

Syllabus for NSEJS

The question paper consists of **80** multiple-choice questions. 3 marks are awarded for each correct answer and 1 mark is deducted for an incorrect answer.

The syllabus has not been defined properly by the body conducting the examination.

In order to bring out the important topics, the following syllabus has been given.

P.S.: This is NOT the official syllabus. Questions related to other topics may also be asked in the examination. The syllabus given below is only to aid the pupils in preparing for the examination. Having a definite set of topics makes preparation easy.

Mathematics

1. Polynomials & Equations

- a) Zero of a polynomial-coefficients of the terms in quadratic, cubic and biquadratic polynomials
e.g.: $ax^3 + bx^2 + cx + d$
b=sum of roots, d=product of roots, and other relations
- b) Relation of quadratic, cubic and biquadratic polynomials with similar types of equations
e.g.: $ax^2 + bx + c$ as a quadratic equation; $ax^3 + bx^2 + cx + d$ as a cubic equation,etc.
- c) Simultaneous linear equations-shape of the graphs when roots are equal,unique,etc.,

2. Plane Geometry

- a) Lines and Angles-Collinear Lines-Parallel Lines-Co-interior angles-Complementary & Supplementary Angles-Vertically Opposite Angles,etc.
- b) Triangles-Congruency & Similarity-Pythagoras Theorem-Inequalities
- c) Circles-Tangent to a circle-Cyclic Quadrilateral and its properties
- d) Theorems on Area

3. Trigonometry

- a) Trigonometric ratios and values of standard angles
- b) Complements of sine and cosine, and other ratios
- c) Heights and Distances

4. Statistics & Probability

- a) Mean, median and mode
- b) Basic knowledge on probability (not using set notation)

5. Sequences & Series

- a) Types of progressions(A.P.,G.P.,H.P.) and associated relations and formulae.
- b) A.M. and G.M.

6. Co-ordinate Geometry

- a) Equations for a straight line, parabola, hyperbola, circle
- b) Distance and Section Formulae

7. Mensuration

- a) Plane figures-Rectangle, triangle, parallelogram, circle and related figures
- b) Solid figures-Cone, Cylinder, Frustum of a cone, Cuboid

8. Set Notation

- a) Roster form, Tabular form
- b) Operations-Union, Intersection, Complement
- c) Venn diagrams (**no Relations and Functions**)

9. Brief Introduction to Cl. 11 topics

- a) Number Theory-Wilson's theorem, Fermat's Little Theorem, Congruences
- b) Permutations and Combinations-Basic Formulae (**excluding restrictions**)
- c) Scales of Notation
- d) High-level questions on surds
- e) Ratio and Proportion-componendo, dividendo
- f) Logarithms-rules for solving logarithmic equations

10. Mental Ability Questions

Physics

1. Basics of Middle-School Physics

- a) Equations of motion and numerical problems
- b) Applications of Newton's Laws of Motion
- c) Work & Power-numerical problems
- d) Gravitation-Kepler's laws of planetary motion, Newton's universal law of gravitation
- e) Archimedes' Principle-Law of Floatation, Fluid Pressure

2. Energy

- a) Heat-numerical problems and temperature-time graphs
- b) Sound-effect of temperature and humidity on sound waves-numerical problems, graphs
- c) Static Electricity (Brief)

3. Light

- a) Reflection-Spherical Mirrors, Mirror Formula
- b) Refraction-Lenses, Lens Formula

c) Human Eye-Structure, Defects, Power of Accommodation, Numerical problems

4. Current Electricity & Electromagnetism

- a) Resistance-Ohm's Law, Series-Parallel Combination, Household wiring
- b) Electromagnetism-Basic Concepts

5. Brief Introduction to Cl. 11 topics

- a) Motion in Two Dimensions-basic knowledge and formulae of operations on vectors
- b) Calorimetric problems, numerical problems on faulty thermometer
- c) Modern Physics-thermionic emission, radioactivity

Chemistry

1. Basic Concepts of Chemistry

- a) Language of Chemistry-Balancing of Equations, Types of Reactions
- b) Atoms and Molecules
- c) Separation of Mixtures-Organic and Inorganic
- d) Metals and Non-metals and basics of metallurgy
- e) Chemical Bonding-Ionic, Covalent and Coordinate bonds
- f) Acids, Bases and Salts
- g) Water and its pollution

2. Periodic Table

- a) Full knowledge of Groups and Periods. Elements up to atomic no. 36 to be memorized.
- b) Knowledge of basic characteristics of elements in Groups IA,IIA,VIA,VIIA,VIII.
- c) Identification of elements in s-block, p-block, d-block and f-block (with reference to orbitals)

3. Electrolysis

- a) Arrhenius Theory
- b) Numerical Problems
- c) Reactions at Cathode and Anode in case of electrolysis of various salts.

4. Carbon, Its Allotropes and Organic Chemistry

- a) Structure and Characteristics of Graphite and Diamond
- b) Preparation of CO,CO₂
- c) IUPAC nomenclature
- d) Characteristics of Alkanes, Alkenes, Alkynes, Alcohols, Carboxylic Acids

5. Brief Introduction to Cl. 11 topics

- a) Atomic Structure-E.C. in terms of orbitals (s,p,d,f), Hund's rule, Aufbau principle

- b) Mole concept & Stoichiometry-%age composition, Empirical and Molecular formula
- c) Chemical bonding-orbital overlap concept, VSEPR theory, MOT theory, introduction to hybridization (**avoid shapes of molecules**)
- d) Gas laws-Boyle's law, Charles' Law, Graham's Law of Diffusion, Dalton's Law
- e) Solutions-Molarity, Molality, numerical problems
- f) Nuclear Chemistry-Carbon dating, numerical problems

Biology

1. Basic Biology

- a) Cell & Cell Cycle
- b) Tissues
- c) Five Kingdom Classification
- d) Basics of Genetics

2. Plant Anatomy and Physiology

- a) Improvement in food resources
- b) Vegetative Propagation
- c) Sexual Reproduction
- d) Respiration and Photosynthesis
- e) Transport in Plants

3. Human Anatomy and Physiology

- a) Circulatory System
- b) Excretory System
- c) Nervous and Endocrine System
- d) Reproductive System
- e) Nutrition
- f) Locomotion

4. Diseases

- a) Plant Diseases-macro & micronutrients
- b) Animal Diseases-Brief
- c) Human Diseases-protein, vitamin and mineral deficiency diseases

5. Ecology: Basic Concepts & Aspects up to Cl.10