SEWA
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JEE MAIN 2021 SYLLABUS

FOR PAPER I

National Testing Agency (NTA) will hold JEE Main four times in a year from 2021 onwards. The national level examination will be conducted only in the online mode (computer-based). Aspirants can opt for one or both the papers of JEE Main. JEE Main syllabus comprises of a list of all the concepts taught in class 11 & 12 Physics, Mathematics and Chemistry.

The syllabus for JEE Main & Advanced has been similar over the past years and is set separately for Paper 1 & Paper 2. However, the distribution is slightly different in the exam pattern. Aspirants must rigorously practice with the sample papers to get an idea of marking scheme and the pattern of JEE Main Papers.

Here we have compiled a list of all the chapters covered in the syllabus of JEE Main. The topic wise weightage of JEE is highly uncertain, therefore, the students are advised to prepare the entire syllabus without skipping.

Mathematics

- Sets, relations and functions
- Complex numbers and quadratic equations
- Matrices and determinants
- Permutations and combinations
- Mathematical induction
- Binomial theorem and its simple applications
- Sequences and series
- Limit, continuity and differentiability
- Integral calculus
- Differential equations
- Co-ordinate geometry
- Three dimensional geometry
- Vector algebra
- Statistics and probability
- Trigonometry
- Mathematical reasoning

Physics

Section-A (Theory Part, Weightage-80%)

- Physics and measurement
- Kinematics
- Laws of motion
- Work, energy and power
- Rotational motion
- Gravitation
- Properties of solids and liquids
- Thermodynamics
- Kinetic theory of gase

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- Oscillations and waves
- Electrostatics
- Current electricity
- Magnetic effects of current and magnetism
- Electromagnetic induction and alternating currents
- Electromagnetic waves
- Optics
- Dual nature of matter and radiation
- Atoms and nuclei
- Electronic devices
- Communication systems

Section-B(Experimental Skills, Weightage-20%)

Familiarity with the basic approach and observations of the experiment and activities:

- Vernier callipers – its use to measure the internal and external diameter and depth of a vessel.
- Screw gauge –its use to determine thickness/ diameter of thin sheet/wire.
- Simple Pendulum-dissipation of energy by plotting a graph between square of amplitude and time.
- Metre Scale- mass of a given object by principle of moments.
- Young's modulus of elasticity of the material of a metallic wire.
- Surface tension of water by capillary rise and effect of detergents.
- Co-efficient of Viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
- Plotting a cooling curve for the relationship between the temperature of a hot body and time.
- Speed of sound in air at room temperature using a resonance tube.
- Specific heat capacity of a given (1) solid (2) liquid by method of mixtures.
- Resistivity of the material of a given wire using metre bridge.
- Resistance of a given wire using Ohm's law.
- Potentiometer
    - Comparison of emf of two primary cells
    - Determination of internal resistance of a cell.
- Resistance and figure of merit of a galvanometer by half deflection method.
- Focal length of:
    - Convex mirror
    - Concave mirror
    - Convex lens (Using parallax method)
- Plot of angel of deviation vs angle of incidence for a triangular prism.
- Refractive index of a glass slab using a travelling microscope.
- Characteristic curves of a p-n junction diode in forward and reverse bias.
- Characteristic curves of a Zener diode and finding reverse break down voltage.
- Characteristic curves of a transistor and finding current gain and voltage gain.
- Identification of Diode, LED, Transistor, IC, Resistor, Capacitor from mixed collection of such items.
- Using multimeter to:
    - Identify base of a transistor
    - Distinguish between npn and pnp type transistor
    - See the unidirectional flow of current in case of a diode and an LED
    - Check the correctness or otherwise of a given electronic component(diode, transistor or IC).

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Chemistry

Section-A (Physical Chemistry)

- Some basic concepts in chemistry
- States of matter
- Atomic structure
- Chemical bonding and molecular structure
- Chemical thermodynamics
- Solutions
- Equilibrium
- Redox reactions and electrochemistry
- Chemical kinetics
- Surface chemistry

Section-B (Inorganic Chemistry)

- Classification of elements and periodicity in properties
- General principles and processes of isolation of metals
- Hydrogen
- S Block elements (alkali and alkaline earth metals)
- P Block elementss
- D – and F – block elements
- Co-ordination compounds
- Environmental chemistry

Section-C (Organic Chemistry)

- Purification and characterisation of organic compounds
- Some basic principles of organic chemistry
- Hydrocarbons
- Organic compounds containing halogens
- Organic compounds containing oxygen
- Organic compounds containing nitrogen
- Polymers
- Biomolecules
- Chemistry in everyday life
- Principles related to practical chemistry

Section-D (Experimental Skills)

- Detection of extra elements (N, S, Halogens) inorganic compounds.
- Detection of the following functional groups:
    - Hydroxyl(Alcoholic and Phenolic)
    - Carbonyl(Aldehyde and Ketone)
    - Carboxyl and Amino groups in organic compounds.
- Chemistry involved in the preparation of the following:
    - Inorganic compounds: Mohr’s salt, potash alum
    - Organic compounds: Acetanilide, pnitroacetanilide, aniline yellow, iodoform
- Chemistry involved in the titrimetric exercises
    - Acids bases and the use of indicators

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  - Oxalic-acid vs KMnO4
  - Mohr's salt vs KMnO4
- Chemical principles involved in the qualitative salt analysis :
  - Cations-Pb2+, Cu2+, Al3+, Fe3+, Zn2+, Ni2+, Ca2+, Ba2+, Mg2+,NH4+
  - Anions-CO32-, S2-, SO42-, NO3–, NO2–, Cl–, Br–, I– (Insoluble salts excluded)
- Chemical principles involved in the following experiments:
  - Enthalpy of solution of CuSO4
  - Enthalpy of neutralization of strong acid and strong base
  - Preparation of lyophilic and lyophobic sols
  - Kinetic study of reaction of iodide ion with hydrogen peroxide at room temperature

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