

Books for Study

Frank Plalee : Grammar, ELBS
John Lyons : An introduction to Theoretical linguistics

Unit-X PRINCIPLES OF LITERARY CRITICISM

1. Aristotle : Poetics
2. Dryden : Essay of Dramatic Poesy
3. Coleridge : Biographia Literaria Ch.XIV and Ch.XVII
4. Keats : Letters (from English Critical Tradition-Macmillan)
5. T.S.Elliot : Metaphysical poets
6. I.A.Richards : Four kinds of Meaning
7. William Empson : The Seventh Type of Ambiguity
8. Northrop Frye : The Archetypes of Literature
9. L.Trilling : Sense of the Past
10. Brooks : Irony as a Principle of Structure
11. Allen Tate : Tension in Poetry

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Syllabus: MATHS (Subject Code: P03)

Unit-I - Algebra

Groups – Examples – Cyclic Groups- Permutation Groups – Lagrange’s theorem- Cosets – Normal groups - Homomorphism – Theorems – Cayley’s theorem - Cauchy’s Theorem - Sylow’s theorem - Finitely Generated Abelian Groups – Rings- Euclidian Rings- Polynomial Rings- U.F.D. - Quotient - Fields of integral domains- Ideals- Maximal ideals - Vector Spaces - Linear independence and Bases - Dual spaces - Inner product spaces - Linear transformation – rank - Characteristic roots of matrices - Cayley Hamilton Theorem - Canonical form under equivalence – Fields - Characteristics of a field - Algebraic extensions - Roots of Polynomials - Splitting fields - Simple extensions – Elements of Galois theory- Finite fields.

Unit-II - Real Analysis

Cardinal numbers - Countable and uncountable cardinals - Cantor’s diagonal process - Properties of real numbers - Order - Completeness of \mathbb{R} -Lub property in \mathbb{R} -Cauchy sequence - Maximum and minimum limits of sequences - Topology of \mathbb{R} .Heine Borel - Bolzano Weierstrass - Compact if and only if closed and bounded - Connected subset of \mathbb{R} -Lindelof’s covering theorem - Continuous functions in relation to compact subsets and connected subsets- Uniformly continuous function – Derivatives - Left and right derivatives - Mean value theorem - Rolle’s theorem- Taylor’s theorem- L’ Hospital’s Rule - Riemann integral - Fundamental theorem of Calculus –Lebesgue measure and Lebesgue integral on \mathbb{R} ’Lchesque integral of Bounded Measurable function - other sets of finite measure - Comparison of Riemann and Lebesgue integrals - Monotone convergence theorem - Repeated integrals.

Unit-III - Fourier series and Fourier Integrals

Integration of Fourier series - Fejer’s theorem on (C.1) summability at a point - Fejer’s-Lebsque theorem on (C.1) summability almost everywhere – Riesz-Fisher theorem - Bessel’s inequality and Parseval’s theorem - Properties of Fourier co-efficients - Fourier transform in $L(-D, D)$ - Fourier Integral theorem - Convolution theorem for Fourier transforms and Poisson summation formula.

Unit-IV - Differential Geometry

Curves in spaces - Serret-Frenet formulas - Locus of centers of curvature - Spherical curvature - Intrinsic equation – Helices - Spherical indicatrix surfaces – Envelope - Edge of regression - Developable surfaces associated to a curve - first and second fundamental forms - lines of curvature - Meusnieu’s theorem - Gaussian curvature - Euler’s theorem - Duplin’s Indicatrix - Surface of revolution conjugate systems - Asymptotic lines - Isometric lines – Geodesics.

Unit-V - Operations Research

Linear programming - Simplex Computational procedure - Geometric interpretation of the simplex procedure - The revised simplex method - Duality problems - Degeneracy procedure - Perturbation techniques - integer programming - Transportation problem – Non-linear programming - The convex programming problem - Dynamic programming - Approximation in function space, successive approximations - Game theory - The maximum and minimum principle - Fundamental theory of games - queuing theory / single server and multi server models (M/G/I), (G/M/I), (G/G1/I) models, Erlang service distributions cost Model and optimization - Mathematical theory of inventory control - Feed back control in inventory management - Optional inventory policies in deterministic models - Storage models - Damtype models - Dams with discrete input and continuous output - Replacement theory - Deterministic Stochastic cases - Models for unbounded horizons and uncertain case - Markovian decision models in replacement theory - Reliability - Failure rates - System reliability - Reliability of growth models - Net

work analysis - Directed net work - Max flowmin cut theorem - CPM-PERT - Probabilistic condition and decisional network analysis.

Unit-VI - Functional Analysis

Banach Spaces - Definition and example - continuous linear transformations - Banach theorem - Natural embedding of X in X - Open mapping and closed graph theorem - Properties of conjugate of an operator - Hilbert spaces - Orthonormal bases - Conjugate space H - Adjoint of an operator - Projections- l^2 as a Hilbert space – l^p space - Holders and Minkowski inequalities - Matrices – Basic operations of matrices - Determinant of a matrix - Determinant and spectrum of an operator - Spectral theorem for operators on a finite dimensional Hilbert space - Regular and singular elements in a Banach Algebra – Topological divisor of zero - Spectrum of an element in a Branch algebra - the formula for the spectral radius radical and semi simplicity.

Unit-VII - Complex Analysis

Introduction to the concept of analytic function - limits and continuity - analytic functions - Polynomials and rational functions elementary theory of power series – Maclaurin's series - uniform convergence power series and Abel's limit theorem - Analytic functions as mapping - conformality arcs and closed curves - Analytical functions in regions - Conformal mapping - Linear transformations - the linear group, the cross ratio and symmetry - Complex integration - Fundamental theorems - line integrals - rectifiable arcs - line integrals as functions of arcs - Cauchy's theorem for a rectangle, Cauchy's theorem in a Circular disc, Cauchy's integral formula - The index of a point with respect to a closed curve, the integral formula - higher derivatives - Local properties of Analytic functions and removable singularities- Taylor's theorem - Zeros and Poles - the local mapping and the maximum modulus Principle.

Unit-VIII - Differential Equations

Linear differential equation - constant co-efficients - Existence of solutions – Wronskian - independence of solutions - Initial value problems for second order equations - Integration in series - Bessel's equation - Legendre and Hermite Polynomials - elementary properties - Total differential equations - first order partial differential equation - Charpits method.

Unit-IX - Statistics - I

Statistical Method - Concepts of Statistical population and random sample - Collections and presentation of data - Measures of location and dispersion - Moments and shepherd correction – cumulate - Measures of skewness and Kurtosis - Curve fitting by least squares – Regression - Correlation and correlation ratio - rank correlation - Partial correlation - Multiple correlation coefficient - Probability Discrete - sample space, events - their union - intersection etc. - Probability classical relative frequency and axiomatic approaches - Probability in continuous probability space - conditional probability and independence - Basic laws of probability of combination of events - Baye's theorem - probability functions - Probability density functions - Distribution function - Mathematical Expectations - Marginal and conditional distribution - Conditional expectations.

Unit-X - Statistics-II

Probability distributions – Binomial, Poisson, Normal, Gama, Beta, Cauchy, Multinomial Hypergeometric, Negative Binomial - Chehychev's lemma (weak) law of large numbers - Central limit theorem for independent identical variates, Standard Errors - sampling distributions of t, F and Chi square - and their uses in tests of significance - Large sample tests for mean and proportions - Sample surveys - Sampling frame - sampling with equal probability with or without replacement - stratified sampling - Brief study of two stage systematic and cluster sampling methods - regression and ratio estimates - Design of experiments, principles of experimentation - Analysis of variance - Completely randomized block and latin square designs.

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Syllabus: PHYSICS (Subject Code: P04)

UNIT- I - Vector Fields

General expression for gradient, divergence curl and Laplace operators in orthogonal curvilinear Co-ordinates and their explicit form in Cartesian spherical-co-ordinates, Stokes theorem and Gauss theorem.

Matrix theory

Algebraic operation – Rank of a matrix. Eigen values and Eigen vectors - characteristic equation – Cayley Hamilton theorem – Diagonalisation and Diagonalizability of unitary orthogonal. Hermitian and symmetric matrices.

Special functions

Legendre, Hermite and Lagrange equation basic properties – Gamma and Beta functions.

UNIT-II - Probability and Theory of errors

Basic concept of probability distribution – Exclusive events and addition – Compound events and products – Binomial – Poisson and Gaussian distribution – Normal distribution of error – Standard error – Principle of least squares – Application of solution of linear equation – Curve fitting.

Group theory

Definition – Sub-groups – Homomorphism and isomorphism – Group representations – Irreducible representation – Unitary representation.

UNIT – III - Classical mechanics

Generalised co-ordinates – D'Alembert's principle, Lagrangian equation of motion – Hamiltonian equation – Conservative and non-conservative systems - Hamilton equation, cyclic variables, principle of least action – Theory of small oscillations – Normal co-ordinates and normal modes - Linear Triatomic molecule - Rigid bodies - Moments and products of inertia-Euler's angle - Euler's equation of motion-Symmetric top.

