

NATIONAL PRIMA TALENT OLYMPIAD EXAMINATIONS

SCIENCE

CLASS X

PHYSICS

Force

- Moment of force and equilibrium
- Centre of gravity and uniform circular motion

Work, power and energy

- Measurement of work
- Different forms of energy
- Conservation of energy

Machines

- Technical terms and levers
- Pulley

Refraction of light at plane surfaces

- Laws of refraction
- Refractive index
- Refraction of light through a glass slab and prism
- Applications of refraction of light
- Critical angle and total internal reflection

Refraction through a lens

- Technical terms related to lens
- Formation of image by a lens
- Sign convention and lens formula
- Application of lenses

Spectrum

- Deviation, dispersion through a prism
- Electromagnetic spectrum and scattering of light



Sound

- Production and propagation of sound waves
- Characteristics of sound subjective and objective nature
- Determination of speed of sound by the method of echo
- Types of vibrations
- Resonance

Current electricity

- Concept of current, potential difference and resistance; ohm's law
- Electromotive force, terminal voltage and internal resistance of a cell, combination of resistors
- Electrical energy and power

Household circuits

- Transmission of power and house wiring
- Some essential components of house wiring system

Electro-magnetism

- Magnetic effect of electric current
- Force on a current carrying conductor in a magnetic field and its application in DC. Motor
- Electromagnetic induction and its applications to AC Generator and transformer

Calorimetry

- Heat capacity, specific heat capacity and its measurement
- Change of phase and latent heat

Radioactivity

- Atomic structure and radioactivity
- Nuclear fission and fusion.

CHEMISTRY

Organic chemistry

- IUPAC names and structure of organic compounds
- Preparation of Alkanes, alkenes, alkynes, Alcohol and acids
- Chemical properties
- Industrial application of hydrocarbons

Periodic table

- Trends of periodic table
- Dobereiner triads
- Mendeleev periodic law
- Position of elements in Periodic table

Metallurgy

- Reactivity series of metals
- Occurrence of metal in nature and their extraction
- Alloys

Chemical bonding

- Electrovalent bonding
- Covalent bonding
- Polar
- Non polar
- Coordinate bonding

Acids Base and salts

- Types and preparation

Analytical Chemistry

- Avogadro law
- Mole concepts



Electrolysis

- Electrochemical series
- Application of electrolysis

Study of compounds

- Hydrogen chloride
- Ammonia
- Nitric acid
- Sulphuric acid

BIOLOGY

Cell cycle and cell division

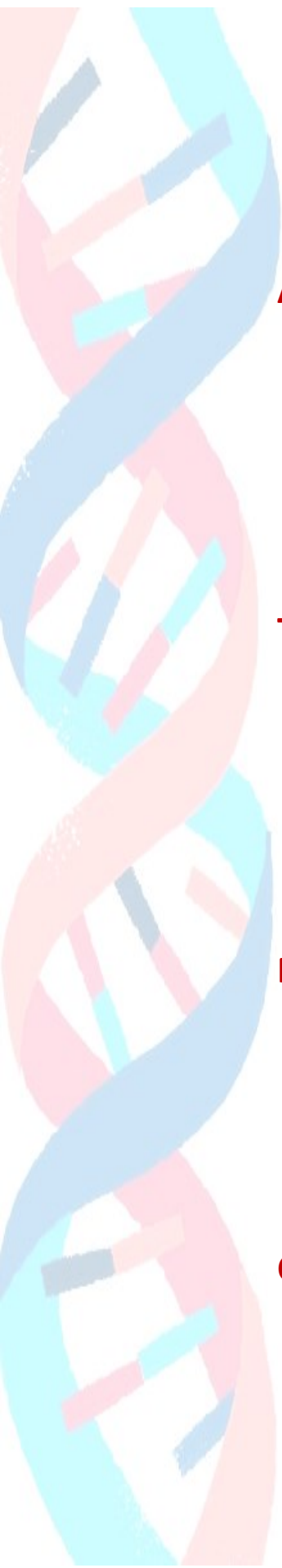
- Cell cycle
- Interphase (G₁, S, G₂) and M. Phase cell division
- Mitosis and its stages
- Significance and major differences between mitotic and meiotic division

Structure of chromosomes

- Basic structure of chromosome with elementary understanding of terms such as chromatin
- Chromatid
- Gene structure of DNA and centromere

Genetics

- Genetics Mendel's laws of inheritance and sex linked inheritance of diseases
- Monohybrid cross, dihybrid cross
- The following terms to be covered gene, allele, heterozygous, homozygous, dominant, recessive, mutation, variation, phenotype, genotype

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- Sex determination in human beings
 - Sex linked inheritance of diseases to include haemophilia and colour blindness (only criss cross inheritance)

Absorption by roots

- Absorption by roots, imbibition; diffusion and osmosis; osmotic pressure, root pressure
- Turgidity and flaccidity; plasmolysis and deplasmolysis
- The absorption of water and minerals, active and passive transport (in brief)
- The importance of root hair

