

# Grade 12 Mock Test

## Science Stream

### Physics

#### 1. Electrostatics

- What is Coulomb's law and how is it applied to calculate the force between two point charges?
- Explain the concept of electric field and how it is represented.
- How do you calculate the electric field due to a dipole at a point on its axial line?
- What is Gauss's law and how is it used to calculate the electric field?
- Explain the concept of electric potential and potential difference.
- How do you calculate the capacitance of a parallel plate capacitor?
- What is the energy stored in a capacitor and how is it calculated?
- Explain the concept of electric flux and its significance.
- How do you solve problems involving the combination of capacitors in series and parallel?
- What are the applications of electrostatics in daily life?

#### 2. Current Electricity

- What is Ohm's law and how is it applied in circuits?
- Explain the concept of resistivity and its dependence on temperature.
- How do you calculate the equivalent resistance in series and parallel circuits?
- What is Kirchhoff's law and how is it used to solve complex circuits?
- Explain the working principle of a potentiometer and its applications.
- How do you calculate the internal resistance of a cell using a potentiometer?
- What is the Wheatstone bridge and how is it used to measure unknown resistance?
- Explain the concept of electric power and its calculation.
- How do you solve problems involving the heating effect of electric current?
- What are the applications of current electricity in daily life?

#### 3. Magnetic Effects of Current and Magnetism

- What is a magnetic field and how is it produced by a current-carrying conductor?
- Explain the concept of magnetic force on a moving charge in a magnetic field.
- How do you calculate the magnetic field due to a straight current-carrying conductor?
- What is Ampere's circuital law and how is it applied?
- Explain the concept of torque on a current loop in a magnetic field.
- How do you describe Earth's magnetism and its significance?
- What is the Biot-Savart law and how is it used to calculate the magnetic field?
- Explain the concept of magnetic dipole and its properties.
- How do you solve problems involving the motion of charged particles in a magnetic field?
- What are the applications of magnetism in daily life?

#### 4. Electromagnetic Induction and Alternating Currents

- What are Faraday's laws of electromagnetic induction?
- Explain the concept of Lenz's law and its significance.
- How do you calculate the induced emf in a coil due to a changing magnetic field?
- What is self-induction and mutual induction?
- Explain the working principle of a transformer and its applications.
- How do you solve problems involving alternating current circuits?
- What is the power factor and how is it calculated?
- Explain the concept of resonance in an RLC circuit.
- How do you calculate the impedance in an AC circuit?

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- What are the applications of electromagnetic induction in daily life?

## 5. Optics

- What is the difference between reflection and refraction of light?
- Explain the laws of reflection and refraction.
- How do you calculate the focal length of a concave and convex mirror?
- What is Snell's law and how is it applied to calculate the angle of refraction?
- Explain the concept of total internal reflection and its applications.
- How do you solve problems involving lenses and mirrors?
- What is the principle of superposition of waves?
- Explain the concept of interference and diffraction of light.
- How do you calculate the fringe width in a double-slit experiment?
- What are the applications of optics in daily life?

## 6. Atoms and Nuclei

- What is Bohr's model of the atom and how does it explain atomic spectra?
- Explain the concept of energy levels and transitions in an atom.
- How do you calculate the wavelength of spectral lines using the Rydberg formula?
- What is the concept of nuclear binding energy and how is it calculated?
- Explain the process of radioactive decay and its types.
- How do you solve problems involving half-life and decay constant?
- What is the difference between fission and fusion reactions?
- Explain the concept of mass defect and its significance.
- How do you calculate the energy released in a nuclear reaction?
- What are the applications of nuclear physics in daily life?

## 7. Electronic Devices

- What are semiconductors and how do they work?
- Explain the concept of p-n junction and its characteristics.
- How do you describe the working principle of a diode and its applications?
- What is a transistor and how does it function?
- Explain the different configurations of a transistor (CE, CB, CC).
- How do you solve problems involving transistor circuits?
- What is the concept of logic gates and their applications?
- Explain the working principle of an operational amplifier.
- How do you calculate the output of a logic circuit?
- What are the applications of electronic devices in daily life?