UNIT-IV - Statistical Mechanics

Maxwell Boltzmann statistics Maxwellian distribution of velocities – Mean – root mean square and most probable velocities Bose-Einstein statistics – Distribution function – Phonon gas – Black body radiation – Fermi-Dirac statistics – Distribution function – Electron gas – Pauli paramagnetism – Thermionic emission – Elementary idea of phase transition – Properties of liquid Helium – phase space, Liouville's theorem – statistical equation – micro canonical ensembles – Equation of state-thermodynamic functions of an ideal gas equipartition of energy.

UNIT-V - Electromagnetic theory

Coulomb law – Gauss law – Poisson's equation – Laplace equation and solution to boundary value problem – Electrostatics of dielectric media – Molecular polarisability and its application – Vector – Scalar potential – B and H in a magnetic material – Maxwell's equations and their significance – Poynting theorem – Radiation of oscillating dipole.

Relativistic Mechanics

Basic ideas - Lorentz transformation. Time dilation and Lorentz contraction -Velocity addition law - Momentum and energy in relativistic Mechanics - Centre of mass system for two relativistic particles.

UNIT-VI - Spectroscopy

Rotation spectra – Vibration spectra – Rotation vibration spectra of diatomic and linear molecules – Raman Spectra – experimental techniques and classical theory of Raman Scattering – Electronic state of diatomic molecules – Frank–Condon principle – Hund’s coupling scheme – Evaluation of molecular constant from vibrational spectra data. Interaction between nuclear spin and magnetic field – Nuclear resonance-Chemical shift-Dipole-Dipole interaction-Spin lattice interaction.

UNIT-VII - Solid State Physics

Energy levels and density of states in one, two and three dimensions – Electrical and Thermal conductivities – Wiedmann-Franz law. Energy bands in solids – Transport phenomena in semiconductors operational functions of a junction diode-Schottky diode – Bloch theorem - Krong-Penny model – Brillouin zones – Wave equation of an electron in a periodic potential.

Thermal Properties of solids

Laws of Thermodynamics – Maxwell’s relations and their applications – Phase transitions – Production and measurement of low temperatures –Einstein and Debye theory of specific heats of solids.

Magnetic properties of materials

Langevin’s theory of dia-para-magnetism – Quantum theory of para – magnetism – Ferro – magnetism – Ferri – magnetism – superconductivity – Meissner effect – Thermodynamics of superconducting materials – London equation – B.C.S. theory – Josephson’s effect.

UNIT-VIII - Quantum mechanics

Schrodinger’s wave equation – Free particle – Particle in a potential well and barrier penetration - The probability interpretation – Expectation value – Eigen functions and eigen values – Stationary states – Wave packet – Uncertainty principle – Linear Harmonic oscillator – angular momentum and addition of angular momenta.

Perturbation theory – Transition probability – Constant and harmonic perturbation – Scattering theory – Differential and total scattering cross section – Born approximation – Partial wave analysis and phase shift analysis – Relativistic wave equations – Klein – Gordon equations – Dirac equation and its free particle solution.

UNIT-IX - Nuclear Physics

Binding energy – Semi empirical mass formula – Stability of nuclei – Nuclear forces – Ground state of deuteron – Alpha decay – B decay – Fermi’s theory – Selection rules – Liquid drop model – Nuclear fission – Shell model – Collective models.

Nuclear Instrumentation

Cyclotron - Synchro cyclotron – Proton synchrotron – Detectors – G.M.Counter – Scintillation Counter – Bubble chamber – Nuclear reactors – Neutron cross section – Fission product – Energy release – Chain reaction – Multiplication factor – Moderator – Natural Uranium – Diffusion equation.

Unit X - Electronics (Digital electronics)

Binary - Decimal – Octal and Hexadecimal numbers – 8421 Excess-3 - Gray Codes – Logic gates – Laws Boolean algebra – Half and full adders – Subtractors – RS, RST, JK and M/S Flip-flops – Ripple counter – Decade counter – Up-down counter – Serial and parallel registers.

Operational amplifier

Differential amplifier – Parameters – Applications – Analog integration and differentiation – Analog computation – Comparators – Sample and hold circuits – Oscillator – Hartley-Colpitt-Phase Shift - Wien's bridge oscillators – Astable mono -Bistable multivibrators – Clipping and clamping circuits.

Microwave Physics

Microwave generation – Klystron – Magnetron – Travelling wave tubes – Microwave in rectangular and cylindrical wave guides – Characteristics of Antennas – Short dipole radiation – Antenna gain – Directivity – Radiation resistance – Radiation intensity.

Microprocessor

Evolution of Microprocessors – Organisation of micro-computers- Preliminary concepts – Basic concepts of programming – Architecture – Address – Data and control buses – Memory decoding – Memory mapped I/O and I/O mapped I/O.

Machine and instruction cycles – Addressing modes – Use of arithmetic logical data – Transfer stack and I/O instructions – Instruction set and assembly programming of 8085 microprocessor – Fetch – Execute – overlap – Instruction cycles – Instruction forward – Memories – RAM-PROMS, EPROMS-EEPROMS – Static and Dynamic RAM.

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Syllabus: CHEMISTRY (Subject Code: P05)

Unit-I

Periodic properties – Atomic radius – ionic radius, ionization potential, electron affinity and electronegativity – Their significance in chemical bonding.

VB theory, MO theory – applications – Comparison of VB and MO theories – VSEPR theory – Bond order – Bond energy – Bond length Bond polarity – Partial ionic character of bonds – The concept of multi-centre bond – Electron deficient compounds – Hydrogen bond – Its influences.

Non aqueous solvents – A general study of typical reactions in non aqueous media – comparison with reactions in aqueous media.

Solid state chemistry – Ionic bonding – Lattice energy – Born equation – Born Haber cycle – Radius ratio rule – Born Meyer equation – Kapustinski's Modification – energetics of the dissolution of ionic compounds in polar solvents – different types of electrostatic interactions.

Structural aspects of solids – Fourier synthesis and analysis structure factors – scattering factors – Spinels and Inverse spinels – defects in stoichiometric and Non stoichiometric crystals.

Electrical properties of solids – Band theory semi conductors – Junction devices – Super conductivity – Ionic conductivity – Optical properties of solids – Lasers and phosphors – Photovoltaic effect – solar energy.

Magnetic properties of solids – Different types – dia, para, ferro, antiferro and ferri Magnetism – Magnetic hysteresis.

Unit II

Co-ordination chemistry – Methods of preparation of complexes – isomerism in complexes – applications of complex formation in analytical chemistry – complexes and their stability chelate effect Stability constants – Their determination – complexes of Metals in different oxidation states and their stability.

Optical activity and concept of chirality – Different kinds of optically active compounds – configuration – Fischer, sawhorse and Newman projections – Absolute configuration R and S Notations – Methods with more than one chiral center – Asymmetric synthesis – optical purity.

Geometrical isomerism resulting from double bonds – The E,Z. system of nomenclature – Geometrical isomerism of monocyclic compounds and fused ring systems – Stereospecific and stereoselective reactions with examples.

Conformational analysis – conformation and reactivity in acyclic and cyclohexane systems – conformation of decalins, cyclohexane and cyclohexanone.

Unit III

Organic reaction mechanisms – General methods of investigating reaction mechanisms – kinetic and non-kinetic methods – different types of reaction intermediates.

Aliphatic nucleophilic substitution SN1, SN2 and SNi reactions – substitution at vinylic and benzylic carbon – stereo chemistry of nucleophilic reaction – solvents and substituent effects – Nucleophilicity Neighboring group participation.

Addition to double and triple bonds – Mechanism Hydration – Hydroboration – Hydroxylation – epoxidation.

Elimination reactions E1, E2, E₁cB Mechanism – Orientation effects in elimination reactions – stereo chemistry of elimination reactors - dehydration of alcohols – dehydro halogenation – cope elemination.

Heterocyclics – synthesis and reactivity of furan, thiophene, pyrrole pyridine, quinoline, isoquinoline, Indole, flavenes, and anthocyanins – skrap synthesis – Fischer indole synthesis.

The chemistry ;of natural products structure elucidations and Biogenesis of the following:

Alkaloids : Reticulene, Reserpine, Morphine

Terpenoids : Zingiberene, Squalene, Lanosterol

Steroids : Cholesterol, Oestrone, Progesterone

Carbohydrates: Maltose, Starch, Cellulose (biogenis not expected)

Structure and functions of biopolymer such as proteins and Nucleic acids – Primary, Secondary and tertiary structures of proteins – Mechanism of Enzyme action – DNA and RNA.

Unit IV

The old quantum theory – Inadequacy of classical mechanics – Failure of classical mechanics – success of quantum hypothesis explaining black body radiation – Photo electric effect – the hydrogen spectrum – Bohr's explanation of hydrogen spectrum – Failure of Bohr's model.

