DETAILED SYLLABUS FOR THE POST OF HIGHER SECONDARY SCHOOL TEACHER IN MATHEMATICS IN HIGHER SECONDARY EDUCATION(484/2019,523/2021) HIGHER SECONDARY SCHOOL TEACHER IN MATHEMATICS (JUNIOR)IN HIGHER SECONDARY EDUCATION DEPARTMENT (490/2021,739/2021)NVT (JUNIOR) MATHEMATICS IN VOCATIONAL HIGHR SECONDARY EDUCATION(270/2021)

Module I - Linear Algebra: (7 Marks)

Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms-rational forms, Jordan forms. Inner product spaces, orthonormal basis. Quadratic form.

Module II - Real Analysis: (7 Marks)

Sequences and series, convergence, lim sup. lim inf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, diferentiability, Rolle's theorem, Mean value theorem. Sequences and series of functions- uniform convergence. Riemann sums and Riemann integral, Improper Integrals. Double and triple integrals,

Module III - Real Analysis(continued): (7 Marks)

Lebesgue measure, Lebesgue integral. directional derivative, partial derivative, Functions of several variables, inverse and implicit function theorems. Special functions- Beta and Gamma functions, Fourier series.

Module IV - Abstract Algebra: (7 Marks)

Groups, subgroups, normal subgroups, quotient groups, homomorphisms, isomorphisms, cyclic groups, permutation groups, Cayley's theorem, Direct products, Fundamental theorem for abelian groups, class equations, Sylow theorems.

Module V - Abstract Algebra (continued): (7 Marks)

Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, fnite felds, feld extensions, Galois Theory.

Module VI – Topology: (7 Marks)

Metric spaces, continuity, Topological spaces, Base, subbase, countability properties, Separation axioms, Compact space, one point compactifcation, locally compact space, connected spaces, pathwise connectedness, Quotient spaces, Product topology.

Module VII - Complex Analysis: (7 Marks)

Complex numbers, polar form, properties of complex numbers, Analytic functions, Cauchy Reimann equations, Conformal Mappings, Mobius transformation, Power series, Zeros of analytic functions, Liouvillis theorem, Complex integration, real integrals using complex integration, Cauchy's theorem and Cauchy's integral formula, Morera's theorem, open mapping theorem, Singularities and its classifcation, residues, Laurent series, Schewarz lemma, Maximum modulus principle, Argument principle.

Module VIII - Functional Analysis: (7 Marks)

Normed Linear spaces, Continuity of linear maps, Banach spaces, Hahn Banach spaces, Open mapping theorem, closed graph theorem, uniform boundedness principle, Inner product spaces, Hilbert spaces Projections, Bounded operators, Normal, unitary and self adjoint operators.

Module IX - Ordinary Diferential & Partial Equations : (7 Marks)

Existence and uniqueness of solutions of initial value problems for frst order ordinary diferential equations, singular solutions of frst order ODEs, system of frst order ODEs. General theory of homogenous and non-homogeneous linear ODEs.

Lagrange and Charpit methods for solving frst order PDEs, Cauchy problem for frst order PDEs. Classifcation of second order PDEs, General solution of higher order PDEs with constant coefcients, Method of separation of variables for Laplace, Heat and Wave equations

Module X - Theory of Numbers: (7 Marks)

Fundamental theorem of arithmetic, divisibility in Z, congruences, Chinese Remainder Theorem, Euler's Ø-function, Fermat's theorem, Wilson's theorem, Euler's theorem, primitive roots.

PART II (10 Marks)

RESEARCH METHODOLOGY/TEACHING APTITUDE

I. <u>TEACHING APTITUDE</u>

- Teaching: Nature, objectives, characteristics and basic requirements;
- Learner's characteristics;

- Factors affecting teaching;
- Methods of teaching;
- Teaching aids;
- Evaluation systems.

II. <u>RESEARCH APTITUDE</u>

- Research: Meaning, Characteristics and types;
- Steps of research;
- Methods of research;
- Research Ethics;
- Paper, article, workshop, seminar, conference and symposium;
- Thesis writing: its characteristics and format.

PART III(10 Marks)

Salient Features of Indian Constitution

Salient features of the Constitution - Preamble- Its significance and its place in the interpretation of the Constitution.

