நறுமலர் தீபம்

இணைய வழி முதுகலை கணிதவியல்

பயிற்சி மையம்

தருமபுரி மாவட்டம் – 8122190917

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PG TRB MATHEMATICS TEST BATCH SCHEDULE

S.No	Test	Topics
		Unit I ALGEBRA
1	Test -1	Groups – Examples – Cyclic Groups – Permutation Groups – Lagrange's theorem – Normal subgroups – Homomorphism – Cayley's theorem – Cauchy's theorem – Sylow's theorems – Finite Abelian Groups.
2	Test -2	Rings - Integral Domain – Field – Ring Homomorphism – Ideals and Quotient Rings – Field of Quotients of Integral domains – Euclidean Rings – Polynomial Rings – Unique factorization domain.
3	Test - 3	**TEST 1 AND TEST 2 TOPICS**
4	Test - 4	Fields – Extension fields – Elements of Galois theory – Finite fields Vector Spaces – Linear independence of Bases – Dual spaces – Inner product spaces – Linear transformations
5	Test -5	Rank – Characteristic roots – Matrices – Canonical forms – Diagonal forms – Triangular forms – Nilpotent transformations – Jordan form – Quadratic forms and Classification – Hermitian, Unitary and Normal transformations.
6	Test - 6	**TEST 4 AND TEST 5 TOPICS**
7	Test -7	**UNIT – I FULL SYLLABUS**
		Unit II REAL ANALYSIS
8	Test - 8	Elementary set theory – Finite, countable and uncountable sets – Real number system as a complete ordered field – Archimedean Property – Supremum, infimum, Sequences and Series – Convergence – limit supremum – limit infimum
9	Test – 9	The Bolzano – Weierstrass theorem – The Heine – Borel Covering theorem Continuity, Uniform Continuity, Differentiability – The Mean Value theorem for derivatives – Sequences and Series of functions – Uniform convergence
10	Test - 10	**TEST 8 & TEST 9 TOPICS**
		Riemann – Stieltjes integral: Definition and existence of the

11	**Test – 11**	integral – properties of the integral – Integral and Differentaition – Integration of vector valued functions – Sequences and Series of functions: Uniform convergence – Continuity, Integration and Differentiation
12	**Test - 12**	Power series – Fourier series Functions of several variables – Directional derivative – Partial derivative – derivative as a linear transformation – The Inverse function theorem and The Implicit function theorem.
13	**Test - 13**	**TEST 11 & TEST 12 TOPICS**
14	**Test - 14**	**UNIT – 2 FULL SYLLABUS**
		Unit III TOPOLOGY
15	**Test - 15**	Topological spaces – Basis – The order Topology – The product Topology – The subspace Topology – Closed sets and limit points
16	**Test - 16**	Continuous functions – The box and product Topologies – the matrix Topology. Connected spaces – Connected subspaces of the real line – Components and local connectedness
17	**Test - 17**	**TEST 15 &TEST 16 TOPICS**
18	**Test - 18**	compact spaces – Compact subspaces of the real line – Limit point compactness – Local compactness
19	**Test - 19**	Countability and separation Axioms – Normal spaces – The Urysohn Lemma – The Urysohn metrization theorem – The Tietze extension theorem.
20	**Test - 20**	**TEST 18&TEST 10 TOPICS**
21	**Test -21**	**UNIT – 3 FULL SYLLABUS**
		Unit IV COMPLEX ANALYSIS
22	**Test -22**	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
23	**Test - 23**	Analytic functions as mapping – conformality arcs and closed curves – Analytical function in regions – conformal mapping – Linear transformation – the linear group , the cross ration and symmetry.
24	**Test - 24**	**TEST 22&TEST 23 TOPICS**
25	**Test - 25**	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
26	**Test -26**	– Higher derivatives – Local properties of Analytic functions and removable singularities – Taylor's theorem – Zeros and Poles – The local mapping – The maximum modulus Principle.
27	**Test - 27**	**TEST 25 &TEST 26 TOPICS**
28	**Test -28**	**UNIT – 4 FULL SYLLABUS**

