

**NARUMALAR ACADEMY – ONLINE COACHING  
CENTRE**

**DHARMAPURI – 8122190917, 9988404061**

**COLLEGE TRB – MATHEMATICS**

Test Series Plan Based on TRB Assistant Professor  
Syllabus (Code 31 – Mathematics)

S.No	Unit / Section	Subtopic / Test Title	No. of Questions
1	Unit 1: Algebra – Group Theory	Permutations, Combinations, Applications of classical number theoretic properties, Groups, Counting Principles, Polynomial Rings, Vector spaces	50
2	Unit 1	Inner Product Spaces,	50

		Orthonormal bases , Fields, Splitting fields, Solvable groups,	
3	Unit 1	Linear transformations, Determinants,	50
4	Unit 1	Cayley Hamilton theorem and Applications, Finite fields.	50
5	Unit 1 – Full Test	Complete Unit 1 (Algebra & Group Theory)	50
6	Unit 2: real analysis	Real number system, Sequences and series, convergence, Metric spaces, Compactness, Connectedness, Continuity, Differentiability,	50

7	Unit 2	Sequences and series of functions, Uniform convergence and continuity, Riemann–Stieltjes sums and integrals, Improper Integrals, Measure and Integration	50
8	Unit 2	Algebra of complex numbers, Analytic functions, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula	50
9	Unit 2	Residues and Poles, Calculus of residues, Applications of Residues, Power series, Taylor	50

		series, Laurent series.	
10	Unit 2 – Full Test	Complete Unit 2 (Linear Algebra)	50
11	Unit 3: Topology and Functional Analysis	Topological spaces, Basis for a Topology, Order topology, Product topology, Subspace topology, Closed sets, Limit points,	50
12	Unit 3	Hausdorff spaces, Continuous functions, Homeomorphisms, Metric Topology, Connected spaces, Compactness, Countability axioms, Separation axioms and Normal spaces.	50

13	Unit 3	Normed linear Spaces, Banach Spaces, Continuous linear transformations, Hahn Banach theorem, Open mapping theorem, Closed graph theorem, Conjugate of an operator, Hilbert spaces	50
14	Unit 3	Orthogonality, Orthonormal bases, Normal operators, Unitary operators, Projections, Banach Algebra.	50
15	Unit 3 – Full Test	Complete Unit 3 (Topology and Functional Analysis)	50

16	Unit 4: Ordinary and Partial Differential Equations	Existence and uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs	50
17	Unit 4	system of first order ODEs, General theory of homogeneous linear ODEs, Variation of parameters	50
18	Unit 4	Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs	50
19	Unit 4	Classification of second order	50

		PDEs, Method of separation of variables for Laplace, heat and wave equations.	
20	Unit 4 – Full Test	Complete Unit 4 (Ordinary and Partial Differential Equations)	50
21	Unit 5: Differential Equations	Curves in spaces, Serret–Frenet formulas, Locus of center of curvature, Spherical curvature, Intrinsic equation, Helices, Spherical indicatrix surfaces	50
22	Unit 5	Envelope, Edge of regression, Developable surfaces associated to a curve, First and Second	50

		fundamental forms, Lines of curvature	
23	Unit 5	Linear programming, Revised simplex method, Duality problems, Degeneracy procedure, Integer programming, Non-linear programming, Convex programming	50
24	Unit 5	Game theory, Queuing theory, Single server and Multi server models, Network analysis.	50
25	Unit 5 – Full Test	Complete Unit 5 (Differential Geometry and	50

		operational reserch)	
26	Unit 6: foundations of education	Philosophical Perspectives: Idealism, Naturalism, Pragmatism, Progressivism, Existentialism, Humanism, Realism, Eclecticism – Philosophers and their contributions: Western Philosophers: Rousseau, Froebel, Maria Montessori, Pestalozzi, Bertrand Russell, John Dewey	50
27	Unit 6	Indian Philosophers: Mahatma Gandhi, Rabindranath Tagore, Swami	50

		Vivekananda, J.Krishnamurti, Aurobindo – Development of Indian Education during Pre- Independence, Post Independence, Modern era– Important Education Committees – Recommendations of National Education Policies, National Curriculum Frameworks.	
28	Unit 6	Sociological Perspectives: Concepts of Special and Inclusive Education, Women	50

		<p>Education, Population Education, Vocational Education, Environmental Education for sustainable development-UN SDG goals, Human Rights: UN Declaration of Human Rights,</p>	
29	Unit 6	<p>Peace and Value Education – Indian Constitution: Articles and Amendments related to Education–Culture and Communication in Education – Social issues: Measures and Reforms – Social Structure,</p>	50

		Socialization process – Social stratification – Indigenous Value systems – History and Culture of Tamil Nadu: Social Equality, Language, Culture and Politics.	
30	Unit 6 – Full Test	Complete Unit 6 (Foundations of Education)	50
31	Unit 7: Topology	Educational Psychology – Cognitive, Humanistic, Behavioural and Transpersonal school of thoughts – Role of heredity and environment – Dimensions of Development: Physical, Cognitive,	50

		Psycho-Social, Moral, Behavioural, Language – Theories of Development: Piaget, Bruner, Kohlberg, Erickson, Vygotsky, Noam Chomsky, Watson Developmental tasks – Sensation and Perception– Factors of learning	
32	Unit 7	Attention, Interest, Aspiration, Motivation and its types, Motivational Theories: Maslow, McDougall's, McClelland – Learning, Factors of Learning, Theories: Trial &	50

