



TM

JEE | NEET | Foundation

NSEJS 2021-22

Question-wise Chapter & Concept Analysis

STUDENT GUIDE FOR CLASSES 7, 8 AND 9

TIME

75 minutes

QUESTIONS

33

MAX. MARKS

126

PAPER CODE 51

All 33 questions are mapped to chapter, concept, skill and revision target.

HOW TO USE THIS GUIDE

First identify the chapter. Then learn the idea and solve one similar question without looking at the answer.

- Class 7: Learn scientific terms, observe diagrams and strengthen ratios, units and simple calculations.
- Class 8: Connect ideas from two chapters and begin short Olympiad-style numerical problems.
- Class 9: Attempt the complete 75-minute paper and record every mistake by chapter.
- Dropped question: Question 18 is not scored, but its binomial-approximation concept is useful.

BIOLOGY

11 questions

CHEMISTRY

11 questions

PHYSICS

11 questions

At a glance

WHAT THE PAPER REWARDS	HOW TO BUILD THE SKILL
Clue reading - genetic material, flower traits and salt tests are identified from several clues.	Underline each clue and ask what fact it rules in or rules out.
Short modelling - many numericals need only one or two equations, but the correct model matters.	Write known values, principle and units before substituting numbers.
Diagram interpretation - circuits, gears, oscillation and glass-slab diagrams carry essential information.	Redraw the diagram and label directions, nodes, angles or moving parts.
Multiple-correct discipline - Questions 25-33 require every option to be checked separately.	Write T or F beside each option and give a one-line reason.

BIOLOGY

Question-wise chapter and concept map.

Question 1 Human Physiology - Blood

**RECALL + HUMAN
PHYSIOLOGY**

What this question tests: Functions of erythrocytes; haemoglobin; blood-group antigens; antibodies
What to revise: Revise the formed elements of blood and the role of RBCs, WBCs, platelets and plasma proteins.

Question 2 Animal Kingdom - Vertebrates

**CLASSIFICATION +
EXAMPLES**

What this question tests: Limbless vertebrates; snakes; caecilians; vertebrate classification
What to revise: Learn one or two diagnostic examples from each vertebrate class, including unusual forms such as caecilians.

Question 3 Animal Kingdom - Insects

RECALL + CLASSIFICATION

What this question tests: Order Diptera; one functional pair of wings; halteres
What to revise: Compare the wing arrangement in Diptera, Lepidoptera, Coleoptera and Hymenoptera.

Question 4 Molecular Basis of Inheritance

**REASONING +
MOLECULAR BIOLOGY**

What this question tests: DNA versus RNA; single and double strands; base composition; alkaline hydrolysis
What to revise: Make a comparison table for DNA and RNA: sugar, bases, strand, stability and location.

Question 5 Anatomy of Flowering Plants

**APPLICATION + PLANT
ANATOMY**

What this question tests: Aerenchyma; aquatic adaptations; buoyancy; gas exchange
What to revise: Revise simple permanent tissues and the special roles of chlorenchyma and aerenchyma.

Question 6 Plant Kingdom - Bryophytes

STATEMENT EVALUATION

What this question tests: Non-vascular plants; rhizoids; water-dependent fertilisation
What to revise: Compare bryophytes with pteridophytes in body organisation, vascular tissue and reproduction.

Question 7 Photosynthesis - CAM Pathway

**RECALL + PLANT
PHYSIOLOGY**

What this question tests: CAM plants; night-time carbon fixation; water conservation
What to revise: Revise the basic differences among C3, C4 and CAM pathways.

Question 8 Sexual Reproduction in Flowering Plants

CLUE-BASED BIOLOGY

What this question tests: Pollination syndromes; cheiropterophily; nocturnal flowers
What to revise: Learn the characteristic colour, smell, nectar and opening time of wind-, insect-, bird- and bat-pollinated flowers.

Question 25 Viruses

**MULTIPLE CORRECT +
BIOLOGY**

What this question tests: Viral genetic material; acellular nature; reverse transcription; mutation rate

What to revise: Revise how viruses differ from cells and compare DNA viruses, RNA viruses and retroviruses.

Question 26 Neural Control and Coordination

**MULTIPLE CORRECT +
NEUROBIOLOGY**

What this question tests: Frontal lobe; Broca area; olfaction; motor control; medulla

What to revise: Study a labelled brain diagram and connect each lobe or region with its major functions.

Question 27 Cell Structure - Cytoskeleton

**MULTIPLE CORRECT +
CELL BIOLOGY**

What this question tests: Microfilaments; microtubules; actin; tubulin; intermediate filaments

What to revise: Compare the composition and functions of microfilaments, microtubules and intermediate filaments.

CHEMISTRY

Question-wise chapter and concept map.

Question 9 Mole Concept and Environmental Chemistry

SHORT NUMERICAL +
MOLE CONCEPT

What this question tests: SO₂ formation; atoms per molecule; Avogadro number; acid rain
What to revise: Always distinguish between one mole of molecules and the total number of atoms inside those molecules.

