

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR EXAMINATION FOR THE POST OF TEACHER, GRADE-II (MATHEMATICS) SANSKRIT EDUCATION DEPARTMENT

(I) **General knowledge and Current affairs with special reference to Rajasthan:**

Current affairs of Rajasthan, Major current issues and happenings at state level related to Political, Socio economic, Games and Sports aspects.

Indian Constitution - salient features. Indian Political System - Union Executive - President : Powers and Functions. Prime Minister & Council of Ministers-Powers and Functions..

Office of Governor, Chief Minister and Cabinet Role and functions of state Secretariat, role of Chief Secretary, Local Government in Rajasthan - Rural and urban, Major institutions and their role in various developmental programmes - Women empowerment through local Governance.

(II) **Geographical, Historical and Cultural Knowledge of Rajasthan** - Location, Extention, relief features, climate, drainage, soil resource, Vegetation, Irrigation, Multipurpose Projects, Agriculture, Live Stock, Dairy Development, Minerals - Power resource, Population distribution and growth, Literacy, Sex-ratio, Religious Composition, Industries, Major Tourists Centres and Means of Transportation of Rajasthan.

Main centres of Uprising and Protest in Rajasthan in 1857.

Freedom movement in Rajasthan and freedom fighters of Rajasthan, Integration of Rajasthan - various stages. People, Religion and culture of Rajasthan - Saints of Rajasthan, Lok Devta and Devayan, various temples.

Important fairs and festivals, Folk songs and dances, Historical Palaces and Forts, Major Centres of Sufism in Rajasthan - Ajmer, Sarwar and Nagaur.

(III) **Educational Psychology :**

- 1 Educational Psychology - meaning, scope and contribution of educational psychology in field of Education.
- 2 Learning - Its Meaning, Factors affecting Learning, Different Theories of Learning and its implications for a teacher.
- 3 Development of Learner - Physical, Emotional and Social development of child and their implications for Learning.
- 4 Individual differences and Education for Special Children.
- 5 Motivation - Meaning and role in the process of learning.

(IV) **School Subject (Mathematics)**

Arithmetic : Partnership, Average, Interest-Simple and Compound, Payment in installments, Percentage, Profit & Loss, Discount, Ratio and Proportion.

Plane Geometry : Angles and lines at a point, Angles made by a transversal with two lines, Classification of triangles on the basis of sides and angles, Rectilinear figures, Congruence of triangles, Inequalities of triangles, Similar triangles, Area of plane figures, Circles, Arcs and Angles subtended by them. Tangents to a circle.

Algebra : Equations (one and two variables), Factors, Mathematical induction, Binomial theorem, Quadratic equations, nature of roots, quadratic functions, quadratic inequalities, finite and infinite sequences, Arithmetic progression, Geometric Progression, Harmonic Progression, Arithmetic

Geometric series, Logarithmic and exponential series, Permutations, Combinations, Matrix, Determinants of order two and three, Inverse matrix, solution of simultaneous linear equations of two and three unknowns, Relations and Functions, Complex numbers, its elementary properties, Demovier's theorem, Separation into real and imaginary parts.

Trigonometry : Angles and their measurements, Trigonometric ratios of acute angles, Angles and lengths of arc, Trigonometric functions, Compound multiple angles, Solutions of trigonometric equations, Inverse trigonometric functions, Properties of triangles, Height & distance.

Calculus :

- 1 Differential Calculus - Limits, Differentiability, Continuity, Derivative of sum and difference, derivative of product of functions, composite functions, implicit functions, trigonometric functions, parametric functions, Applications of derivatives, Maxima and minima of one variable, Partial derivatives, Mean Value Theorems.
- 2 Integral Calculus - Indefinite integrals, Definite integrals, definite integral as a limit of sum, Applications of definite integral, Quadrature.