		Error, Operant and Classical Conditioning, Insight and Gestalt – Intelligence: Theories – Single-Factor, Two-Factor, Triarchic, Group and Multi-factor theory,	
33	Unit 7	Guilford's Structure of Intellect, Gardner's Multiple Intelligence theory, Factor Personality: Type and Trait theories – Personality Assessment methods and techniques –	50
34	Unit 7	Educational Implications of Learning,	50

		Intelligence and Personality theories – Mental Health, Adjustment and Defense mechanisms – Concepts of Guidance and Counselling.	
35	Unit 7 – Full Test	Complete Unit 7 (Educational Psychology)	50
36	Unit 8: Probability and Statistics	Nature, Scope, Aims and Objectives, Values of Teaching the subject, Inter-disciplinary aspects, Taxonomy of Educational Objectives: Bloom's, Anderson's, RCEM, NCERT –	50

		<p>Micro-teaching:  Skills and  Components,  Micro Cycle, Link  Lesson–Planning  of the lesson:  Curricular Plan,  Unit Plan and  Lesson Plan,  General and  Specific  Instructional  objectives, Action  verbs – Methods  of Teaching:  Traditional and  Modern Methods  –</p>	
37	Unit 8	<p>Techniques of  Teaching: Small  and Large Group  Techniques –  Models of  Teaching: Concept  attainment,  Advanced</p>	50

		Organizers, Inquiry Training, Information Processing, Personalized Model – Resources for Teaching- Learning: Text Books, Laboratory, Library, E- resources and Field-trips – Flander’s Classroom Interaction Analysis	
38	Unit 8	Dale’s Cone of Experience – Educational Technology and ICT Resources in Teaching- Learning: Blended Learning,	50

		Simulation, Augmented Reality, Virtual Learning – Digital Resources – Assessment and Evaluation: Types of Tests	
39	Unit 8	ypes of Tests, Steps in construction of an achievement test – Continuous and Comprehensive Evaluation – Analysis and Interpretation of test scores.	50
40	Unit 8 – Full Test	Complete Unit 8 (Pedagogical approaches)	50
41	Unit 9: Curriculum Components	Curriculum – Principles, Bases of Curriculum: Philosophical,	50

	and Teacher Education	Psychological and Sociological, Criteria of selection of content – Types: Subject, Learner, Community and Activity centred curriculum – Concepts of core and hidden curriculum – Curriculum Organization: Articulation, Balance and Continuity – Approaches: Concentric, Spiral, Topical, Logical, Vertical and Horizontal	
42	Unit 9	Curricular Materials – Role of NCERT and SCERT in	50

		<p>curriculum planning – Stakeholders contribution and participation in the curricular, co-curricular and extra-curricular activities – Curriculum Evaluation and Theories: Tyler’s model, Hilda Taba model, Beauchamp’s model, D.K.Wheeler’s model, Virgil V. Herrick model</p>	
43	Unit 9	<p>Teacher Education – National Council for Teacher Education: Functions– Teacher Education systems and</p>	50

		<p>Programmes: Pre-service and In-service –  Integrated Teacher Education  Programmes–  Concept of Teaching Profession;  Changing roles and responsibilities –  Continuous Professional development and Professional ethics–National Professional Standards for Teachers –  Teacher Appraisal and accountability</p>	
44	Unit 9	<p>Significance of Teachers In-service education and training–</p>	50

		<p>Research and innovations in Teacher education, NAAC's Assessment and Accreditation process –</p> <p>Autonomy in Education: Institutional, Administrative and Teacher autonomy –</p> <p>Teacher Eligibility Tests – Concepts of Andragogy –</p> <p>Life-long and continuing education</p>	
45	Unit 9 – Full Test	Complete Unit 9 (Curriculum Components and Teacher Education)	50
46	Unit 10: Research	Research – Types of Research:	50

	Methodology and Statistics	Basic, Applied and Action Research, Sources of Selecting Research Problem, Importance of Review of Literature, Hypothesis, Variables, Sampling Techniques: Probability and Non-Probability techniques, Steps in writing research proposal and research report – Academic and Research Writing – Experimental Research Designs: Pre-Experimental, True and Quasi Designs	
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47	Unit 10	Factors affecting internal and external validity of experimental research, Quantitative, Qualitative and Mixed Research Methods– Research Tools: Likert and Thurstone, Personality, Interest and Intelligence test, Item and Factor analysis	50
48	Unit 10	Characteristics of Research tools – Statistical Analysis: Descriptive and Inferential Analysis, Hypothesis	50

		testing: Type I and Type II errors	
49	Unit 10	Level of Significance, Graphical Representation of Data – Issues related to plagiarism– Research Ethics and Integrity.	50
50	Unit 10 – Full Test	Complete Unit 10 (Research Methodology and Statistics)	50
51	Comprehensive Test 1	Units 1 to 5 (Part I)	50
52	Comprehensive Test 2	Units 6 to 10 (Part II)	50
53	Full Syllabus Test 1	All Units 1 – 10	50
54	Full Syllabus Test 2	All Units 1 – 10	50

55	Full Syllabus Test 3	All Units 1 – 10	50
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