Question 10 Acids, Bases and Stoichiometry

NUMERICAL +
NEUTRALISATION

What this question tests: Neutralisation; molarity; balanced equation; antacids
What to revise: Write the balanced equation before comparing moles of an acid and a base.

Question 11 Mole Concept - Thermal Decomposition

NUMERICAL +
STOICHIOMETRY

What this question tests: Mass loss; carbonate decomposition; mixture calculation
What to revise: Use the gaseous mass loss to find the amount of the decomposing component.

Question 12 Periodic Classification

PERIODIC TREND

What this question tests: Metallic character; periodic trend; group and period comparison
What to revise: Practise arranging elements using their positions before recalling individual properties.

Question 13 Electrolytic Conductance

DIAGRAM + CONCEPT

What this question tests: Weak electrolyte; dilution; degree of ionisation; conductance of an open-electrode setup
What to revise: Revise the difference between degree of ionisation, specific conductivity, molar conductivity and the geometry of a conductivity cell.

Question 14 Salts, Hydrolysis and Qualitative Analysis

CHEMICAL
IDENTIFICATION

What this question tests: Ammonium ion test; chloride test; AgCl photodecomposition; salt hydrolysis
What to revise: Revise common gas tests, precipitate colours and the pH of salts of strong/weak acids and bases.

Question 15 Mole Concept and Gases

CONCEPT + GAS LAWS

What this question tests: Avogadro law; molar volume; molar mass
What to revise: When equal gas volumes are compared at the same T and P, first compare the number of moles.

Question 16 Solutions - Osmotic Pressure

NUMERICAL REASONING +
SOLUTIONS

What this question tests: van't Hoff factor; dissociation of salts; number of particles
What to revise: Write the ions produced by one formula unit before comparing colligative properties.

Question 28 Chemical Bonding and States of Matter

**MULTIPLE CORRECT +
BONDING**

What this question tests: Intramolecular covalent bonds; intermolecular forces; molecular solids
What to revise: For a molecular solid, identify bonds within a molecule separately from forces between molecules.

Question 29 Thermochemistry

**MULTIPLE CORRECT +
THERMOCHEMISTRY**

What this question tests: Exothermic and endothermic dissolution; hydration; dilution of acids
What to revise: Learn common hot-pack and cold-pack examples and the reason strong acid dilution releases heat.

Question 30 Soaps and Detergents

**MULTIPLE CORRECT +
APPLIED CHEMISTRY**

What this question tests: Hard water; calcium soap; scum; detergent action
What to revise: Write the insoluble calcium-soap reaction and compare it with sulphonate detergents.

PHYSICS

Question-wise chapter and concept map.

Question 17 Kinematics and Coordinate Geometry

NUMERICAL + GEOMETRY

What this question tests: Uniform acceleration; displacement; cosine rule; orientation ambiguity
What to revise: Draw both possible orientations of the second axis after calculating the smaller angle between X_1 and X_2 .

Question 18 Mathematical Tools in Physics

DROPPED IN FINAL KEY

What this question tests: Binomial approximation; graph linearisation; intercept and slope
What to revise: Practise $(1 + x)^n \approx 1 + nx$ for $|x|$ much smaller than 1, and identify slope-intercept form.

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

Question 19 Mechanical Properties of Fluids

SHORT NUMERICAL + FLUIDS

What this question tests: Hydrostatic pressure; density; gravitational acceleration
What to revise: Use $p = \rho gh$ and cancel quantities that are the same on both sides.

Question 20 Oscillations

GRAPH INTERPRETATION

What this question tests: Damping; amplitude decay; time period; energy at maximum displacement
What to revise: Read an oscillation graph for amplitude, period and starting phase separately.

Question 21 Current Electricity - Wheatstone Bridge

CIRCUIT + NUMERICAL

What this question tests: Balanced bridge; series-parallel reduction; Ohm law
What to revise: First remove the galvanometer branch when the bridge is balanced, then reduce the remaining network.

Question 22 Rotational Motion and Gears

DIAGRAM + NUMERICAL

What this question tests: Gear ratio; angular speed; circumference; gravitational potential energy
What to revise: Relate angular speeds through the number of teeth, then convert revolutions to string displacement.

Question 23 Energy, Radiation and Mass-Energy Equivalence

MULTI-STEP NUMERICAL

What this question tests: Inverse-square spreading; luminosity; light year; $E = mc^2$
What to revise: Convert light years to metres, find total luminosity from flux, and then divide by c squared.

Question 24 Work, Power and Energy

NUMERICAL + EFFICIENCY

What this question tests: Power; efficiency; electrical energy in kWh
What to revise: Use input power = useful output/efficiency and remember that one unit is one kWh.

Question 31 Modern Physics - Photons

**MULTIPLE CORRECT +
NUMERICAL**

What this question tests: Photon frequency; Planck relation; pulse energy; electron-volt; photon count

What to revise: Use $v = c/\lambda$, $E = h\nu$, pulse energy = power $\times$ time, and number = total energy/photon energy.