## Chemistry

### 1. Physical Chemistry

- What is electrochemistry and how is it applied in batteries and fuel cells?
- Explain the concept of electrochemical cells and their types.
- How do you calculate the cell potential using the Nernst equation?
- What is the rate of a chemical reaction and how is it determined?
- Explain the concept of activation energy and its significance.
- How do you describe the properties of surfaces in surface chemistry?
- What is adsorption and its types?
- Explain the concept of catalysis and its applications.
- How do you solve problems involving chemical kinetics?
- What are the applications of physical chemistry in daily life?

### 2. Organic Chemistry

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- What are aldehydes, ketones, and carboxylic acids and how are they synthesized?
- Explain the structure and function of biomolecules.
- How do you name organic compounds using IUPAC nomenclature?
- What is the mechanism of nucleophilic addition reactions?
- Explain the concept of electrophilic substitution reactions.
- How do you solve problems involving organic reactions?
- What are the properties and uses of alcohols and phenols?
- Explain the concept of isomerism and its types.
- How do you describe the synthesis and properties of polymers?
- What are the applications of organic chemistry in daily life?

## 3. Inorganic Chemistry

- What are coordination compounds and their properties?
- Explain the characteristics of d- and f-block elements.
- How do you describe the electronic configuration of transition elements?
- What is the concept of crystal field theory and its applications?
- Explain the process of extraction of metals from their ores.
- How do you solve problems involving the isolation of elements?
- What are the properties and uses of lanthanides and actinides?
- Explain the concept of metallurgy and its principles.
- How do you describe the preparation and properties of interhalogen compounds?
- What are the applications of inorganic chemistry in daily life?

## 4. General Principles and Processes of Isolation of Elements

- What are the different methods of metallurgy and their principles?
- Explain the process of extraction of metals from their ores.
- How do you describe the refining of metals?
- What is the role of reducing agents in metallurgy?
- Explain the concept of thermodynamic principles in metallurgy.
- How do you solve problems involving the isolation of elements?
- What are the properties and uses of important metals like iron, copper, and aluminum?
- Explain the concept of electrolysis and its applications in metallurgy.
- How do you describe the environmental impact of metallurgical processes?
- What are the applications of metallurgy in daily life?

## Biology

### 1. Reproduction

- What are the different reproductive processes in plants and animals?
- Explain the concept of reproductive health and its importance.
- How do you describe the structure and function of the human reproductive system?
- What is the process of gametogenesis and its significance?
- Explain the concept of fertilization and embryo development.
- How do you solve problems involving human reproductive systems?
- What are the methods of birth control and their effectiveness?
- Explain the concept of assisted reproductive technologies (ART).
- How do you describe the reproductive strategies in plants?
- What are the applications of reproductive biology in daily life?

### 2. Genetics and Evolution

- What are the patterns of inheritance and how are they studied?
- Explain the structure and function of DNA.

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- How do you describe the process of DNA replication?
- What is the concept of genetic code and its significance?
- Explain the process of transcription and translation.
- How do you solve problems involving Mendelian genetics?
- What are the different theories of evolution and their evidence?
- Explain the concept of natural selection and its role in evolution.
- How do you describe the process of speciation?
- What are the applications of genetics and evolution in daily life?

## 3. Biotechnology

- What is genetic engineering and how is it applied in health and agriculture?
- Explain the different techniques used in biotechnology.
- How do you describe the process of recombinant DNA technology?
- What is the role of plasmids and vectors in genetic engineering?
- Explain the concept of gene cloning and its applications.
- How do you solve problems involving the use of restriction enzymes?
- What are the different methods of gene transfer in plants and animals?
- Explain the concept of polymerase chain reaction (PCR) and its significance.
- How do you describe the applications of biotechnology in medicine?
- What is the role of biotechnology in agriculture?
- Explain the concept of genetically modified organisms (GMOs) and their benefits.
- How do you solve problems involving the ethical issues in biotechnology?
- What are the applications of biotechnology in environmental conservation?
- How do you ensure safety while working with biotechnological tools?

