



JEE | NEET | Foundation

NSEJS 2022

Question-wise Chapter & Concept Analysis

STUDENT GUIDE FOR CLASSES 7, 8 AND 9

TIME

120 minutes

QUESTIONS

60

MAX. MARKS

216

PAPER CODE 51

Every question is mapped to its chapter, key concept, skill and revision target.

HOW TO USE THIS GUIDE

Do not try to memorise every answer. First identify the chapter, then learn the idea, and finally solve a similar question.

- Class 7: Learn the scientific words, study the diagrams and build strong basics.
- Class 8: Connect two ideas in the same question and practise short calculations.
- Class 9: Attempt the full paper under time limits and maintain an error notebook.
- Dropped questions: Questions 45-48 and 54-57 are not scored in the final key. They are retained only as chapter practice.

BIOLOGY 20 questions	CHEMISTRY 20 questions	PHYSICS 20 questions
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At a glance

WHAT THE PAPER REWARDS	HOW TO BUILD THE SKILL
Diagram reading - ovule, chromatography, glycolysis, circuits, graphs and nephron.	Cover the labels, redraw the figure and explain every arrow in your own words.
Concept linking - one question often joins two chapters or two ideas.	After solving, write the two ideas that were connected. This builds Olympiad thinking.
Short numerical modelling - the arithmetic is often easy, but choosing the equation is not.	Write known data, required quantity, principle and units before substituting numbers.
Option-wise judgement - Questions 49-60 require checking every statement separately.	Do not stop after finding one correct option. Mark each option true or false with a reason.

BIOLOGY

Question-wise chapter and concept map.

Question 1 Plant Growth and Development

**RECALL + PLANT
PHYSIOLOGY**

What this question tests: Gibberellins; fungal origin of a plant hormone; stem elongation
What to revise: Learn the main plant hormones, their discovery stories and their effects on growth.

Question 2 Sexual Reproduction in Flowering Plants

**DIAGRAM +
REPRODUCTION**

What this question tests: Pollen-tube entry; porogamy; chalazogamy; mesogamy; ovule structure
What to revise: Draw an ovule and label micropyle, chalaza and integuments before learning the three routes.

Question 3 Anatomy of Flowering Plants

**CONCEPT + PLANT
ANATOMY**

What this question tests: Vascular bundles; bicollateral arrangement; phloem translocation
What to revise: Compare collateral, bicollateral, radial and concentric vascular bundles.

Question 4 Principles of Inheritance

GENETICS + RATIO

What this question tests: Incomplete dominance; monohybrid cross; genotype-to-phenotype ratio
What to revise: Practise Punnett squares for complete dominance, incomplete dominance and codominance.

Question 5 Photosynthesis in Higher Plants

**DIAGRAM +
EXPERIMENTAL BIOLOGY**

What this question tests: Photosynthetic pigments; chromatography; relative mobility
What to revise: Revise chlorophyll a, chlorophyll b, carotenoids and the principle of chromatography.

Question 6 Cell: Structure and Function

RECALL + CELL BIOLOGY

What this question tests: Glyoxysomes; glyoxylate cycle; conversion of fats to sugars
What to revise: Learn the functions of peroxisomes, glyoxysomes, lysosomes and ribosomes.

Question 7 Microbes and Water Quality

**APPLICATION +
MICROBIOLOGY**

What this question tests: Indicator organisms; coliform bacteria; faecal pollution
What to revise: Understand why indicator organisms are used instead of testing for every pathogen.

Question 8 Environmental Science

**ENVIRONMENT +
INTERPRETATION**

What this question tests: Acid rain; water pH; survival of aquatic organisms
What to revise: Revise the pH scale and the biological effects of acid rain on lakes and soil.

Question 9 Chemical Coordination and Integration

**RECALL + HUMAN
PHYSIOLOGY**

What this question tests: Ovarian hormones; estrogens; relative activity of estradiol
What to revise: Revise the source and function of estrogen, progesterone, FSH and LH.

Question 10 Locomotion and Movement

RECALL + ANATOMY

What this question tests: Vertebral column; sacrum; pelvic girdle
What to revise: Learn the number and location of cervical, thoracic, lumbar, sacral and coccygeal vertebrae.

Question 11 Respiration in Plants / Cellular Respiration

PATHWAY + CONCEPT

What this question tests: Glycolysis; substrate-level phosphorylation; ATP-generating steps
What to revise: Memorise the ten steps of glycolysis as investment, cleavage and payoff phases.

Question 12 Neural Control and Coordination

**RECALL +
NEUROANATOMY**

What this question tests: Cerebral hemispheres; commissural fibres; corpus callosum
What to revise: Revise a labelled sagittal section of the human brain and the functions of major parts.

Question 13 Biological Classification

CLASSIFICATION + RECALL

What this question tests: Body symmetry; protozoan form; diagnostic characters
What to revise: Compare asymmetry, radial symmetry and bilateral symmetry with examples.

Question 14 Neural Tissue

**RECALL + CELL
STRUCTURE**

What this question tests: Nissl bodies; rough endoplasmic reticulum; neuron structure
What to revise: Draw a neuron and label soma, dendrites, axon, myelin and Nissl bodies.

Question 15 Viruses and Viroids

**CONCEPT +
MICROBIOLOGY**

What this question tests: Acellular nature; nucleic acid; host dependence; replication
What to revise: Revise viral structure and why viruses are described as living only inside host cells.

Question 16 Taxonomy and Systematics

**HISTORY +
CLASSIFICATION**

What this question tests: Linnaean sexual system; artificial classification; binomial nomenclature
What to revise: Compare artificial, natural and phylogenetic systems of classification.

Question 49 Evolution

**MULTIPLE CORRECT +
EVOLUTION**

What this question tests: Human evolution; hominid stock; prehistoric humans; modern humans
What to revise: Make a timeline from early hominids to Homo habilis, Homo erectus, Neanderthals and modern humans.

Question 50 Human Nutrition

**MULTIPLE CORRECT +
NUTRITION**

What this question tests: B-complex vitamins; deficiency diseases; protein-energy malnutrition
What to revise: Prepare a table of vitamins, sources, functions and deficiency symptoms.

Question 51 Plant Kingdom

**MULTIPLE CORRECT +
CLASSIFICATION**

What this question tests: Freshwater algae; aquatic bryophytes and pteridophytes; habitats
What to revise: Classify common algae and lower plants by habitat as well as by taxonomic group.

Question 52 Excretory Products and Their Elimination

**MULTIPLE CORRECT +
DIAGRAM**

What this question tests: Nephron histology; PCT brush border; water permeability of loop and collecting duct
What to revise: Trace filtrate through all nephron segments and note what each segment reabsorbs and its permeability.

CHEMISTRY

Question-wise chapter and concept map.

Question 17 Acids, Bases and Chemical Bonding

STRUCTURE + ACID-BASE

What this question tests: Ionisation of a carboxylic acid; polar O-H bond; conjugate base
What to revise: Revise which hydrogen is acidic in carboxylic acids and how ions form in water.

Question 18 Chemical Diversity and Valency

COMPARATIVE
REASONING

What this question tests: Compound-forming capacity; valency; transition-metal coordination chemistry
What to revise: Review why hydrogen and carbon occur in many compounds and how variable oxidation states increase diversity.

Question 19 Structure of Atom / Nuclear Chemistry

RECALL + NUCLEAR
CHEMISTRY

What this question tests: Stable nuclides; radioactivity; isotopes
What to revise: Revise stable and radioactive elements and the meaning of half-life.

Question 20 Solutions and Mole Concept

NUMERICAL + SOLUTIONS

What this question tests: Mole fraction; dilution by mass; conversion between mass and moles
What to revise: Practise calculating mole fraction after adding solvent, not merely multiplying by a dilution factor.

Question 21 States of Matter

NUMERICAL + GAS LAWS

What this question tests: Graham law of effusion; molar mass; metal carbonyl
What to revise: Revise r proportional to $1/\sqrt{M}$ and check units before squaring the rate ratio.

Question 22 Chemical Bonding

NUMERICAL + BONDING

What this question tests: Dipole moment; partial ionic character; charge separation
What to revise: Use ionic character = observed dipole moment / theoretical ionic dipole moment $\times 100$.

Question 23 Stoichiometry and Neutralisation

NUMERICAL +
STOICHIOMETRY

What this question tests: Equivalent moles; carbonate-acid reaction; mixture calculation
What to revise: Set up separate mole terms for each component of a mixture before using the total acid consumed.

Question 24 Redox Reactions

SHORT NUMERICAL +
REDOX

What this question tests: Oxidation number; sum rule in a neutral molecule
What to revise: Remember that the question asks for the sum over all carbon atoms, not the average.

Question 25 Redox and Special Compounds

CONCEPT + OXIDATION STATE

What this question tests: Dioxygenyl ion; average oxidation state; ionic formulation
What to revise: Do not automatically assign -2 to oxygen; first identify peroxide, superoxide or dioxygenyl species.