De broglie's postulates of Matter waves – experimental observation of matter waves – Heisenberg's uncertainly principle – wave particle dualism – Davisson, Garmer experiments – Postulates of quantum mechanics – Time dependent schrodinger equation – Needs of an acceptable wave function – Physical significance of Psi function.

Operators in quantum mechanics. Operator algebra – Linear and Hermitian operators –m Eigen functions and Eigen values – Hamiltonian operators – Angular momentum.

Application of schrodinger equation – particle in one and three dimensional boxes – quantum mechanical results for a simple harmonic oscillaltor and rigid rotator - approximation methods – perturbation methods – variation method – VB and MO methods.

Symmetry elements and symmetry operations – Point groups – representation of groups reducible and irreducible representations characters tables – Orthogonality theorem and its consequences.

Symmetry selection rule for IR and Ramanspectra – Systematic procedure for determining symmetries of normal modes of vibration – symmetry applied to MO theory and orbital hybridization.

Unit V

Thermodynamic equations of state – closed and open systems – partial molal quantities – chemical potential with temperature and pressure – third law of thermodynamics.

Fugacity – methods of determination – activity and activity co-efficient – standard states for gases, liquids – solids and solutions – mean activity co-efficients of electrolytes.

Maxwell's distribution of molecular velocities – derivation of expression for average, most probable and rcot mean square velocities – Microstates Macrostates – partial functions – Sackur tetrode equation – statistical approach to the third law of Thermodynamics – Maxwell Boltzmann – Bose Einstein and Fermi

Dirace statistics – Heat capacities of solids – Einstein and Debye Models Low temperature – Negative absolute temperature.

Chemical equilibrium – thermodynamic derivation of equilibrium constant – standard free energy – calculations.

Phase equilibrium – thermodynamic derivation of phase rule application of phase rule – three component systems.

Chromotography – column, paper, thinlayer, gas-liquid, High pressure liquid chromatography HPLC principle and applications.

Thermal analysis – different thermal analysis (DTA) – Principle and applications – thermogravimetric analysis (TGA) Principle and application.

Chemical crystallography – Diffraction methods – X ray Neutron, electron diffraction methods. Principle and applications.

Polarimetry – Circular ichroism – Optical Rotatory dispersion (ORD) Principle and applications.

Unit VI

Nuclear – chemistry – Nuclear nadii spin and moments – Nuclear structure – Nuclear forces – Nuclear stability – Nuclear modes – Modes of Radioactivity decay. Nuclear isomerisation Nuclear Reaction Energy – Coulomb barrier cross section – excitation function – Radiactive Equilibria – Types of Neclear reactions – Nuclear fision Nuclear Reactors – Atomic Power Project in India – Radiation hazards – Radiation desimetry – Nuclear fusion – Stellar Energy.

Application of Radioactivity – Tracer Techniques – Neutron - Activation analysis – Isotope Dilution Analysis – Interaction of radiation with matter – Range of alpha and beta particles – Absorption co-efficient,.

Orgnometallic compounds – Metallecences – Arene complexes – Nonaromatic olefins and acetylenes complexes – catalysis by organometallic compounds Wilkinson's catalyst – Oxoprocess – wecker process – Ziegler – Natta catalysis.

Inorganic photo chemistry – Photochemical reactions of coordination and organ metallic compounds – Properties of excited states – charge transfer photo Oxidation, photo reduction, photo substitution, photo isomerisation - Photo chemical conversion – Solar energy.

Unit VII

Term symbols and term states – D_n - ions energy levels – Diagrams weakfield and strong field and strong field concepts – spin orbit coupling – The Nephelaxetic effect charge transfer spectra – Applications of UV, IR, NMR, BSR and mossbaver spectroscopy techniques in the study of co-ordination chemistry.

Magnetic interactions – Magnetic susceptibilities determination – application in co-ordination chemistry. Application of VB, MO, CF and LF theories in co-ordination chemistry – Group theoretical approach – splitting of d-orbitals – spectro-chemical series – concept of weak and strong fields – Thermodynamic and chemical effect of d-orbitals splitting – Jahn Teller distortion.

Nuclear Magnetic Resonance Spectroscopy – Theory – Study of PMR – chemical shift – Type of shielding – Spin-spin coupling spin decoupling – spplications to simple natural products.

Electron spin resonance spectroscopy – paramagnetism – Nuclear hyperfine structure – Hyperfine coupling.

Unit VIII

Huckel's rule and concept of aromaticity – aromaticity of Benzenoid – Nonbenzenoid aromatics. The annulenes - Aromaticity in charged rings and fused ring systems. Aromatic electrophilic substitution – Mechanism and reactivity, Typical reactions to include diazonium coupling – Halogenation, sulphonation. Friedal craft alkylation and acylation. Aromatic Nucleophilic substitution – Benzyne mechanism – Examples. Oxidation – Reduction reactions – Mechanisms – selectivity in oxidations and reductions.

Molecular rearrangements – Rearrangements with Carbon to Nitrogen, Carbon to Oxygen and Carbon migrations. Curtius, Lossen, Schmitts Baeyer – Villiger, Pinacol – Pinacolone, Benzoin – Benzilic acid, Benzidine, Favorski and Fries rearrangements – sigmatropic rearrangements – Claisen and Cope. Pericyclic reactions, selection rules – orbital symmetry – Electrocyclic reactions – cycloadditions sigmatropic reactions.

Modern synthetic reactions – Diels Alder reaction Wittig reactions – Stork Enamine reactions – Mannich reactions, Birch reductions.

Unit IX

Theories of reaction rates – simple collision theory – absolute reaction rate theory (ARRT) – Reaction co-ordinate – Potential energy surfaces. Hammett – Taft equation – Hammett acidity function – Acid base catalysis Bronsted relation Enzyme catalysis – Michaelis Menton Law – influence of pH and temperature. Surface phenomenon – Heterogeneous catalysis – Absorption isotherms. Electrolytic conductance – applications – solubility product – Interionic attraction theory – Debye – Huckel – Onsager equation – equivalent conductivity of electrolytes.

Electro potentials – Electrochemical cells – electrode – electrolyte interface – electrical double layer electro capillary phenomena – electro kinetic Phenomena – Membrane potential – Polarisation – over potential – Polarography – concentration polarization – electro chemical polarization – Butler – Volmer equation.

Unit X

Theory and applications of the following spectroscopic methods; electronics spectra-UV-Visible spectra – IR spectra – Raman spectra – Laser – Raman spectra – NMR – WCR- ESR Spectra – Mossbauer spectroscopy – photoelectron spectroscopy – Poly

merisation reactions – Mechanism – stereochemical aspects. Types of polymers – organic and inorganic polymers – preparation – properties – structure – polystyrene – Polyvinylchloride – Polyesters – Nylon – Phenol resin – amino resins – epoxy resins. Phosphonitrilic compounds – silicones – Borazines applications of polymers.

For the post of Written Recruitment Test for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: BOTANY (Subject Code: P06)

CONTENTS INCLUDED

Unit I	:	Viruses, Bacteria, Thallophytes and Lichens.
Unit II	:	Plant Pathology and Microbiology
Unit III	:	Bryophytes, Pteridophytes and Gymnosperms
Unit IV	:	Morphology, Taxonomy and Economic Botany
Unit V	:	Cell Biology and Genetics
Unit VI	:	Anatomy and Embryology
Unit VII	:	Plant Physiology and Bio-Chemistry
Unit VIII	:	Plant Breeding and Bio-Technology
Unit IX	:	Ecology and Phytogeography
Unit X	:	Palaeo Botany and General Principles

Unit-I

i) Viruses - A general account of viruses-Their nature origin purification symptomatology methods, transmission and control measures of viruses - Vector relationships, multiplication, Bacterial viruses, algal viruses and mycoviruses.

ii) Bacteria-A general account of bacteria with reference to cell morphology, appendages, envelopes and nutrition, growth and reproduction, structure and replication of nucleic acids in Bacteria plasmids and gene manipulation, classification as per Bergey Manual (1973) economic importance of bacteria.

iii) Thallophytes - a) Algae: A comparative study of the range of structure, organisation, reproduction, life history and classification of algae (Bold and Wynne, 1978). Ecology of Algae-Productivity in the sea, algae as indicators meant of pollutions, algicides, economic importance of algae.

b) Fungi -Classification (Alexopoulos and Mims 1979). A systematic study of the range of structure, reproduction, life cycles phylogeny and affinities of the main classes of fungi; Economic importance of fungi.

c) Lichens - A general account of lichens - Structure, nutrition; reproduction, classification and economic importance of lichens.

Unit-II

a) Plant Pathology - A general account of plant disease due to fungi, bacteria and viruses with special reference to India Host-microbe interaction, principles of disease control, (physical, chemical and biological methods).

b) Microbiology-Soil microbiology-Soil microbes N₂ fixation and Bio-geochemical cycles-Food and Water microbiology-Microbial flora of fresh and spoiled foods-Industrial microbiology-Industrial applications of microbes for the manufacture of Alcohols S.C.P. organic acids.