## 4. Human Welfare

- What are the common health and disease issues and their prevention?
- Explain the impact of drugs and alcohol abuse on human health.
- How do you describe the structure and function of the human immune system?
- What is the role of vaccines in disease prevention?
- Explain the concept of public health and its importance.
- How do you solve problems involving the spread of infectious diseases?
- What are the different methods of disease control and prevention?
- Explain the concept of lifestyle diseases and their management.
- How do you describe the role of nutrition in maintaining health?
- What are the applications of human welfare studies in daily life?

## 5. Ecology and Environment

- What is biodiversity and why is it important?
- Explain the structure and function of ecosystems.
- How do you describe the different environmental issues and their solutions?
- What is the role of conservation biology in protecting biodiversity?
- Explain the concept of sustainable development and its significance.
- How do you solve problems involving the management of natural resources?
- What are the different types of pollution and their impact on the environment?
- Explain the concept of biogeochemical cycles and their importance.
- How do you describe the role of environmental laws and policies?
- What are the applications of ecology and environmental studies in daily life?

## Mathematics

### 1. Algebra

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- What are matrices and how are they used in problem-solving?
- Explain the different types of matrices and their properties.
- How do you perform matrix addition and multiplication?
- What is the determinant of a matrix and how is it calculated?
- Explain the concept of inverse of a matrix and its applications.
- How do you solve systems of linear equations using matrices?
- What is the rank of a matrix and how is it determined?
- Explain the concept of eigenvalues and eigenvectors.
- How do you solve problems involving the characteristic equation of a matrix?
- What are the applications of matrices in real life?

## 2. Calculus

- What are integrals and how are they calculated?
- Explain the concept of definite and indefinite integrals.
- How do you solve problems involving integration by substitution?
- What is the concept of integration by parts and its applications?
- Explain the fundamental theorem of calculus.
- How do you solve problems involving differential equations?
- What are the different methods of solving first-order differential equations?
- Explain the concept of second-order differential equations and their solutions.
- How do you solve problems involving applications of integrals?
- What are the applications of calculus in real life?

## 3. Vectors and 3-D Geometry

- What are vectors and how are they represented?
- Explain the different operations on vectors (addition, subtraction, scalar multiplication).
- How do you calculate the dot product and cross product of vectors?
- What is the concept of vector projection and its applications?
- Explain the concept of lines and planes in 3-D geometry.
- How do you solve problems involving the equation of a line in space?
- What is the equation of a plane and how is it determined?
- Explain the concept of the distance between a point and a plane.
- How do you solve problems involving the intersection of lines and planes?
- What are the applications of vectors and 3-D geometry in real life?

## 4. Probability and Statistics

- What are the different measures of central tendency (mean, median, mode)?
- Explain the concept of variance and standard deviation.
- How do you solve problems involving probability distributions?
- What is the concept of binomial distribution and its applications?
- Explain the concept of normal distribution and its properties.
- How do you solve problems involving the calculation of probabilities?
- What is the concept of conditional probability and its significance?
- Explain the concept of Bayes' theorem and its applications.
- How do you solve problems involving random variables and their distributions?
- What are the applications of probability and statistics in real life?

## 5. Linear Programming

- What is linear programming and how is it used in optimization?
- Explain the different components of a linear programming problem (objective function, constraints).

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- How do you solve linear programming problems using graphical methods?
- What is the concept of feasible region and its significance?
- Explain the simplex method and its applications.
- How do you solve problems involving the dual of a linear programming problem?
- What is the concept of sensitivity analysis in linear programming?
- Explain the concept of integer programming and its applications.
- How do you solve problems involving transportation and assignment models?
- What are the applications of linear programming in real life?

## Computer Science/Informatics Practices

### 1. Python Programming

- What are the different data types in Python and how are they used?
- Explain the concept of functions in Python and their importance.
- How do you perform file handling operations in Python?
- What is the concept of exception handling in Python and its applications?
- Explain the concept of object-oriented programming in Python.
- How do you solve problems involving the use of classes and objects?
- What are the different methods of string manipulation in Python?
- Explain the concept of list comprehensions and their applications.
- How do you solve problems involving the use of libraries in Python?
- What are the applications of Python programming in real life?