Question 26 Hydrocarbons and Free-Radical Reactions

STRUCTURE + ORGANIC REASONING

What this question tests: Radical stability; allylic resonance; selective bromination
What to revise: Rank radicals using resonance first, then degree of substitution: allylic/benzylic, tertiary, secondary, primary.

Question 27 Hydrocarbons

NUMERICAL + ORGANIC STRUCTURE

What this question tests: Degree of unsaturation; rings; double and triple bonds
What to revise: Use $DBE = (2C + 2 + N - H - X)/2$ and count a triple bond as two units.

Question 28 Surface Chemistry

RECALL + SURFACE CHEMISTRY

What this question tests: Adsorption and absorption of hydrogen; palladium; catalysis
What to revise: Revise common adsorbents and examples of gas adsorption on metals.

Question 29 Coordination Chemistry

ELECTRONIC CONFIGURATION + REASONING

What this question tests: d-electron count; paramagnetism; colour of transition-metal ions
What to revise: Find oxidation state, then d-electron count, before deciding magnetic behaviour and colour.

Question 30 Organic Reactions and Gas Analysis

NUMERICAL + REACTION ANALYSIS

What this question tests: Decomposition of formic and oxalic acids; absorption of CO₂ by KOH
What to revise: Write the gas products separately and identify which gas the absorbent removes.

Question 31 Structure of Atom

CONCEPT + ATOMIC STRUCTURE

What this question tests: Hydrogen energy levels; degeneracy; principal quantum number
What to revise: Distinguish hydrogen-like atoms, where energy depends only on n, from multi-electron atoms.

Question 32 Solutions and Osmosis

DIAGRAM + CONCEPT

What this question tests: Semipermeable membrane; osmotic pressure; complete ionisation; solvent movement
What to revise: Remember that osmosis moves solvent, not dissolved ions, through an ideal semipermeable membrane.

Question 53 Ionic Equilibrium

MULTIPLE CORRECT + EQUILIBRIUM

What this question tests: Salt hydrolysis; weak acid conjugate; pH and pOH
What to revise: Revise hydrolysis of salts made from strong/weak acids and bases.

Question 54 Metallurgy of Aluminium

DROPPED IN FINAL KEY

What this question tests: Amphoteric Al_2O_3 ; Bayer, Hall, Serpek and Dow processes

What to revise: Review the purpose and chemistry of the main aluminium extraction and purification processes.

Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 55 Periodicity

DROPPED IN FINAL KEY

What this question tests: First ionisation energy down groups; transition-metal irregularities

What to revise: Compare actual ionisation-energy values rather than applying only the simple down-group trend.

Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 56 States of Matter - Vapour Pressure

DROPPED IN FINAL KEY

What this question tests: Vapour pressure at different temperatures; connected containers; condensation and evaporation

What to revise: Use equality of chemical potential, mass transfer and temperature-dependent saturation vapour pressure.

Study note: The question is not counted in the final key, but its chapter is still useful for practice.

PHYSICS

Question-wise chapter and concept map.

Question 33 Work, Energy and Power

SHORT NUMERICAL + ENERGY

What this question tests: Constant power; rate of change of kinetic energy
What to revise: Use $P = dW/dt = dK/dt$ when the force changes but power is fixed.

Question 34 Linear Momentum and Variable Mass

CONCEPT + MOMENTUM

What this question tests: Momentum conservation; mass leakage without relative horizontal velocity
What to revise: Check whether ejected mass has velocity relative to the moving body before applying rocket-style formulas.

Question 35 Kinematics

GRAPH + NUMERICAL

What this question tests: Acceleration-time graph; area under graph; piecewise motion; displacement
What to revise: Integrate acceleration interval by interval, and use average velocity in each constant-acceleration part.

Question 36 Gravitation

NUMERICAL + GRAVITATION

What this question tests: Gravitational potential energy; conservation of mechanical energy; two-body symmetry
What to revise: Remember to include the kinetic energy of both stars, not only one.

Question 37 Sound and Relative Motion

NUMERICAL + SOUND

What this question tests: Echo from an approaching reflector; moving observer; relative distance
What to revise: Draw the positions of train and sound at reflection and at the meeting point.

Question 38 Mechanical Properties of Fluids

NUMERICAL + FLUIDS

What this question tests: Archimedes principle; buoyancy in two liquids; floating equilibrium
What to revise: Add buoyant forces from each liquid in proportion to the volume submerged in that liquid.

Question 39 Motion under Gravity and Buoyancy

MULTI-STEP NUMERICAL

What this question tests: Free fall; upthrust; effective acceleration; symmetry of motion
What to revise: Treat the air and water portions separately and calculate the net acceleration in water.