Unit-III

i) Bryophytes: Classification (Watson 1963)-Ecology and distribution-Range of structure in gametophyte and sporophyte and their evolutionary trends - Reproduction and Economic importance of Bryophytes.

ii) Pteridophytes: Classification (Sporne 1976) - Distribution of extinct and extant forms - comparative study of morphology anatomy of sporophytes-Structure and development of gametophytes of the major groups (Psilopsida Lycopsida Sphenopsida and pteropsida).

iii) Gymnosperms: Classification (Sporne 1977) - Distribution of extinct and extant forms - Comparative study of morphology, anatomy and reproductions of major groups - Cycadopsida coniferopsida and Gnetopsida evolution of male and female gametophytes and Economic importance.

Unit-IV

i) Morphology: The plant body, the root system, the stem the leaf, the inflorescence, the flower, pollination and fertilization, the fruit and the seed, dispersal of fruits and seeds, vegetative reproduction and Germination.

ii) Taxonomy: History and classification-Artificial system-Linnaeus, Natural system-Jessieu De candolle, Bentham and Hooker, Phylogenetic system-Engler and PrantD. Bessey Hutchinson Recent Trends in systematics-Cyto-taxonomy, Chemotaxonomy, numerical taxonomy. International code of Botanical nomenclature, Herbarium techniques, A critical study of the following families: Ranunculaceae Magnoliaceae, Polygalaceae, Caryophyllaceae, Rubiaceae, Meliaceae, Lythraceae, Cactaceae, Rhizophoraceae, Oleaceae, Aristalochaceae, Casuarinaceae, Dioscoriaceae, Bignoniaceae, Solanaceae, Lauraceae, Loranthaceae, Euphorbiaceae, Arecaceae, Typhaceae and Poaceae.

iii) Economic Botany: Food crops, Cereals, millets, legumes nuts and tropical fruits, sugar yielding crops – spices –Beverage plants – Timbers and pulp yielding plants – Minor forest products – Resins, gums, tannin and rubber yielding plants – oil yielding plants – medicinal plants – fibre yielding plants.

Unit-V

i) Cell Biology: Cytological methods-auto radio graphy – Isolation of cellular components – Fixation – staining – prokaryotes and Eukaryotes. Ultra structure and molecular organization of cell-cell wall, plasma membrane, Endoplasmic reticulum, Mitochondria, Lysosomes and other cell organelle. Plastids – Classification, morphology, structure – functions Cytoplasm – Physical and Chemical properties. Nucleus – morphology, structure and chemistry – Cell division – Mitosis, meiosis, meiosis and their significance chromosome – morphology, fine structure, Types – giant chromosome, Isochromosome.

ii) Genetics: Mendelian and non-mendelian inheritance – linkage and crossing over. Mutation – Mutagenic agents – structural and chemical basis of mutations in plants cytoplasmic inheritance, Male sterility in plants – Sex determination in plants – sex linked inheritance. Chromosomal aberrations. Molecular genetics – Nucleic acids as genetic material – Types of Nucleic acids – Replication of DNA – Methods and models in DNA repair mechanism – Enzymes – split genes – Jumping and mobile genes – concepts of gene – Cistron, Muton and recon.

Unit-VI

i) Anatomy: Meristems – General account, classification, various concepts of apical organization of shoots and root apices. Procambium, Cambium and their relationship. Development of Secondary vascular tissues.

Simple tissues, conductive tissues – Xylem & Phloem.

Wood anatomy – variations in wood structure – tyloses – Heartwood and sapwood – growth rings.

Microtomy: Use of Rotary and Sledge microtomes – whole mounts – Paraffin method – clearing and macerations.

Fixation and fixatives: Staining and stains – Histo – chemistry – cellulose, lignin, enzymes, proteins and nucleic acids.

ii) Embryology : Microsporogenesis and structure of micro-sporangium – Male gametophyte. Mega sporogenesis and structure of megasporangium – Female gametophyte. Present concept of fertilization, endosperm types – Endosperm haustoria.

Unit-VII

i) Plant Physiology: Water relations of plants – Mechanisms; of absorption of water – passive and active – apoplast symplast concept. Stomatal mechanism and Transpiration – Ascent of Sap. Mineral nutrition – Methods of studying plant nutrition. Essential elements – macro and micro nutrients. Absorption of solutes translocation of solutes – pathway and mechanism.

Photosynthesis – Properties of light – interaction between radiant energy and matter. Photosynthetic pigments and pigments and pigment systems. Hill Reaction – Photochemical reaction, Photophosphorylation – Cyclic and non-cyclic and calvincycle.

Respiration – Glycolysis, Krebs cycle, Electron Transport Nitrogen metabolism – Sources of soil nitrogen, Nitrogen fixation. Legume-Rhizobium symbiosis – biochemistry and physiology. Growth and Development – auxins, cytokinins. Gibberellins, phytochromes – role and mode of action.

ii) Bio-chemistry: Chemistry of carbohydrates – classification – structure and function, lipids – classification, occurrence, structure and importance of lipids and phosphates.

Proteins – structure, properties and classification of aminoacids – peptides – structural organization and classification of proteins Nucleic acids – chemistry of Nucleic acids – structure and properties, location and biological significance of DNA – different types of RNA, their origin, properties and functions.

Enzymes – Properties, mode of action, nomenclature and classification – factors affecting enzyme activity.

Unit-VIII

i) Plant Breeding: Methods of improvement of crops. Plant introduction – Selection – Heterosis Hybridization – Polyploidy – Mutation breeding.

ii) Bio-Technology: Scope and importance of Bio-technology – Basic techniques – Transformation of E.coli cutting and joining DNA molecules – vectors – Plasmids. Cosmids. Application of recombinant DNA technology in Enzyme engineering – industries in prevention, diagnosis fermentation and cure of diseases (medicine) in the production of bio-fertilisers, bio-insecticides, Tissue culture.

Unit-IX

i) Ecology: Importance of ecology, Ecological factors – their classification and interaction Edaphic factors – Water factors – Fire factors – Biotic factor. Synecology – classification of plant communities Raunkiaer's life – forms – Ecological succession – causes and effects climax concept. Eco system – components and inter relationship. Bio-geo-chemical cycles.

ii) Plant Geography: Principles of Plant Geography Dispersal and migration – Types – Age and Area hypothesis – continuous range, cosmopolitan, circum polar, circum boreal and circum austral, pantropical Discontinuous distribution – Wegner’s theory of continental drift.

Unit-X

- i) Palaeo Botany: Geological time scale – Techniques of fossil study – Types of fossils and different methods of fossilization – Radio carbon dating – study of fossil forms in algae, bryophytes, pteridophytes and Gymnosperms. Conservation of fossil fuels.

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: ZOOLOGY (Subject Code: P07)

Unit-I:

Classification Binomial Nomenclature – Invertebata and Chordata – Structure and life history of pathogenic Protozon Entamoeba histoytica Plasmodium viva P.Ovale P.Malariae P.falciparum, Trypanosoma gambiansi; and Leishmania donovoni, Structure and life history of Helminth parasites; Taenia solium, Fasciola hepattca Schistosoma Ascaris lumbricoides.

Structure and life history of Amphioxus Balanoglospus Ascidian and their evolutionary significance, vertebrate comparative anatomy; Integument, Brain; Heart and Urinogenital organe. Economically important vertebrates and vertebrate pests. Fishery resources of India.

Unit-II:

Biological Chemistry – Structure of atom valencies molecular and structural formula of biochemical compounds. Isomerism Oxidation and reduction. Redox potential (Eh): RH Determination of EH and PH. Buffers Biologically important properties of water. Energy metabolism of carbohydrates. Lipids proteins and Nucleic Neids. Oxidative Physphorylation.

Role of major (Na, K, Ca and P) and minor (trace) elements in metabolism enzymes, their nature, classification of enzymes Coenzymes and cofactors, Mechanism of action of enzymes Inhibitions of enzyme actions.

Unit-III:

Collection of data-primary and secondary, Methods of Classification and tabulation of data.

Diagramatic and graphic representation – Rules of constructing diagrams – Types of diagrams – Bar diagram-Pie diagram, graphs-construction of graphs – Types: Frequency distribution – Histograms – Frequency Polygon—Smooth frequency curve-cumulative frequency curve of 'Ogives'.

Measures of central value – Average-Median-Mode-Measures of dispersion-Mean deviation-coefficient of variation-variance-Standard deviation and standard error.

Correlation Types – Methods of studying correlation co-efficient of correlation – Regression analysis.

Statistical inference – Procedure of testing hophthesis – Standard error test of significance for attributes – Test of significances for large and small samples – Student 't' distribution.

Unit-IV:

Cell and Molecular Biology – Prokaryotic and Eukaryotic cells. Ultra structure, Organisation and functions of cell membrane, Endoplasmic reticulum, golgibody, Lysosome, Mitochondrion; Ribosome structure of DNA, A,B,C and Z forms of D.N.A. Transcription – mRNA tRNA and rRNA and their functions. Synthesis of eukeryotic RNAS Structure and functions of nucleolus, D.N.A. replication D.N.A. repair, Microtubules cilia and flagella carcinogenic agents, Genetic basis of malignant transformation.

Unit-V:

Genetics-Gene Interactions, Multiple alleles, Recombination and its molecular mechanism. Linkage, crossing over, chromosome, mapping. Cytoplasmic genes and their expression. Mitochondrial DNA its transcription code and translation, Population genetics Genetic organisation of a Mendelian population. Hardy-Weiberg Law. Derivation of Hardy – Weinberg equilibrium.

Animal breeding and human genetics – Inbreeding outbreeding Heterosis. Expression of Eukaryotic genes in bacterial cells. Transfer of genes into Eukaryotic cells. Genetic Engineering and its applications in Agriculture Animal Husbandary and Medicine. Inborn errors of metabolism.

Unit-VI:

Physiology – Nutrition – Essential aminoacids, vitamins, minerals and Trace elements required by men. Digestion, Digestive enzymes, digestion, absorption and assimilation of carbohydrates, proteins and lipids. Intermediary metabolism, Respiration – Transport of respiratory gases by blood. Circulation: Types of heart.

Movement – Types of muscle cells, Ultra structure of muscle cells. Muscle contraction and types of contraction. Osmo-iono regulation: Maintenance of water and electrolyte Balance in aquatic and terrestrial vertebrates.

Excretion: Vertebrate kidney and formation of urine. Excretion of nitrogenous products. Renal regulation of acid-base balance. Thermoregulation: Temperature and rates of bio-logical activities.

Unit-VII:

Sensory physiology: Chemo-reception. Mechano-reception, Thermo-reception, Photoreception. Nervous coordinations: Transmission of impulses in nerve cells. Central Nervous system. Autonomic Nervous System. Memory and learning, Chemical coordination: Endocrine glands and hormones. Endocrine Interrelations. Neure endocrine reflexes. Growth and reproduction: Growth moulting and metamorphosis in crustaceans, Insects and vertebrates. Pheromones in reproduction. Physiology of human reproduction.

Developmental Biology and Immunology-Gametogenesis – Organisation of egg cytoplasm. Fertilisation-Biochemical and Electron-Microscopic studies, Partherogenesis-Cleavage and Metphegenetic movements – Fate maps – presumptive. Organ forming areas – Formation of Primary organ rudiments – Gradients in the determination of organ rudiments – involvement of genes in developmental process – General Metabolism during gastrulation – Integration of gastrulation.

Organizer: Organogenesis with reference to heart, eye, brain and kidney.

Cell differentiation – The chemical basis of cell differentiation Selective action of genes in differentiation – Control of differentiation by the intraorganic environment.

Extra embryonic membranes. Placenta-Sex differentiation and godadial hormones, congenital abnormalities in humans Growth, aging and senescence.

Unit-VIII:

ANTIGEEES AND ANTIBODIES – Specific and non-specific immune mechanism – Immunity (innate and acquired) – Antigens – Heptens – Antigenic determinants – Adjuvants. Immunoglobulin molecules as antigens – allotypes Immune system and lymphoid organs. Macrophages – T-Cell and B Cell Antibodies production Immune response: Humoral and cell mediated immunity – regulation of immune response – Tolerance – Antigen and antibody reaction – Physical and Biological – Vaccination – Allergy – AIDS – Congential immunodeficiencies.

Environmental Biology – Biotic and abiotic factors of the environment Biogeochemical Cycles – Eco System – Concepts. Resource Management – Ecological energetics; energy transformation, productivity - food chain – Food webs, Pyramids.

Unit-IX:

Zoogeography of Indian wild mammals. Indian primates – Natural Resources – Conservation of natural resources and wild life (Protection) Act. Wild life - Sancturries of Tamil Nadu. Environmental degradation - factors affecting environment. Patterns of Behaviour – Instinctive and learning behaviour – social behaviour – social organisation – Social behaviour in mammals – Aggression and courtship.

EVOLUTION: Origin of life – Theories of evolution evidences for evolution – Natural selection – Micro evolution – Hardy - Weinberg Equilibrium – genetic draft. Speciation – Mechanism of speciation –

Phyletic and sudden speciation modes of gradual speciation – Incomplete species – Species problems – Allopatric and sympatric speciation.

Unit-X:

Macro evolution: Geological records – Fossils and fossilization – evolutionary trends – Parallel evolution – Progressive and retrogressive trends – Rates of evolution.

Course of evolution: Chemical evolution – evolution of prokaryotic cells. Speculative origin of Eukaryotic cells – Origin of Metazoa. Primate and Human Evolution – Human racial diversity – Theories of human racial origins – Future evolution of man.

MAN AND BIOSPHERE - Man's role in conservation of natural resources. Biosphere. Human activities that modify the biosphere. Human resource management. Tribals and biosphere. Future of man and biosphere.

For the post of Written Recruitment Test for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: COMMERCE (Subject Code: P11)

Unit-I

Marketing – Fundamental Concepts and Approaches-Marketing Mix-Segmentation-Buyer behaviour, Four P's Role of Middlemen Arguments FOR and AGAINST – Pricing policies and strategies.

Unit-II

Advertising-Media-Copy-Effectiveness-Consumer rights and protection – Recent Trends in Advertising.

Unit-III

Accounting for management-Functions and Benefits-Analysis and Interpretation of financial statements-Ratios-Fund flow and Cash Flow-Budgetary Control.

Unit-IV

Capital Expenditure decisions-Marginal costing and Break Even analysis - Managerial uses-Working capital forecast-Zero based -Budgeting.

Unit-V

Costing-Methods and Techniques of costing-Different cost concepts-Process-unit-Operating-job-contract, costing - CVP analysis-Profit planning.

Unit-VI

Differential costing-Reconciliation of costing and trading Profits-Allocation and apportionment of overheads.

Unit-VII

Entrepreneurial Development-Functions and kinds of Entrepreneurs-Traits-Women entrepreneurs-Incentives and subsidies- Consideration and Factors in setting up of an Unit Sources of Finance-Venture Capital-Forms of organization-Project Appraisal Techniques.

Unit-VIII

Role of Banks in EDP-TRYSEM – Self employment-SEEUY-SEPUP-DICS- Industrial Estate-Role of SIDCO, SIPCOT in Tamil Nadu TCO's- Problems of small Entrepreneurs-Sickness of small scale units-Causes and revival.

Unit-IX

Statistics-Importance- Scope-Primary and Secondary DATA – Collection – Tabulation and Analysis – Measures of Central Tendency – Dispersion – Correlation- Regression Theories of Analysis – Chi-square Test.

Unit-X

Sampling – Probability – Time Series Index numbers – Skewness and Kurtosis.

Unit-XI

Accounting Concepts and conventions-Amalgamation, Absorption and Reconstruction of companies.

Unit-XII

Company Liquidator's Final statement- Different Methods of valuation of shares and Goodwill.

Unit-XIII

International Trade - B.O.P. – Tariffs, Quotas and Licences-Terms of Trade – World Lending Bodies – IMF, IBRD AND ADB – Impact of liberalizations, privatization and Globalisation.

Unit-XIV

Export Promotion-Institutional Arrangements-EOU-EPZ-EOGC-SEZ EXIM Bank-STC-Multinational Corporations and Joint Ventures Abroad-EEC- Group of 8, G15-WTO - UNCTAD-IMf and SDR-International liquidity-International Chamber of Commerce-Recent Foreign Trade Policy of India – Euro currency.

Unit-XV

Banking and Finance-Innovative Services of Modern Commercial Banks in India – Short-term instruments - Certificate of Deposits and Commercial papers- Diversification of Banking-Financial Services-Leasing-Credit Cards-Mutual Funds-Merchant Banking-Factoring Services – Credit rating – E banking.

Unit-XVI

Capital Market – Institutions and Instruments used-Development Banks (IDBI IFCI ICICI AND IIB) - Appraisal of term Loans - Regulation of Stock Market – Investor Protection – Dematerialisation and Depositories.

Unit-XVII

Company Law and Auditing-Concept of company-Legal Features- Promotion and Formation of Companies – Memorandum and Articles of Association – Alteration of Directors-Winding up of companies-Duties of a Company Secretary relating to Meetings.

Unit-XVIII

Auditing – Scope Nature and objects of Auditing Kinds-Audit Programme- Internal Control-Internal Check and Internal Audit- Vouching-Verification of Assets and Liabilities-Auditors-Appointment-Duties and Liabilities-Investigation and Audit.

Unit-XIX

Direct Taxes and Tax planning: Income Tax – Basic concepts Incomes exempt from Tax Residential Status- Heads of Income- Salary Income – Meaning-Allowances and Prerequisites- Provident Funds – Income from house property – Self occupied and Letout- Deductions – Profits and Gains from Business and Profession – Capital Gains – Deductions and Rebates allowed – Computation of CTI-Income from other sources.

Unit-XX

Income Tax authorities – Powers – Filing of Returns- Types of Assessment – Wealth Tax Act 1957 - Concept of Tax Planning – Objectives- Systems and Methods- Factors in Tax planning- Tax Avoidance and Evasion – Personal Tax planning – Various savings schemes.

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: HISTORY (Subject Code: P08)

Unit -1

Sources of Indian – History – Geography of Indian- Harappan civilization – vedic age – Jainism and Buddhism – mauryas – Chandra gupta- Ashoka – mayuran administration – kanishka-Guptas – Sumudra Gupta –Chandra gupta II – classical age – Harshavarthana.

Unit –II

Arab conquest of sindh and muslim invasions slave dynasty – Alavuddin khilji – Thuglaqs- Society – Religion and culture under the Vijayanger rule .

Unit –III

Mughals- Babar to Aurangzeb – Shershah Suri- Administration – Society, Religion and Culture under the Mughals – Shivaji – Maratha administration

Unit – IV

Foundation of British rule in India – Robert Clive – Warren Hastings – Corn Wallis, Wellesley, Hastings, William Bentick – Dalhousie

Unit-V

Great Mutiny 1857 – Social and religious reform movements in India in the nineteenth century – Indian – National Movement – Constitutional development in India from 1858 to 1947.

Unit – VI

Integration of Indian States – Republican Constitution of India, Gandhian and Nehru Eras – India's role in world affairs

Unit - VII

Sources of the History of Tamilnadu – Sangam age and its culture – Pallava dynasty – Social, Economic, Religious and Cultural developments under Pallvas – Imperial Cholas and their administration, Social Life, religion and culture.

Unit – VIII

Later Pandyas and the Muslim invasions in Tamil Nadu Thirumalainaikker – Later Polygar rebellion – Tamil Nadu and Freedom struggle – Social reform movements in Tamil Nadu – Political social and economic developments in Tamil Nadu since 1947.

Unit – IX

Geographical discoveries, Renaissance and Reformation Age of Enlightened depots – Industrial and Agrarian revolutions – French revolution – Napoleon – Congress of Vienna

Unit – X

Unification of Italy and Germany – Russian revolution – First World War and Peace Treaties – League of Nations, Rise of Dictatorships – Hitler, Mussolini and Kamal Paksha – II World War – U.N.O. and Cold War.

For the post of Written Recruitment Test for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: ECONOMICS (Subject Code: P10)

MICRO, MACRO AND MONETARY ECONOMICS

Unit-I

Micro Economics-Theory of consumer behaviour–Cardinal and Ordinal approaches-Revealed preference Hypothesis-Hick's Revision of Demand Theory-Modern Utility, Analysis of Choice involving risks and uncertainties.

Unit-II

Production function-Linear, Homogeneous, Cobb-Douglas and C.E.S. Production functions-Short Run and Long Run cost curves Derivation of cost functions from productions functions-Least cost combination of factor inputs.

Unit-III

Market structure-Perfect competition-Monopoly and price Discrimination- Monopolistic competition-Oligopoly and models of Oligopoly.

Unit-IV

Factor Prices and factor market-Pricing of factors of production-Theories of Rent- Wages- Interest- Profits.

Unit-V

Macro Economics-National Income and Social accounting-consumption function and its modern developments-investment function and its determinants.

Unit-VI

Theories of Income and employment Classical theory-Bay's Law-Output and employment in classical theory-classical model with and without saving and investment-Keynesian theory of income and employment-Appraisal of Keynsian theory of employment-Post Keynesian developments-Secular Stagnation-Real Balance effect.

Unit-VII

Macro Theories of Distribution-Records-Kalecky-Lerner and Keynes-Dynamic adjustments of Is-LM Models-Modern Theories of Business Cycles-Kaldor Samuelson Harred and Hicks-Theory of inflation.

Unit-VIII

General Equilibrium Theory-Walraisian approach-Input Output analysis-Leonties's Input-Output Model-Open and closed Input Output Model Economic Policy-Monetary-Income and Fiscal Policies.

Unit IX

Money in Macro Economy-Classical approach-Keynesian approach-Post Keynesian developments-Don Patinkin-Milton Friedman-Gurley shaw-The Demand for money-Classical Keynesian and Post-Keynesian-Supply of Money-Classical Version.

Unit X

Central Bank and its functions-Money supply in India.

INTERNATIONAL, FISCAL AND INDIAN ECONOMICS

Unit-XI

International monetary system and international capital movements-Tariffs and quotas and their effects-EEC and regional arrangements by the developing countries-Trade problems in developing countries.

Unit-XII

Fiscal Economics-Nature, Scope and importance-Principle of maximum social advantage-Principles of taxation-Taxable capacity-Types of taxes- Direct and Indirect taxes-Shifting and incidence of taxation.

Unit-XIII

Theories of Public expenditure-Canons of public expenditure-Growth of public expenditure in recent times-Public expenditure in India-Public debt- Burden and effects of Public debt-Methods of repayment of public debt-Public borrowing and development finance in India.

Unit-XIV

Budgetary procedure-Types of Budget-deficit financing and methods- Role and objectives of Budgetary policy-Budgetary trend in India since independence-Objectives and instruments of fiscal policy-Fiscal policy in India.

Unit-XV

Principles of federal finance-Problems of allocation of Resources between Center and States-Fiscal relation between Center and State-Finance Commissions-Federal Finance in India-Local finance in India-Sources-functions growth structure and its defect.

Unit-XVI

Structure and character of Indian Economy-National income growth-Sectoral and Personal distribution-Inter State variation in National Income-Development Constraints in Indian Economy-Regional imbalance-problem of Poverty and unemployment.

Unit-XVII

Agriculture in India-Determinants of agricultural development-Institutional aspects-Land reforms-Agricultural finance and credit-Agricultural marketing and agricultural Price Policy-Modernisation of Agriculture-Green Revolution.

Unit-XVIII

Industry in India –Structure and growth strength in Industry-Large and Small Industries-Industrial finance-Industrial Labour problems and Policies.

Unit-XIX

India's Economic policy-Planned Growth and Development-Role of Private and Public sectors-Planning models-Seventh and Eighth Five Year Plans-Ninth Five Year Plan and approach paper to Tenth Plan.

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: GEOGRAPHY (Subject Code: P09)

Unit –1

Land forms

Land forms due to water action – wind action – wave action and glacial action – continental drift – plate tectonics – normal cycle of erosion – concept of davis penck.

Unit –2

Climatology

Heat budget of the earth and atmosphere – Indian monsoon – cyclones and anti cyclones – climatic classification of koppen and therntwaite.

Unit –3

Population and settlement

World distribution of population – over population ,under population and optimum population- growth of population – theories of population – migration : Internal and international - Rural settlements – types of patterns – Urban settlements – Functional classification of towns and cities.

Unit –4

Environmental Studies

Ecosystem concepts – human impact on physical environments – natural hazards – Air, Land ,Water and Noise pollution – waste disposal and its effects on society – Environmental planning and management .

Unit –5

Geography of India

Division of india based on relief,climate soil and naturalvegatiton – Agricultural distribution – population distribution – Power production – Mineral distribution and a production – industrial regions – trade and transport – Urbanization.

Unit –6

Quantitative Techniques in Geography

Source of data – Geographic methods of sampling ; point ,line and area sampling – correlation and regression analysis – centrographic measures of mean and meadian centres and standard distance.

Unit –7

Regional analysis

Formal and functional region – regional hierarchy – regionalism – classification of region – Techniques of regional classification – simple feature and multifeature regions . Macro and micro regions of India – Regions planning in tamilnadu.

Unit –8

Geography of resources and industries

Meaning and nature of resources – Trends of resources – Development – Agricultural resources – Nature and types – food resources – major cereals, oil seeds, beverage crops, sugarcane and sugarbeet – Animal and marine products – Energy resources – coal, mineral oil, H.E.P and Atomic Power production development and trends – industries – Iron and steel, ship building, automobiles, Textiles – cotton, jute, rayon and woolen – Petroleum refining – Petrochemical industries and fertiliser.

Unit - 9

Thematic Cartography

Compilation and generalization of maps – Map design and layout – Mapping of climatic, Economic population and other social data – Map reproduction – Signification of Air photos and satellite imagery in map making choropleth maps.

Unit –10

Geography of Tamilnadu

Relief and Drainage, Climate, Vegetation – Floods and droughts – distribution of food crops and cash crops – animal Husbandry – Fisheries – Minerals – Industries – Power resources- Population and urban centres.

For the post of Written Recruitment Test for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: Home Science (Subject Code: P12)

Unit-I

Methods of Collecting data- Conducting statistical enquiries to collect primary data. Source of secondary data - Preparation of schedules and questionnaire. Pretesting data. Interview Methods of enquiry.

Unit-II

Classification and organization of data collected classification by categories and measurement- Discreets and continuous variables. Tabulation schemes – Preparation of tabular forms- Methods of securing accuracy in tabulation.

Unit-III

Mesures of Central Tendency- The mean, median and mode, their relative advantages and disadvantages. Measures of dispersion. The mean deviation, standard deviation, quartile deviation – coefficient of variation.