### 2. Data Structures

- What are stacks and how are they implemented in Python?
- Explain the concept of queues and their applications.
- How do you perform operations on linked lists?
- What is the concept of binary trees and their properties?
- Explain the different traversal methods for binary trees.
- How do you solve problems involving the use of hash tables?
- What is the concept of graphs and their applications?
- Explain the different algorithms for graph traversal (BFS, DFS).
- How do you solve problems involving the use of priority queues?
- What are the applications of data structures in real life?

### 3. Database Management

- What are SQL commands and how are they used in database management?
- Explain the concept of database normalization and its importance.
- How do you perform operations on relational databases?
- What is the concept of transactions and their properties?
- Explain the different types of database keys (primary, foreign, unique).
- How do you solve problems involving the use of joins in SQL?
- What is the concept of indexing and its applications?
- Explain the concept of stored procedures and their importance.
- How do you solve problems involving the use of triggers in SQL?
- What are the applications of database management in real life?

### 4. Networking and Web Technology

- What are the different network protocols and their functions?
- Explain the concept of IP addressing and its significance.
- How do you describe the different types of network topologies?
- What is the concept of network security and its importance?

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- Explain the different methods of data encryption and decryption.
- How do you solve problems involving the use of firewalls and antivirus software?
- What is the concept of cloud computing and its applications?
- Explain the different types of web technologies (HTML, CSS, JavaScript).
- How do you solve problems involving the development of web applications?
- What are the applications of networking and web technology in real life?

## English Core

### 1. Reading Comprehension

- How do you analyze and interpret passages?
- Explain the concept of note-making and its importance.
- How do you solve problems involving reading comprehension?
- What are the applications of reading comprehension skills in daily life?
- How do you identify the main idea and supporting details in a passage?
- Explain the concept of summarizing and its significance.
- How do you solve problems involving the interpretation of graphs and charts?
- What are the different types of reading comprehension questions?
- How do you improve your reading speed and comprehension skills?
- What are the applications of reading comprehension in academic and professional settings?

### 2. Writing Skills

- How do you write formal letters, essays, and articles?
- Explain the different formats and structures of writing.
- How do you solve problems involving writing skills?
- What are the applications of writing skills in daily life?
- How do you write a persuasive essay?
- Explain the concept of descriptive writing and its techniques.
- How do you write a narrative essay?
- What are the different types of reports and their formats?
- How do you write a speech on a given topic?
- What are the applications of writing skills in academic and professional settings?

### 3. Literature

- What are the main themes and characters in the “Flamingo” and “Vistas” textbooks?
- Explain the significance of the literary works in the syllabus.
- How do you analyze and interpret literary texts?
- What are the literary devices used in the poems and prose?
- How do you describe the setting and plot of the stories?
- What is the role of the narrator in the literary works?
- How do you identify the tone and mood of the literary pieces?
- What are the major conflicts and resolutions in the stories?
- How do you compare and contrast different characters in the texts?
- What are the applications of literature studies in daily life?

## Commerce Stream

### 1. Accountancy

- What are the different methods of accounting for partnership firms?
- Explain the process of admission of a new partner.

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- How do you calculate the goodwill of a partnership firm?
- What is the procedure for the retirement of a partner?
- Explain the concept of dissolution of a partnership firm.
- How do you prepare the financial statements of a company?
- What are the different types of shares and debentures?
- Explain the process of issuing shares and debentures.
- How do you analyze financial statements using ratio analysis?
- What is the significance of cash flow statements?

## 2. Business Studies

- What are the different principles of management?
- Explain the various functions of management.
- How do you describe the different types of business organizations?
- What is the role of marketing management in a business?
- Explain the concept of product life cycle and its stages.
- How do you describe the different pricing strategies?
- What is the significance of place and promotion in marketing?
- Explain the concept of business environment and its components.
- How do you describe the role of entrepreneurship in business?
- What are the different challenges faced by businesses in the modern world?

## 3. Economics

- What is the theory of demand and supply?
- Explain the concept of market equilibrium and its significance.
- How do you describe the different types of market structures?
- What is the role of national income in macroeconomics?
- Explain the different methods of calculating national income.
- How do you describe the functions of money and banking?
- What is the significance of the government budget in the economy?
- Explain the concept of fiscal policy and its impact on the economy.
- How do you describe the role of monetary policy in economic stability?
- What are the different challenges faced by the Indian economy?