	Unit V FUNCTIONAL ANALYSIS	
29	**Test - 29**	Banach Spaces – Definition and examples – Holder's inequality and Minkowski's inequality – Continuous linear transformations – The Hahn-Banach theorem – Natural imbedding of X in X**
30	**Test - 30**	The open mapping and The closed graph theorem – properties of conjugate of an operator. Hilbert spaces – Orthonormal bases – Conjugate space H* – Adjoint of an operator – Projections
31	**Test - 31**	**TEST 29 & TEST 30 TOPICS**
32	**Test -32**	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
33	**Test -33**	Regular and Singular elements in a Banach Algebra – Topological divisor of zero – Spectrum of an element in a Banach algebra – The formula for the spectral radius – Radical and semi-simplicity.
34	**Test - 34**	**TEST -32 & TEST 33 TOPICS**
35	**Test - 35**	**UNIT – 5 FULL SYLLABUS**
	Unit VI DIFFERENTIAL GEOMETRY	
36	**Test - 36**	Curves in spaces – Serret – Frenet formulae – Locus of centers of curvature – Spherical curvature – Intrinsic equations – Helices
37	**Test - 37**	Spherical Indicatrix Surfaces – Curves on a surface – Surface of revolution – Helicoids – Gaussian curvature – First and Second fundamental forms
38	**Test -38**	**TEST 36 & TEST 37 TOPICS**
39	**Test -39**	Isometry – Meusnier's theorem – Euler's theorem- lines of curvature – Dupin's Indicatrix Asymptotic lines – Edge of regression – Developable surfaces associated to a curve – Geodesics – Conjugate points on Geodesics
40	**Test -40**	**TEST 37 & TEST 39 TOPICS**
41	**Test - 41**	**UNIT – 6 FULL SYLLABUS**
	Unit VII DIFFERENTIAL EQUATIONS	
42	**Test -42**	Linear differential equation with constant and variable co-efficients – Linear dependence and independence – Wronskian
43	**Test -43**	Non homogeneous equations of order two and n – Initial value problems for nth order equations Second order equations with ordinary point and regular singular points
44	**Test -44**	**TEST 42 & TEST 43 TOPICS**
45	**Test -45**	– Legendre Equations – Bessel's equation – Hermite's equation and their properties
46	**Test -46**	Existence and Uniqueness of solutions to first order equations – Exact equation – Lipschitz condition – Non local existence of Solution – Approximation to Uniqueness of solutions.
47	**Test - 47**	**TEST 45 & TEST 46 TOPICS**
48	**Test - 48**	Partial Differential Equations Lagrange and Charpit methods for solving first order Partial Differential equations – Classification of Second order partial differential equations – General solution of higher order partial differential equation with constant co-efficients
49	**Test - 49**	Method of separation of variables for Laplace, Heat and Wave

		equations (upto two dimensions only).
50	**Test - 50**	**UNIT – 7 FULL SYLLABUS**
		Unit VIII CLASSICAL MECHANICS AND NUMERICAL ANALYSIS
51	**Test -51**	**Classical Mechanics** Generalised Co-ordinates – Lagrange's equations – Hamilton's Canonical equations – Hamilton's principle – Principle of least action.
52	**Test - 52**	Canonical transformations – Differential forms and Generating functions – Lagrange and Poisson brackets.
53	**Test -53**	**TEST 51 & TEST 52 TOPICS**
54	**Test - 54**	**Numerical Analysis** Numerical solutions of algebraic and transcendental equations – Method of iteration – Newton Raphson method – Rate of convergence – Solution of Linear algebraic equations using Gauss elimination and Gauss – Seidel methods.
55	**Test -55**	Finite differences – Lagrange, Hermite and Spline Interpolation, Numerical differentiation and integration
56	**Test - 56**	Numerical solutions of Ordinary differential equations using Picard, Euler, Modified Euler and Runge- Kutta methods.
57	**Test - 57**	**TEST 54,55,56 TOPICS**
58	**Test - 58**	**UNIT – 8 FULL SYLLABUS**
		Unit IX OPERATIONS RESEARCH
59	**Test - 59**	Linear programming problem – Simplex Methods – Duality – Dual Simplex Method – Revised Simplex Method
60	**Test - 60**	Integer Programming Problem – Dynamic Programming – Non linear programming – Network Analysis – Directed Network – Max Flow Min Cut theorem
61	**Test - 61**	**TEST 59 & TEST 60 TOPICS**
62	**Test – 62**	Queuing theory – Steady State solutions of M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1 models
63	**Test - 63**	Inventory models – Deterministic models with and without shortages – Single Price break models.
64	**Test - 64**	**TEST 62 & TEST 63 TOPICS**
65	**Test - 65**	**UNIT – 9 FULL SYLLABUS**
		Unit X PROBABILITY THEORY
66	**Test - 66**	Sample space – Discrete Probability – Independent events – Baye's theorem – Random variables and Distribution functions (Univariate and Multivariate)
67	**Test - 67**	Expectation and Moments – Moment Generating function – Characteristic functions and Cumulants – Independent Random variables
68	**Test - 68**	**TEST 66 & TEST 68 TOPICS**
69	**Test - 69**	Marginal and conditional distributions – Probability inequalities (Tchebyshev, Markov, Jensen) – Modes of convergence, Weak and Strong laws of large numbers – Central limit theorem (i.i.d case).

70	**Test - 70**	Probability distributions – Binomial, Poisson, Uniform, Normal, Exponential, Gamma, Beta, Cauchy distributions
71	**Test - 71**	**TEST 69 & TEST 70**
72	**Test - 72**	Standard Errors – Sampling distributions of t, F and Chi square and their uses in tests of significance – ANOVA – Large sample tests for mean and proportions.
73	**Test - 73**	**TEST 69,70,72 TOPICS**
74	**Test - 74**	**UNIT – 10 FULL SYLLABUS**
75	**TEST - 75**	UNIT 1,2
76	**TEST - 76**	UNIT 3,4
77	**TEST - 77**	UNIT 5,6
78	**TEST - 78**	UNIT 7,8
79	**TEST - 79**	UNIT 9,10
80	**TEST - 80**	UNIT 1,2,3,4,5
81	**TEST - 81**	UNIT 6,7,8,9,10
82	**TEST - 82**	FULL SYLLABUS - 1
83	**TEST - 83**	FULL SYLLABUS - 2
84	**TEST – 84**	FULL SYLLABUS - 3
85	**TEST -85**	FULL SYLLABUS - 4