Unit-IV

Graphic and Diagrammatic Representation- Bar diagrams, Pie diagrams, scatter diagrams, Histograms, frequency polygons, frequency curve, ogive, logarithmic graphs.

Unit-V

Microbiological Intoxications and Infections. Toxin production significance of toxic organism like clostridium botulinum, staphylococci and clostridium perfringes. Sources of infection through foods by pathogenic organisms. Symptoms and methods of control and prevention of infection.

Unit-VI

Food Hygiene- Sources of contamination of food. Microbial indicators of hygiene. Significance of cleaning and sanitizing agents. Hygienic handling, processing and packaging of food. Lessons for India.

Unit-VII

Application of art principles in interior decoration. Colour scheme for different rooms, furniture arrangement, flower arrangement and accessories. Optical illusion in interior decoration.

Unit-VIII

Clothing selection. Importance of clothing and accessories to express individually and distinction in apperance. Application of basic art principles in achieving a pleasing personality. Study of figure irregularities and methods of minimizing the effect.

Unit-IX

Nutrition in pregnancy and lactation. Physiological implication of pregnancy and lactation. Nutritional requirements during pregnancy and lactation. Impact of nutrition on the outcome of pregnancy and efficiency of milk production. Public Health measures for the pregnant and lactating mothers.

Unit-X

Nutrition in Infancy. Physical and mental development- prenatal and postnatal. Nutritional requirements during infancy. Feeding of infants- value of breast feeding versus artificial feeding. Types of milk and their use in infant feeding. Weaning- Supplementary foods and infant weaning foods.

Nutritional disorders infancy. Common diseases in infancy. Feeding the sick child. Immunisation schedule.

Unit-XI MANAGEMENT AS A SYSTEM

Definition of system components of Management system-Input, throughput, output and feedback. Characteristics of system. Factors influencing management

Unit-XII TIME AND ENERGY MANAGEMENT

Factors affecting use of time. Tools in time management. Effective use of body- body mechanics in energy management.

Types and causes of fatigue work simplification- techniques and principles- Ideas for simplifying work tasks.

Unit-XIII Financial Management

Values and goals in financial management. Income- Types of income- Expenditure budgeting. Savings- types and institutions. Use of credits. Records in maintaining accounts.

Unit-XIV Communication

Meaning and importance of communication. Communication and social changes. Communication process. Factors affecting communications. Barriers in communication. Growing popularity of mass media communication. Recent trends in communication media.

Unit-XV Food Science

Changes in food due to cooking, physical and physico-chemical changes in foods in relation to cookery, gel formation, denaturation of protein. Properties of Colloids, emulsion. Stabilisers and browning reactions.

Unit-XVI Dietetics

Therapeutic adaptation of normal diet, calculation and Planning of normal diet. Modification of diets in relation of gastro intestinal disorders including those of the liver. Cardiovascular conditions and renal disorders.

Unit-XVII Nutrition needs

Preschool age, school age, adolescence, adult and old age, Growth and development during preschool and schoolage. Changes of growth during adolescence. Prevalence of malnutrition in children and adolescents. Supplementary foods- Feeding programmes.

Unit-XVIII Community Nutrition

Assessment of nutritional status- Need for assessment methods, anthropometry, clinical assessment, food weightment and biological analysis.

Organisation working for nutritional improvement Indian Council of Agricultural Research, Indian Council of Medical Research, State Nutrition Councils and Bureaus, Extension programmes. The Applied Nutrition Programme, ICDS, SNP etc., Central Food Technological Research Institute, Voluntary Bodies, special programmes such as Nutrition Noon Meal Scheme. Midday Meal programmes International Organisations such as FAO, WHO, UNICEF, CARE, AFPRO, CWS, CRS, IBP, World Bank and others.

Unit-XIX Textile Design

Printing and dyeing. Different methods of hand printing- Block printing, Resist printing methods- Stenciling, tie and dye, screen printing and bathik.

Unit-XX

Sources of consumer Information and protection- Information- Advertisement display, labels, journals and magazines.

Protection- Standardisation, ISC standards, consumer organizations.

Syllabus for Written Recruitment Examination for the post of
P.G. Assistants in Tamil Nadu Higher Secondary Educational Service

Syllabus: Indian Culture (Subject Code: P13)
(INDIAN PHILOSOPHY SAIVA SIDDHANTA VISISTADVAITA)

Unit-I

The basic features of Indian Philosophy-Salient features of Indian Philosophy-The upanisads and to Bhagawad Gita-The Carvaka philosophy-Source of knowledge-Metaphysics and Ethics-the Jaina philosophy-Theory of knowledge-Syed vada-Sapta banginaya-Metaphysics-Ethics and Religion-The Baudha Philosophy-Theory of knowledge-Four Noble Truths-Theory of dependent origination-Theory of non-existence of the soul-The four schools of Baudha philosophy Mahayana and Hinayana-Concept of Nirvana-The Nyaya Philosophy-Theory of knowledge-Self and its liberation-The vaisesika philosophy-the categories-The Sankya philosophy-Metaphysics-Praktri and purushe- The Yoga philosophy-Yoga Ethics-Idea of God-The Mimamsa schools- The Vedanta Philosophy.

Unit-II

Sankara's Advaita-Absolute and God Maya and Avidya-a man and jiva-Uwartavada and evaocedavata-Meens to MOKSHA Nature of moksha-Jivanmukti and Vedehamukti-Vyavakarika and Paramarthika dretis-Madva's Dwaita-Nature of God- Nature of the World-Nature of souls and their bondage- Panchechelas-Nature and means of moksha-Ramanuja's Visistadvaita-Meaning of Visistadvaita-Metaphysics-Brahman as the immanent cause of cosmic evolution-Brahman cit and acit-Dharmabhutajnana-Sesa- Sesi and Sarira-Sarirj relations-Brahman as Adhara and Niyantara- Criticisms of Vivartavada and Nirgunavada-

Unit-III

The Philosophy of Saiva Siddhanta- Metaphysics-pati pasu and pasa-concept of God and Soul-Arguments for the existence of God and Soul- Bondage-Anava Karma and Maya-Means to release-cariya, kirija, yoga and jnana Iruvinai oppu-malaparipakam and Sathinipatham- concept of Grace- Meyyunarvu- Nature of release- nature and kinds of Diksha-Dasa caryan Vira Saivam and Kashmir Saivam- Theories of Truth and error.

Unit-IV

Definitions of Culture and Civilization-The physical features of India- Fundamental unity in diversity- The Indus valley civilization-its age- the people their social, economic and religions life- its destruction- The culture of the vedic age-Homeland of Aryans-the social economic and political life of the vedic age- later vedic age-the sutra period- social conditions-Condition of women-varunashrama dharma-contribution of Jainism to Indian Culture- Contribution of Buddhism to Indian Culture- Buddhism and social revolution-causes for the rise and fall of Buddhism-The sangam age-Social life- concept of Aham-Sangam Literature-Secular thought poetry poems-maritime trade-Muruga worship-the period of Pallavas is a period of religious renaissance- Alvars and Nayanmars-The Cholas and their contribution to Indian Culture- Political unification of Indian under the Mauriyas-

Unit-V

Cultural contribution of the Mughals-Impact of west on India- Influences of Islam and Christianity on Indian Culture-Cultural renaissance in the 19th Century-Causes of renaissance-Brahma Samaj-Arya Samaj- Pararthana Samaj-Ramakrishna mission-Theosophical society

Art Architecture Ethics and Religion

Unit-VI

Role of temples in Society-Temple as a center of worship-as a center of learning-as a center of public administration-as a Centre of Public health-History and literature are preserved in temples through Ilanga leaves copper plates Epigraphics-Common place of society-Rituals-

Unit-VII

Music-Vocal and instrumental- Music, dance and other like fine arts as found in Silappathikaram and other Sangam Classics-Natiya Divya prabandham and panniru Tirumurai-Festivals and their significance-Folk arts- Kathakalakshapam, Lavam, Puppet show and Villuppattu.

Unit-VIII

The inter-relationship between Art and Architecture-evolution of Hindu temples-Architecture- Nagara, Vesara and Dravidian styles-their characteristic feature- Evolution of Vimanas through ages-Gopuras Manatapas and prakaras-An outline of the history of temple architecture in South India- Various periods- Chalukyas, Kakatiyas, Cholas, Pallavas Pandyas Vijayanagara Nayaks-

Unit-IX

Definition scope and methods of Ethics-Ethics concepts-Rights and duty, Right and good-Right and wrong-merit and demerit-Virtue and vice-Values of life-Dharma, arthakama and moksha-Transition from customary morality to reflective morality- Ethical theories (Indian)- Ethical ideals of the Bhagavad Gita- Nishkamakarma- Swadharma-Ethical doctrines of Jainism and Buddhism-Law of Karma-Determinism and fatalism-Ethical basis of religions of India-Ethical concept in Tolkappiyam Sangam Literature, eighteen didactic literature including Tirukkural-Saivaita and Vaishnavaita ethics.