Question 40 Ray Optics

DIAGRAM + GEOMETRY

What this question tests: Multiple reflection; law of reflection; angular geometry
What to revise: Use direction angles or draw normals carefully at both mirrors.

Question 41 Magnetic Effects of Current

DIAGRAM + MAGNETISM

What this question tests: Magnetic field of a solenoid; field at centre, end and outside
What to revise: Sketch field lines of a bar magnet and a solenoid and compare their strengths.

Question 42 Mechanical Properties of Fluids

NUMERICAL + FLUIDS

What this question tests: Hydrostatic pressure; pressure difference; force on a small door
What to revise: Convert cm^2 to m^2 carefully and use the difference of liquid densities.

Question 43 Moving Charges and Magnetism

VECTOR DIRECTION + MAGNETISM

What this question tests: Lorentz force; right-hand rule; negative charge
What to revise: First find $\mathbf{v} \times \mathbf{B}$ for a positive charge, then reverse the direction for an electron.

Question 44 Light and Matter

RECALL + MODERN PHYSICS

What this question tests: Raman effect; inelastic scattering; frequency shift
What to revise: Distinguish elastic Rayleigh scattering from inelastic Raman scattering.

Question 45 Kinematics - Motion Graphs

DROPPED IN FINAL KEY

What this question tests: Uniform motion; displacement-time, velocity-time and acceleration-time graphs
What to revise: Review how slope and area reveal velocity, acceleration and displacement.
Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 46 Current Electricity

DROPPED IN FINAL KEY

What this question tests: Rated power; bulb resistance; series-parallel circuit interpretation
What to revise: Use $R = V^2/P$ and redraw the circuit before calculating power.
Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 47 Current Electricity

DROPPED IN FINAL KEY

What this question tests: Resistance under stretching; volume conservation; percentage change
What to revise: Revise $R = \rho L/A$ and, when volume is fixed, R is proportional to $1/r^4$.
Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 48 Sound Waves and Measurement

DROPPED IN FINAL KEY

What this question tests: Speed of sound versus temperature; percentage error
What to revise: Practise converting Celsius to Kelvin and state clearly which value is used in the error denominator.
Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 57 Laws of Motion and Pulley Systems

DROPPED IN FINAL KEY

What this question tests: Atwood-machine dynamics; tension; support force; spring-balance readings
What to revise: Draw separate free-body diagrams for each block, the lower balance and the movable support.
Study note: The question is not counted in the final key, but its chapter is still useful for practice.

Question 58 Ray Optics

**MULTIPLE CORRECT +
OPTICS**

What this question tests: Convex lens formula; plane-mirror symmetry; magnification
What to revise: Solve the lens first, then treat the would-be lens image as the object for the mirror.

Question 59 Current Electricity

**MULTIPLE CORRECT +
CIRCUIT**

What this question tests: Symmetric resistor network; equivalent resistance; power and voltage division
What to revise: Mark equipotential nodes and reduce a symmetric network from the centre outward.

Question 60 Collisions

**MULTIPLE CORRECT +
NUMERICAL**

What this question tests: One-dimensional elastic collision; momentum and kinetic-energy conservation
What to revise: Use signed velocities and verify the result by checking both momentum and kinetic energy.

CHAPTER-WISE PAPER MAP

Use these tables to see where the paper concentrated its questions.

Biology

Chapter / area	Questions	Count
Anatomy of Flowering Plants	3	1
Biological Classification	13	1
Cell: Structure and Function	6	1
Chemical Coordination and Integration	9	1
Environmental Science	8	1
Evolution	49	1
Excretory Products and Their Elimination	52	1
Human Nutrition	50	1
Locomotion and Movement	10	1
Microbes and Water Quality	7	1
Neural Control and Coordination	12	1
Neural Tissue	14	1
Photosynthesis in Higher Plants	5	1
Plant Growth and Development	1	1
Plant Kingdom	51	1
Principles of Inheritance	4	1
Respiration in Plants / Cellular Respiration	11	1
Sexual Reproduction in Flowering Plants	2	1
Taxonomy and Systematics	16	1
Viruses and Viroids	15	1

Chemistry

Chapter / area	Questions	Count
Acids, Bases and Chemical Bonding	17	1
Chemical Bonding	22	1
Chemical Diversity and Valency	18	1
Coordination Chemistry	29	1
Hydrocarbons	27	1
Hydrocarbons and Free-Radical Reactions	26	1
Ionic Equilibrium	53	1
Metallurgy of Aluminium	54	1