Fundamental Rights - Directive Principles of State Policy - Relation between Fundamental Rights and Directive Principles - Fundamental Duties.

Executive - Legislature - Judiciary - Both at Union and State Level. - Other Constitutional Authorities.

Centre-State Relations - Legislative - Administrative and Financial.

Services under the Union and the States.

Emergency Provisions.

Amendment Provisions of the Constitution.

Social Welfare Legislations and Programmes

Social Service Legislations like Right to Information Act, Prevention of atrocities against Women & Children, Food Security Act, Environmental Acts etc. and Social Welfare Programmes like Employment Guarantee Programme, Organ and Blood Donation etc.

RENAISSANCE IN KERALA

TOWARDS A NEW SOCIETY

Introduction to English education - various missionary organisations and their functioning- founding of educational institutions, factories, printing press etc.

EFFORTS TO REFORM THE SOCIETY

(A) Socio-Religious reform Movements

SNDP Yogam, Nair Service Society, Yogakshema Sabha, Sadhu Jana Paripalana Sangham, Vaala Samudaya Parishkarani Sabha, Samathwa Samajam, Islam Dharma Paripalana Sangham, Prathyaksha Raksha Daiva Sabha, Sahodara Prasthanam etc.

(B) Struggles and Social Revolts

Upper cloth revolts.Channar agitation, Vaikom Sathyagraha, Guruvayoor Sathyagraha, Paliyam Sathyagraha. Kuttamkulam Sathyagraha, Temple Entry Proclamation, Temple Entry Act .Malyalee Memorial, Ezhava Memorial etc.

Malabar riots, Civil Disobedience Movement, Abstention movement etc.

ROLE OF PRESS IN RENAISSANCE

Malayalee, Swadeshabhimani, Vivekodayam, Mithavadi, Swaraj, Malayala Manorama, Bhashaposhini, Mathnubhoomi, Kerala Kaumudi, Samadarsi, Kesari, AI-Ameen, Prabhatham, Yukthivadi, etc

AWAKENING THROUGH LITERATURE

Novel, Drama, Poetry, *Purogamana Sahithya Prasthanam, Nataka Prashtanam,* Library movement etc

WOMEN AND SOCIAL CHANGE

Parvathi Nenmenimangalam, Arya Pallam, A V Kuttimalu Amma, Lalitha Prabhu.Akkamma Cheriyan, Anna Chandi, Lalithambika Antharjanam and others

LEADERS OF RENAISSANCE

Thycaud Ayya Vaikundar, Sree Narayana Guru, Ayyan Kali.Chattampi Swamikal, Brahmananda Sivayogi, Vagbhadananda, Poikayil Yohannan(Kumara Guru) Dr Palpu, Palakkunnath Abraham Malpan, Mampuram Thangal, Sahodaran Ayyappan, Pandit K P Karuppan, Pampadi John Joseph, Mannathu Padmanabhan, V T Bhattathirippad, Vakkom Abdul Khadar Maulavi, Makthi Thangal, Blessed Elias Kuriakose Chaavra, Barrister G P Pillai, TK Madhavan, Moorkoth Kumaran, C. Krishnan, K P Kesava Menon, Dr.Ayyathan Gopalan, C V Kunjuraman, Kuroor Neelakantan Namboothiripad, Velukkutty Arayan, K P Vellon, P K Chathan Master, K Kelappan, P. Krishna Pillai, A K Gopalan, T R Krishnaswami Iyer, C Kesavan. Swami Ananda Theerthan , M C Joseph, Kuttippuzha Krishnapillai and others

LITERARY FIGURES

Kodungallur Kunhikkuttan Thampuran, KeralaVarma Valiyakoyi Thampuran, Kandathil Varghesc Mappila. Kumaran Asan, Vallathol Narayana Menon, Ulloor S Parameswara Iyer, G Sankara Kurup, Changampuzha Krishna Pillai, Chandu Menon, Vaikom Muhammad Basheer. Kesav Dev, Thakazhi Sivasankara Pillai, Ponkunnam Varky, S K Pottakkad and others

PART IV (10 Marks)

GENERAL KNOWLEDGE AND CURRENT AFFAIRS

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper