RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER
SYLLABUS FOR EXAMINATION FOR THE POST OF
LECTURER - MATHEMATICS,
(SCHOOL EDUCATION)
Paper - II

Part – I (Senior Secondary Standard)

1. Sets, Relations and Functions : Different kinds of sets and their basic properties, Relations, types of relations, Different types of real valued functions.
2. Limit, Continuity and Differentiability : Limit, continuity and differentiability of algebraic functions, trigonometric functions, exponential functions and logarithmic functions.
3. Complex and Vector Algebra : Complex numbers and their algebraic properties, polar representation, square root of a complex number, Vectors and scalars, types of vectors and their algebraic properties, scalar and vector product of two vectors, scalar triple product.
5. Integral calculus : Integration of functions by the method of substitution, partial fraction and by parts. Basic properties of definite integrals and their uses to evaluate them.
7. Permutations and combinations : Derivation of formulae, their connections and simple applications.
10. Determinant : Determinant of a square matrix and their properties. Solution of system of linear equations in two or three variables using inverse of a matrix.
11. Two dimensional geometry : Straight line, standard equations and simple properties of circle, parabola, ellipse, hyperbola.

Part – II (Graduation Standard)

1. Group Theory : Groups and their simple properties, order of an element, order of a group, permutation groups, cyclic groups and their properties, subgroups and their basic algebraic properties, cosets and their properties.
2. Normal subgroup and Rings : Normal subgroups and quotient groups, theorems on homomorphism and isomorphism.
4. Calculus : Partial derivatives, curvature, asymptotes, envelopes and evolutes, maxima and minima of functions up to two variables, Beta and Gamma functions, double and triple integrals.
5. Advanced Calculus : Mean value theorems (Rolle’s, Lagrange’s, Taylor’s theorems), sequence and series with convergence properties.


Vector calculus: Gradient, divergence and curl, identities related to them. Line, surface and volume integrals. Applications of Gauss, Stoke’s and Green’s theorems.

Three dimensional geometry: Direction ratios and cosines, straight line, plane, sphere, cone and cylinder.

Statics: Equilibrium of co-planner forces, moments, friction, virtual work catenary.

Dynamics: Velocities and acceleration along radial and transverse directions and along tangential and normal directions, simple harmonic motion, Rectilinear motion under variable laws, Hook’s law and problems, projectiles.

Part – III (Post Graduation Standard)


Metric Spaces: Bounded and unbounded metric spaces. Open and closed sets in a metric space, Cantor’s ternary set, closure, bases, product spaces.


4. Numerical Analysis: Newton’s formula for forward and backward interpolation for equal intervals, Divided difference, Newton’s Lagrange’s, Starling’s and Bessel’s interpolation formulae.


Part – IV (Educational Psychology, Pedagogy, Teaching Learning Material, Use of computers and Information Technology in Teaching Learning)

1. Importance of Psychology in Teaching-Learning:
   * Learner,
   * Teacher,
   * Teaching-learning process,
   * School effectiveness.

2. Development of Learner:
   - Cognitive, Physical, Social, Emotional and Moral development patterns and characteristics among adolescent learner.

3. Teaching – Learning:
   - Concept, Behavioural, Cognitive and constructivist principles of learning and its implication for senior secondary students.
   - Learning characteristics of adolescent and its implication for teaching.

4. Managing Adolescent Learner:
   - Concept of mental health and adjustment problems.
- Emotional Intelligence and its implication for mental health of adolescent.
- Use of guidance techniques for nurturing mental health of adolescent.

5. Instructional Strategies for Adolescent Learner:
   - Communication skills and its use.
   - Preparation and use of teaching-learning material during teaching.
   - Different teaching approaches:
     - Teaching models- Advance organizer, Scientific enquiry, Information, processing, cooperative learning.
   - Constructivist principles based Teaching.

6. ICT Pedagogy Integration:
   - Concept of ICT.
   - Concept of hardware and software.
   - System approach to instruction.
   - Computer assisted learning.
   - Computer aided instruction.
   - Factors facilitating ICT pedagogy integration.

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### Scheme of Examination

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<th>S. No.</th>
<th>Subject Concerned</th>
<th>No. of Questions</th>
<th>Total Marks</th>
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<tr>
<td>1</td>
<td>Knowledge of Subject Concerned : Senior Secondary Level</td>
<td>55</td>
<td>110</td>
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<td>2</td>
<td>Knowledge of Subject Concerned : Graduation Level</td>
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<td>3</td>
<td>Knowledge of Subject Concerned : Post Graduation Level</td>
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<tr>
<td>4</td>
<td>Educational Psychology, Pedagogy, Teaching Learning Material, Use of Computers and Information Technology in Teaching Learning</td>
<td>30</td>
<td>60</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>300</strong></td>
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**Note:**
1. All the question in the Paper shall be Multiple Choice Type Question.
2. Negative marking shall be applicable in the evaluation of answers. For every wrong answer one-third of the marks prescribed for that particular question shall be deducted.
   Explanation: Wrong answer shall mean an incorrect answer or multiple answer.
3. Duration of the paper shall be 3 Hours.

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