Chapter / area	Questions	Count
Organic Reactions and Gas Analysis	30	1
Periodicity	55	1
Redox Reactions	24	1
Redox and Special Compounds	25	1
Solutions and Mole Concept	20	1
Solutions and Osmosis	32	1
States of Matter	21	1
States of Matter - Vapour Pressure	56	1
Stoichiometry and Neutralisation	23	1
Structure of Atom	31	1
Structure of Atom / Nuclear Chemistry	19	1
Surface Chemistry	28	1

Physics

Chapter / area	Questions	Count
Current Electricity	46, 47, 59	3
Mechanical Properties of Fluids	38, 42	2
Ray Optics	40, 58	2
Collisions	60	1
Gravitation	36	1
Kinematics	35	1
Kinematics - Motion Graphs	45	1
Laws of Motion and Pulley Systems	57	1
Light and Matter	44	1
Linear Momentum and Variable Mass	34	1
Magnetic Effects of Current	41	1
Motion under Gravity and Buoyancy	39	1
Moving Charges and Magnetism	43	1
Sound Waves and Measurement	48	1
Sound and Relative Motion	37	1
Work, Energy and Power	33	1

PREPARATION ROADMAP FOR CLASSES 7, 8 AND 9

CLASS 7 - BUILD THE LANGUAGE OF SCIENCE	CLASS 8 - CONNECT IDEAS	CLASS 9 - BUILD THE NSEJS BRIDGE
• Learn units, symbols and scientific terms. • Observe diagrams and experiments. • Strengthen fractions, ratios and simple algebra. • Study cells, plants, motion, heat, light, atoms and acids-bases.	• Compare and classify organisms. • Explain force, pressure, sound, light and electricity. • Balance equations and understand atoms and molecules. • Start mixed-reasoning and short numerical questions.	• Master Class 9 motion, force, work-energy, atoms-molecules, tissues and diversity. • Add mole concept, bonding, genetics, fluids, optics and magnetism. • Practise matching, assertion-reason, graphs and multiple-correct questions.

A useful weekly routine

Day	Task	Time
Monday	Read one chapter and make a one-page summary.	45-60 min
Tuesday	Solve 10 basic questions from the same chapter.	45 min
Wednesday	Practise diagrams, matching or scientific terms.	30-45 min
Thursday	Solve 5 Olympiad bridge questions.	45-60 min
Friday	Review mistakes and solve them again without help.	30 min
Saturday	Take a mixed Science quiz.	60 min
Sunday	Revise the week and update the chapter checklist.	30 min

MY NSEJS CHAPTER CHECKLIST

Tick a box only when you can explain the topic in your own words and solve at least five questions without help.

Biology

☐ Plant Growth and Development	☐ Sexual Reproduction in Flowering Plants	☐ Anatomy of Flowering Plants
☐ Principles of Inheritance	☐ Photosynthesis in Higher Plants	☐ Cell: Structure and Function
☐ Microbes and Water Quality	☐ Environmental Science	☐ Chemical Coordination and Integration
☐ Locomotion and Movement	☐ Respiration in Plants / Cellular Respiration	☐ Neural Control and Coordination
☐ Biological Classification	☐ Neural Tissue	☐ Viruses and Viroids
☐ Taxonomy and Systematics	☐ Evolution	☐ Human Nutrition
☐ Plant Kingdom	☐ Excretory Products and Their Elimination	

Chemistry

☐ Acids, Bases and Chemical Bonding	☐ Chemical Diversity and Valency	☐ Structure of Atom / Nuclear Chemistry
☐ Solutions and Mole Concept	☐ States of Matter	☐ Chemical Bonding
☐ Stoichiometry and Neutralisation	☐ Redox Reactions	☐ Redox and Special Compounds
☐ Hydrocarbons and Free-Radical Reactions	☐ Hydrocarbons	☐ Surface Chemistry
☐ Coordination Chemistry	☐ Organic Reactions and Gas Analysis	☐ Structure of Atom
☐ Solutions and Osmosis	☐ Ionic Equilibrium	☐ Metallurgy of Aluminium
☐ Periodicity	☐ States of Matter - Vapour Pressure	

Physics

☐ Work, Energy and Power	☐ Linear Momentum and Variable Mass	☐ Kinematics
☐ Gravitation	☐ Sound and Relative Motion	☐ Mechanical Properties of Fluids
☐ Motion under Gravity and Buoyancy	☐ Ray Optics	☐ Magnetic Effects of Current
☐ Moving Charges and Magnetism	☐ Light and Matter	☐ Kinematics - Motion Graphs
☐ Current Electricity	☐ Sound Waves and Measurement	☐ Laws of Motion and Pulley Systems
☐ Collisions		

Use this page after every mock test. Write only the questions that taught you something important.

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