Aligarh Muslim University

Scheme of Exam for Direct Recruitment of Post Graduate Teacher in AMU Schools

The written test is of 120 marks (120 objective type multiple choice question) carrying 01 mark for each question. The duration of written test will be 120 minutes without ant time limit for each part individually.

Section Name – Nature of Questions

Part I – Proficiency in Languages   (12 marks)

    A. General English (06 questions)
    B. General Hindi (06 questions)

Part II – General awareness, Reasoning & Proficiency in computers   (18 marks)

    a) General Awareness & Current Affairs and Aligarh Movement (10 questions)
    b) Reasoning Ability (4 questions)
    c) Computer Literacy (4 questions)

Part III – Perspectives on Education and leadership (25 questions)   (25 marks)

(a) Understanding the learner (5 questions)

(b) Understanding teaching learning (5 questions)

(c) Creating Conducive learning (5 questions)

(d) School Organization and leadership (5 questions)

(e) Perspectives in Education (05 questions)

Part IV – subject – specific Syllabus   (65 marks)

Professional Competency Test:

The Professional Competency Test is 70 marks (Demo Teaching 70 marks)

Note: The weightage of Written Test & Demo Teaching in drawing the Final Merit list will be 30:70 respectively.

Scheme & Syllabus of Exam for Direct Recruitment of PGTs:

Part I – Proficiency in Language   (12 marks)

(a) General English (06 questions)
Reading comprehension, word power, Grammar & usage)

(b) General Hindi (6 questions)
पठन कौशल शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति

Part II – General Awareness, Reasoning & Proficiency in Computers   (18 marks)

(a) General Awareness & Current Affairs and Aligarh Movement (18 questions)
(b) Reasoning Ability (5 questions)
(c) Computer literacy (5 questions)

Part III – Perspectives on Education and Leadership   (25 marks)

(a) Understanding the Learner (10 questions)
- Concept of growth, maturation and development, principles and debates of development, development tasks and challenges.
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications.
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- Understanding Adolescence: Needs, challenges and implications for designing institutional support.
- Role of Primary and Secondary Socialization agencies. Ensuring Home School continuity.

(b) Understanding Teaching Learning (15 questions)
- Theoretical perspectives on learning – Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
    i. The role of teacher
    ii. The role of learner
    iii. Nature of teacher-student relationship
    iv. Choice of teaching methods
    v. Classroom environment
    vi. Understanding of discipline, power etc.
- Factors affecting learning and their implications for:
    i. Designing classroom instructions,
    ii. Planning student activities and,
    iii. Creating learning spaces in school.
- Planning and Organization of Teaching – Learning
    i. Concept of Syllabus and Curriculum, Over and Hidden Curriculum, Principles of curriculum organizations.

ii. Competency based Education, Experiential learning, etc.
iii. Instructional Plans :- Year Plan, unit Plan , Lesson Plan
iv. Instructional material and resources.
v. Information and Communication Technology (ICT) for teaching – learning
vi. Evaluation: Purpose, types and limitations. Continuous and Comprehensive Evaluation, Characteristics of a good tool.
vii. Assessment of learning, for learning and as learning: Meaning, purpose and consideration in planning each.

- Enhancing Teaching learning processes: Classroom Observation and Feedback, Reflections and Dialogues as a means of constructivist teaching.

(c) Creating Conducive Learning Environment (04 questions)

- The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities – their identification and interventions.
- Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.

(d) School Organization and Leadership (4 questions)

- Leader as reflective practitioner, team builder, initiator, coach and mentor.
- Perspectives on School Leadership: instructional, distributed and transformative
- Vision building, goal setting and creating a School Development plan
- Using School Processes and forums, for strengthening teaching learning – Annual Calendar, time – tabling, parent teacher forums, school assembly, teacher development forums, using achievement data for improving teaching – learning, School Self-Assessment and improvement
- Creating partnerships with community, industry and other neighbouring schools and Higher Education Institutes- forming learning communities

(e) Perspectives in Education (2 questions)

- NEP – 2020: Curriculum and Pedagogy in Schools: Holistic & Integrated Learning: Equitable and inclusive Education: Learning for All: Competency based learning and Education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act,2009,
- Historically studying the National Policies in education with special reference to school education;
- School Curriculum Principles: Perspective, Learning and Knowledge, Curricular Areas, School Stage, Pedagogy and Assessment

Part IV- Subject – specific Syllabus   **(65 marks)**

Note: The weightage of Written Test & Demo Teaching in drawing the Final Merit list will be 30:70 respectively.

Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.

Sets:

Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets. Subsets of a set of real numbers especially intervals (with notations). Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of Complement.

Relations & Functions:

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (upto $R \times R \times R$).Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a junction. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. Sum, difference, product and quotients of functions.

Trigonometric Functions

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin2x + \cos2x = 1$, for all x. Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing sin (x±y) and cos (x±y) in terms of sinx, siny, cosx & cosy and their simple applications. Identities related to sin2x, cos2x, tan2 x, sin3x, cos3x and tan3x.

Complex Numbers and Quadratic Equations

Need for complex numbers, especially$\sqrt{-1}$, to be motivated by inability to solve some of the quardratic equations. Algebraic properties of complex numbers. Argand plane

Linear Inequalities

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.

Permutations and Combinations

Fundamental principle of counting. Factorial n. (n!) Permutations and combinations, derivation of Formulae for nPr and nCr and their connections, simple applications.

Binomial Theorem

Historical perspective, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, simple applications.

Sequence and Series

Sequence and Series. Arithmetic Progression (A. P.). Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.

Straight Lines

Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form. Distance of a point from a line.

Conic Sections

Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

Introduction to Three-dimensional Geometry

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points.

Limits and Derivatives

Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to scope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

Statistics

Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data.

Probability

Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

Relations and Functions

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

Inverse Trigonometric Functions

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

Matrices

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. On commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2).Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

Determinants

Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

Continuity and Differentiability

Continuity and differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

Applications of Derivatives

Applications of derivatives: rate of change of bodies, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

Integrals

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

$$\int \frac{px + q}{ax^2 + bx + c}dx, \int \frac{px + q}{\sqrt{ax^2 + bx + c}}dx, \int \sqrt{a^2 \pm x^2}\,dx, \int \sqrt{x^2 - a^2}\,dx$$

$$\int \sqrt{ax^2 + bx + c}\,dx.$$

Fundamental Theorem of Calculus. Basic Properties of definite integrals and evaluation of definite integrals;

Applications of the Integrals

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

Differential Equations

Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type: dy /dx + py = q, where p and q are functions of x or constants. $dx/dy + px = q$, where p and q are functions of y or constants.

Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

Three - dimensional Geometry

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between two lines.

Linear Programming

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Probability

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.