Co-ordinate Geometry :

- 1 **Two Dimensional Geometry** - Distance between two points, Sections formula, Area of triangle, Locus, equations of straight line, pair of straight lines, Circles, Parabola, Ellipse, Hyperbola, their equations, general properties, tangent, normal, chord of contact, pair of tangents, pole & polar, System of circle.
- 2 **Co-ordinate Geometry in 3 - dimensions** - Distance formula, Sections Formula, Direction cosines, Direction ratios, angle between two lines, Equation of plane one point form, normal form, intercept form, distance of a point from a plane, Angle between two planes, angle between a line and a plane, Symmetrical equations of a line through one and two points, Co-planer and skew lines, Shortest distance between two lines, Sphere.

Statistics : Mean, Mode, Median, Quartiles, Deciles, Percentiles, Index number, Measure of dispersion, Correlation and Regressions Probability - Laws of probability, addition and multiplications law, Conditional probability.

Vector - Dot product, Cross product, their properties, Scalar triple product, Vector triple product and related problems, Differentiation of vector functions, Gradient, Divergence and Curl.

Statics and Dynamics : Composition and resolution of co-planer forces, Component of a force in two given directions, Equilibrium of concurrent forces, Parallel forces and moment, velocity and acceleration, Simple linear motion under constant acceleration, Laws of motion, Projectile, Simple harmonic motion.

Abstract Algebra - Group, Normal subgroup, Permutation group, Quotient group, Homomorphism & groups, Isomorphism theorems, Cayley and Lagrange's theorems, Automorphism.

Real Analysis - Real numbers as a complete ordered field, linear sets, lower and upper bounds, limit points, closed and open sets, Real sequence, limit and convergence of a sequence, Riemann integration, Convergence of series, absolute convergence, uniform convergence of sequence and series of functions.

Differential Equations - Ordinary differential equations of first order and first degree, Differential equations of first order but not a first degree, Clairut's equations its general and singular solutions, Linear differential equations with constant coefficients, Homogeneous, Linear differential equations with variable coefficients, Simultaneous linear differential equations of first order.

Linear Programming - Graphical method of solution of linear programming in problems two variables, Convex sets and their properties, Simplex method, Assignment problems, Transportation problems.

Numerical Analysis and Difference Equation - Polynomial interpolation with equal or unequal step size, Lagrange's interpolation formula, Truncation error, Numerical differentiation, Numerical integration.

(V) Educational Methodology (Mathematics)

- Meaning and Nature of Mathematics.
- History of mathematics, contribution of Indian and Western mathematicians.
- Relation of mathematics with other subjects as Physics, Chemistry, Biology, Geography, History, Economics and Languages.
- Aims and objectives of mathematics teaching.
- Methods of Mathematics Teaching (analytic, synthetic, inductive, deductive, heuristic, project & laboratory methods).
- Techniques of teaching mathematics viz – Oral, Written, Drill, Assignment, Supervised study and Programmed learning.
- Maxims of mathematics teaching.
- Planning in Mathematics teaching viz – Lesson Plan, Unit Plan & Yearly Plan.
- Teaching aids in mathematics teaching, preparing low cost improvised teaching aids.
- Academic and Professional preparation of mathematics teacher.
- Selection criterion of a good mathematics book.
- Curriculum of mathematics teaching.
- Planning & equipments of Mathematics laboratory.
- Evaluation in mathematics, Achievement test, Diagnostic test and remedial teaching.
- Innovative techniques in mathematics teaching as Tem teaching, Micro-teaching and field trip.
- Use of multimedia in mathematics teaching.

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Scheme and syllabus of competitive examination for the post of Teacher Grade II (Mathematics)

- 1 The competitive examination shall carry 200 marks.
- 2 Duration of examination shall be two hours.
- 3 The question paper of written examination shall carry multiple choice type questions.
- 4 Paper shall include following subjects carrying the number of marks as shown against them :-

(i)	General Knowledge and Current Affairs with special reference to Rajasthan.	60 Marks
(ii)	Geographical, Historical & Culture Knowledge of Rajasthan.	60 Marks
(iii)	Educational Psychology	10 Marks
(iv)	School Subject (Mathematics)	40 Marks
Note : Standard of contents of School subject shall be of the Praveshika standard.		
(v)	Educational Methodology (Mathematics)	30 Marks
	Total	200 Marks

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