Unit-X

The religious leaders- Alvars Nayanmars Samaya kuravas Saitanya Acharyas of Saivism- Vaishnava Acharyas-Sankara, Ramanuja, Madhva-Panniru Thirumarai and Nalayira Divya Prabandham works- Meykanda Sastras-Works of the Acharya-their significance.

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: PHYSICAL EDUCATION (Subject Code: P15)

Unit –1

- (i) Definitions of
 - (a) Basic Research (b) Applied Research (c) Action Research
- (ii) Need and Scope of Research.

Unit –2

- (i) Classification of Research data and its collections.
- (ii) Methods of classification and tabulation of data

Unit – 3

Writing a proposal for the following types of Research

- (i) Historical type.
- (ii) Philosophical type
- (iii) Descriptive type
- (iv) Experimental type.

Unit – 4

- (i) Tools and Techniques of Research
- (ii) Hypothesis and Formulation of Hypothesis
- (iii) Writing Research Reports

Unit –5

- (i) Definition need and importance of statistics in Physical Education Research.
- (ii) Qualitative data and attributes and variables
- (iii) Construction of scales/norm -
 - (a) Zigma scale, (b) ‘Z’ scale (c) ‘T’ scale (d) Hull scale

Unit –6

Types of statistical process –

- (a) Descriptive
- (b) Comparative
- (c) Relationship
- (d) Inferential
- (e) Predictive

Unit – 7

- (i) Philosophy in Evaluation in Physical Education
- (ii) Criteria for Evaluation –
 - (a) Validity
 - (b) Reliability
 - (c) Objectivity

- (d) Administrative procedure
- (iii) Modern concept of curriculum in Physical Education
- (iv) Sources of curriculum materials.
Text books, journals, dictionaries, encyclopedias, magazines, etc.

Unit – 9

- (i) Definition of Teaching, Training and Coaching in Sports/Physical Education
- (ii) Periodisation in Training.
- (iii) Concept of Sport Injury Management.
- (iv) Misuse of Drugs in Sports.

Unit – 10

- (i) Concept of Health – Physical Health, Mental Health and Community Health
- (ii) Health Education Programmes in schools.
 - (a) Health Supervision
 - (b) Health instruction
 - (c) Health services
- (iii) Signs –Symptoms and preventions of communicable Diseases and AIDS.

Unit – 11

- Meaning of sports Psychology and its importance.
- (ii) Motor Learning and motor performance.

Unit –12

- (i) Basic consideration in motor fitness----
 - (a) Body build
 - (b) Mental aspects
 - (c) Physical fitness
 - (d) Reaction time
 - (e) Movement time
- (ii) Components of physical fitness

Unit –13

- (i) Sense Perception -----
 - (a) Vision
 - (b) Kinesthesia
 - (c) Tactile
- (ii) Emotional effects----
 - (a) Tension
 - (b) Anxiety
 - (c) Stress
- (iii) Breathing exercises and Asanas towards reduction of the above emotional disturbances

Unit –14

- (i) Definition of tactics and strategy

- (ii) Offensive and Defensive Strategies
- (iii) Training methods-circuit Training interval and weight training

Unit –15

Places of test in training

- (i) Types of tests
- (ii) National competition
- (iii) Yogasanas and its values.

Unit –16

Rule of sports and games included in the school games federation competitions

- (a) Ground making maintenance
- (b) Equipments required
- (c) Officials required and their duty.

Unit –17

- (i) Lay out of standard track(400 meters)
- (ii) Staggers for 200,400.800.
- (iii) Relay zone marking for 4*100,4*400.
- (iv) Layout of sector for -----
 - (a) Javeline
 - (b) Shotput
 - (c) Discuss and
 - (d) Hammer throw events.

Unit –18

Principles and techniques of supervision

- (i) Role of primary school teachers towards physical education programme
- (ii) Functions of DTERT/DIET/Nehru Yuva Kendra.

Unit –19

- (i) Sports authority of Tamilnadu
- (ii) National integration by sports
- (iii) Sports-a social need.

Unit –20

Definitions of ----

Balanced diet

- (i) Nutritions
- (ii) Food components needed for growing children
Chief minister's mid-day meals scheme.

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: Education (Subject Code: P16)

Unit-I

Pre-primary Education - Programme of Pre-primary Education-universalization of Primary Education- Equality of opportunity- Secondary and Higher Secondary Education-Need for uniform pattern-Non-formal and Adult Education-Functional Literacy Programme- Programmes for workers in Industry- Programme for dropouts-Role of Educational Institutions in Non-formal Education-Open School/Open University, Quantity and Quality of Education-State and National level-Unemployment and underemployment- Delinking employment from degrees- Skill development- Vocational Skill oriented education- Man Power planning and education – Brain drain – Special problems of rural and tribal people – Illiteracy and poverty- Eradication of poverty through Education.

Unit-II

National Integration – International understanding – Value Education in action – Nutrition and health – Sanitation – Safety and first aid – Women's education – Education for handicapped – Education for gifted - Population Education– Need for protecting the environment – Environmental Education – Language policy – Medium of education – Channel of International communication – Management of Schools, Private, Aided, Government, Local authorities – Government Department of education, administration and academic supervision- Headmaster / Headmistress as an administrator and academic supervisor.

Unit-III

History and Culture of Tamil Nadu:

Political – Spiritual – Religion – Literature – Language – Education – Natural Resources – Trade – Occupations – Historical places – Tourist centers - Arts – Games – Society.

Unit-IV

The Learner, learning process – Learning situation – Significance of Educational Psychology to the teacher concept of growth and maturity – Development characteristics and trends – Developmental tasks and education – Development of mental abilities – Attention, Inattention and distraction – span of attention, sensation and perception – factors in perception – Errors – concept formation – Piagets stages of cognitive development – concept maps language. Imagination, thinking and reasoning – Psycho-linguistics – Implications for the teacher.

Unit-V

Special characteristics of adolescents and their problems, attitudes, interest, group behaviour, Discipline – Leadership – Nature and importance of learning – Individual differences in learning – Learning curves – Transfer of learning – Learning styles – Factors in learning – Types of learning – Trial and error – Conditioning – Classical and operant – Learning by insight – Imitation – Levels of learning – Remembering and forgetting- Learning Disabilities.

Unit-VI

Motivation- Maslow's hierarchy of needs- Role of rewards and punishments – Levels of aspiration – Achievement motivation – Goal as a motivational factor – Nature of Intelligence – Theories of Intelligence – Assessment of intelligence – IQ constancy – Distribution – uses of intelligence tests – Creativity – Creativity and intelligence – Identification and promotion of creativity – Meaning of personality – Factors influencing personality -Assessment of personality – Integrated personality – concept of mental health and hygiene – conflict and frustration- Unrest – Adjustment – Defence mechanisms - Mental illness – Guidance and counselling.

Unit-VII

Meaning of educational innovation – Principles involved in innovation – Emergence of School – in cultural, social and religious setting – Innovations that emerged from educational experiments – Tagore:- Santiniketan – Gandhiji:- Basic Education – A.S.Neill:- Progressive School - Sri Aurobindo:- Ashram Schools. Rousseau: Children's Education - Montessori:- Sense Experience – Bertrand Russell:- Education for Social Order- Froebel:-Kindergarten – Dewey:- Pragmatic life – J. Krishnamoorthy:- Freedom in learning situation. Influence of Psychological factors on innovation – principles underlying self learning devices. Piaget:- Experiments and discovery learning - Child -centred learning. Effects of cultural, religious and social factors on innovation – Principles of equality - conformity to common educational goals.

Unit-VIII

Modernization of education – National Educational Policy (1986) – DPEP-Special focus on Teacher Education (DTERT, DIETs, BRCs, CRCs) MLL based curriculum and syllabus - Joyful learning - Autonomy in institutional structures – Individual freedom – Library based learning: Self paced instruction – pace setting schools - Mobile schools – De-Schooling and non-classroom learning – community schools – school complex Distance education and open learning – Education through mass communication – Special education – Sainik School – Defence academy – Educational Technology – need for and use of Instructional technology – mass media for instructional purposes – Review of radio and TV educational programmes – educational computing.

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: **GENERAL KNOWLEDGE** (Subject Code: P17)

- Unit – I** **Indian History**
History of India – Vedic period 1526 AD to 1947 – Free India – Modern India
- Unit-II** **Indian Constitution**
Origin of Indian Constitution – Salient and special features – Fundamental rights - Legislature – Judiciary – Executive – Adult franchise – Human rights
- Unit-III** **History of Tamil Nadu**
Ancient period – Sangam age – Chera, Chola, Pandias – Economical, political, social conditions – Literature – Architecture – Fine arts – Geography of Tamil Nadu – Natural boundaries – Resources – Rivers and places.
- Unit-IV** **Personalities**
Books and authors – Discoveries
- Unit-V** **Sports & Games**
(confined to India)
- Unit-VI** **Abbreviations**
- Unit-VII** **Every Day Science**
- Unit-VIII** **Current Affairs**