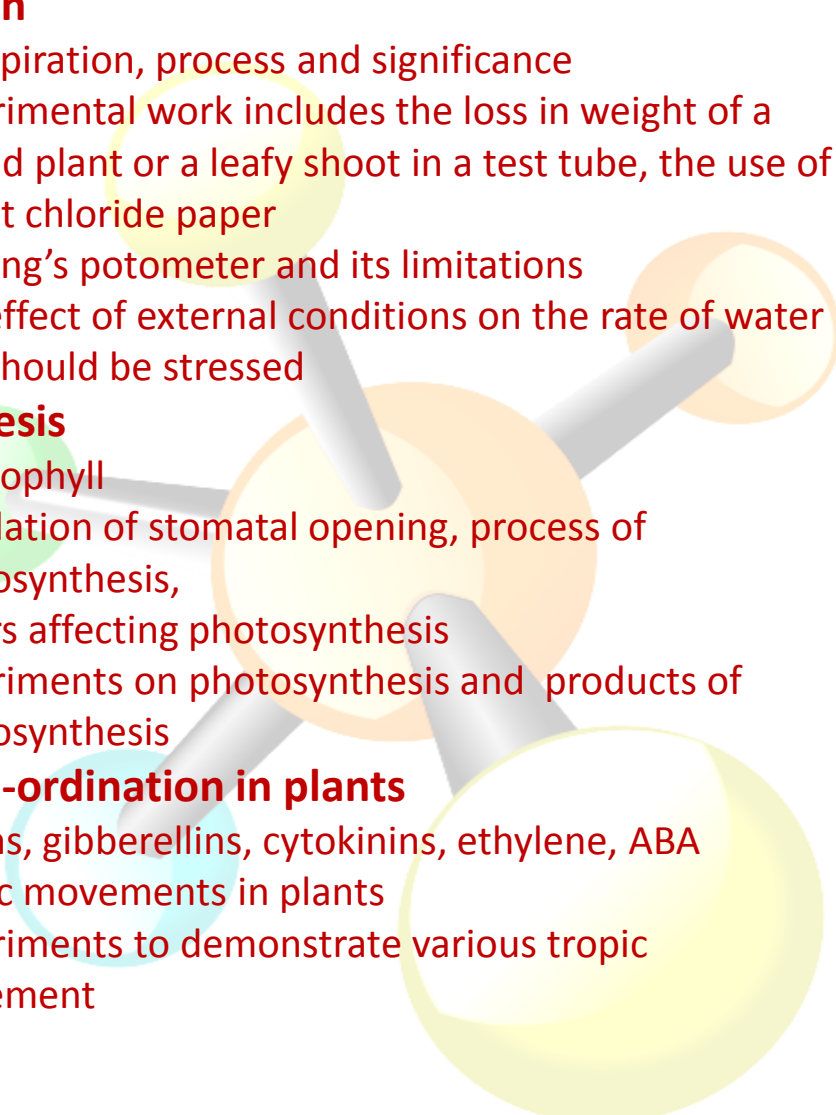
Transpiration

- Transpiration, process and significance
- Experimental work includes the loss in weight of a potted plant or a leafy shoot in a test tube, the use of cobalt chloride paper
- Ganong's potometer and its limitations
- The effect of external conditions on the rate of water loss should be stressed

Photosynthesis

- Chlorophyll
- Regulation of stomatal opening, process of photosynthesis,
- Factors affecting photosynthesis
- Experiments on photosynthesis and products of photosynthesis

Chemical co-ordination in plants

- Auxins, gibberellins, cytokinins, ethylene, ABA
 - Tropic movements in plants
 - Experiments to demonstrate various tropic movement
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Circulatory system

- Need for transport inside the body
- Fluids in our body, the blood, clotting of blood
- Blood transfusion
- Blood groups
- Blood circulatory system
- The two blood circulations, pulse, blood pressure
- Tissue fluid and lymph

Nervous system

- Need of nervous system
- Neuron, nerves, brain, spinal cord, reflexes, types of reflexes
- Nervous pathways in reflexes, complex reflex actions

Sense organs

- Eyes
- Structure
- Lens
- Chambers
- How do we see
- dark and light adaptations
- Colour vision
- Common defects in eyes
- Ear
- Function
- Balancing

Endocrine system

- Endocrine system: general study of the following glands: adrenal
 - Pancreas
 - Thyroid and pituitary Difference in endocrine and exocrine glands
- 



Reproductive system

- The reproductive system: organs
- Fertilisation
- Menstrual cycle
- Outline of menstrual cycle
- Implantation
- Placenta
- Parturition
- Twins
- Triplets
- Quadruplets

Human evolution

- Theories of evolution
- Human evolution
- Modern man

Population

- Population: problems posed by the increase in population in India; need for adopting control measures - population control

Pollution

- Air pollution
 - Soil pollution
 - Noise pollution
 - International ozone day
 - Vehicular standards
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