Question 32 Current Electricity - Parallel Circuits

**MULTIPLE CORRECT +
CIRCUIT**

What this question tests: Ohm law; branch current; power; equal voltage in parallel

What to revise: For parallel circuits, mark the common pair of nodes before calculating current or power.

Question 33 Ray Optics - Refraction through a Slab

**MULTIPLE CORRECT +
OPTICS**

What this question tests: Snell law; lateral shift; dispersion; limiting angle of incidence

What to revise: Derive the lateral-shift formula from the ray diagram and remember that refractive index varies with wavelength.

CHAPTER-WISE PAPER MAP

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

Biology

Chapter / area	Questions	Count
Anatomy of Flowering Plants	5	1
Animal Kingdom - Insects	3	1
Animal Kingdom - Vertebrates	2	1
Cell Structure - Cytoskeleton	27	1
Human Physiology - Blood	1	1
Molecular Basis of Inheritance	4	1
Neural Control and Coordination	26	1
Photosynthesis - CAM Pathway	7	1
Plant Kingdom - Bryophytes	6	1
Sexual Reproduction in Flowering Plants	8	1
Viruses	25	1

Chemistry

Chapter / area	Questions	Count
Acids, Bases and Stoichiometry	10	1
Chemical Bonding and States of Matter	28	1
Electrolytic Conductance	13	1
Mole Concept - Thermal Decomposition	11	1
Mole Concept and Environmental Chemistry	9	1
Mole Concept and Gases	15	1
Periodic Classification	12	1
Salts, Hydrolysis and Qualitative Analysis	14	1
Soaps and Detergents	30	1
Solutions - Osmotic Pressure	16	1
Thermochemistry	29	1

Physics

Chapter / area	Questions	Count
Current Electricity - Parallel Circuits	32	1
Current Electricity - Wheatstone Bridge	21	1
Energy, Radiation and Mass-Energy Equivalence	23	1

Chapter / area	Questions	Count
Kinematics and Coordinate Geometry	17	1
Mathematical Tools in Physics	18	1
Mechanical Properties of Fluids	19	1
Modern Physics - Photons	31	1
Oscillations	20	1
Ray Optics - Refraction through a Slab	33	1
Rotational Motion and Gears	22	1
Work, Power and Energy	24	1

PREPARATION ROADMAP FOR CLASSES 7, 8 AND 9

CLASS 7 - BUILD BASICS	CLASS 8 - CONNECT IDEAS	CLASS 9 - PRACTISE THE PAPER
• Learn cells, blood, plant tissues and animal groups. • Master units, fractions and simple equations. • Observe every diagram before reading options.	• Add acids-bases, mole idea, pressure, energy and circuits. • Explain why each wrong option is wrong. • Solve short mixed-topic questions.	• Complete Class 9 science first. • Add CAM, osmotic pressure, optics and modern physics. • Take 75-minute mixed tests and maintain an error notebook.

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 that chapter.	45 min
Wednesday	Practise one diagram, graph or experiment.	30-45 min
Thursday	Solve 5 Olympiad bridge questions.	45-60 min
Friday	Correct mistakes without seeing the solution.	30 min
Saturday	Take a mixed Science quiz.	60 min
Sunday	Update the chapter checklist and revise formulas.	30 min

MY NSEJS CHAPTER CHECKLIST

Tick a chapter only when you can explain the basic idea and solve at least five questions without help.

Biology

☐ Human Physiology - Blood	☐ Animal Kingdom - Vertebrates	☐ Animal Kingdom - Insects
☐ Molecular Basis of Inheritance	☐ Anatomy of Flowering Plants	☐ Plant Kingdom - Bryophytes
☐ Photosynthesis - CAM Pathway	☐ Sexual Reproduction in Flowering Plants	☐ Viruses
☐ Neural Control and Coordination	☐ Cell Structure - Cytoskeleton	

Chemistry

☐ Mole Concept and Environmental Chemistry	☐ Acids, Bases and Stoichiometry	☐ Mole Concept - Thermal Decomposition
☐ Periodic Classification	☐ Electrolytic Conductance	☐ Salts, Hydrolysis and Qualitative Analysis
☐ Mole Concept and Gases	☐ Solutions - Osmotic Pressure	☐ Chemical Bonding and States of Matter
☐ Thermochemistry	☐ Soaps and Detergents	

Physics

☐ Kinematics and Coordinate Geometry	☐ Mathematical Tools in Physics	☐ Mechanical Properties of Fluids
☐ Oscillations	☐ Current Electricity - Wheatstone Bridge	☐ Rotational Motion and Gears
☐ Energy, Radiation and Mass-Energy Equivalence	☐ Work, Power and Energy	☐ Modern Physics - Photons
☐ Current Electricity - Parallel Circuits	☐ Ray Optics - Refraction through a Slab	

Use this page after a mock test. Record only the mistakes that taught you something useful.

[illegible]