## 4. Mathematics

### Algebra

- What are matrices and how are they used in problem-solving?
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## **Vectors and 3-D Geometry**

- What are vectors and how are they represented?
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## **Probability and Statistics**

- What are the different measures of central tendency (mean, median, mode)?
- Explain the concept of variance and standard deviation.
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- What is the concept of binomial distribution and its applications?
- Explain the concept of normal distribution and its properties.
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## **Linear Programming**

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## **5. English Core**

### **Reading Comprehension**

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- What are the applications of reading comprehension skills in daily life?
- How do you identify the main idea and supporting details in a passage?

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- Explain the concept of summarizing and its significance.
- How do you solve problems involving the interpretation of graphs and charts?
- What are the different types of reading comprehension questions?
- How do you improve your reading speed and comprehension skills?
- What are the applications of reading comprehension in academic and professional settings?

## Writing Skills

- How do you write formal letters, essays, and articles?
- Explain the different formats and structures of writing.
- How do you solve problems involving writing skills?
- What are the applications of writing skills in daily life?
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## Literature

- What are the main themes and characters in the “Flamingo” and “Vistas” textbooks?
- Explain the significance of the literary works in the syllabus.
- How do you analyze and interpret literary texts?
- What are the literary devices used in the poems and prose?
- How do you describe the setting and plot of the stories?
- What is the role of the narrator in the literary works?
- How do you identify the tone and mood of the literary pieces?
- What are the major conflicts and resolutions in the stories?
- How do you compare and contrast different characters in the texts?
- What are the applications of literature studies in daily life?

## Humanities (Arts) Stream

### 1. History

- What are the main themes in ancient Indian history?
- Explain the significance of the Indus Valley Civilization.
- How do you describe the major dynasties in medieval India?
- What is the impact of the Mughal Empire on Indian history?
- Explain the causes and consequences of the British colonization of India.
- How do you describe the major events in the Indian freedom struggle?
- What is the significance of the partition of India in 1947?
- Explain the major events in world history like the French Revolution.
- How do you describe the causes and impact of World War I and II?
- What are the major developments in post-independence India?

### 2. Political Science

- What are the main features of the Indian Constitution?
- Explain the concept of federalism in India.
- How do you describe the role of the President and Prime Minister in India?
- What is the significance of the Parliament in the Indian political system?
- Explain the concept of judicial review and its importance.

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- How do you describe the major political parties in India?
- What is the role of international organizations like the UN?
- Explain the concept of globalization and its impact on world politics.
- How do you describe the major challenges to democracy in India?
- What are the different theories of international relations?

## 3. Geography

- What are the different types of resources and their distribution in India?
- Explain the concept of sustainable development and its importance.
- How do you describe the major physical features of India?
- What is the significance of agriculture in the Indian economy?
- Explain the different types of industries and their distribution in India.
- How do you describe the major environmental issues in India?
- What is the role of urbanization in the development of India?
- Explain the concept of human development and its indicators.
- How do you describe the major population trends in India?
- What are the different methods of resource conservation?

## 4. Sociology

- What are the main features of Indian society?
- Explain the concept of social stratification and its types.
- How do you describe the major social issues in India?
- What is the role of family and kinship in Indian society?
- Explain the concept of social change and its factors.
- How do you describe the major development programs in India?
- What is the significance of education in social development?
- Explain the concept of gender and its impact on society.
- How do you describe the role of religion in Indian society?
- What are the different methods of social research?

## 5. Psychology

- What are the different stages of human development?
- Explain the major theories of personality.
- How do you describe the different types of psychological disorders?
- What is the role of counseling in mental health?
- Explain the different therapeutic approaches in psychology.
- How do you describe the impact of stress on mental health?
- What is the significance of motivation and emotion in psychology?
- Explain the concept of intelligence and its measurement.
- How do you describe the different learning theories?
- What are the applications of psychology in daily life?

## 6. English Core

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- What are the major conflicts and resolutions in the stories?
- How do you compare and contrast different characters in the texts?
- What are the applications of literature studies in daily life?