

Madhyamik Shikshak – Teacher selection test

Subject- Science

Biology

UNIT	CONTENT
UNIT -1	<ul style="list-style-type: none"> Biological classification-five kingdom classification, Salient features and classification of Monera, Protista and fungi into major groups; lichen, Viruses and Viroid's. Plant Kingdom - Classification of plants into major groups, salient features and a few examples of Algae, Bryophyte, pteridophyte, Gymnosperm, Angiosperms plant cycle and alternation of Generations.
UNIT -2	<ul style="list-style-type: none"> Morphology of Flowering Plants - Morphology of different parts of flowering plants- root, stem, Leaf, inflorescence, flower, fruit and seed. Modification of root, stem and leaf. Description of families- Solanaceae, Malvasias, Liliaceae, Fabaceae, Cucurbitaceae. Anatomy of flowering plants- Anatomy and functions of tissue systems in monocot and dicot plants. structure of Monocotyledonous and dicotyledonous root structure of Monocotyledonous and dicotyledonous stem Structure of Monocotyledonous and dicotyledonous leaf. And secondary growth
UNIT-3	<ul style="list-style-type: none"> Photosynthesis in higher plants - Autotrophic nutrition, photosynthetic pigments, cyclic and non-cyclic photo-phosphorylation, photorespiration, C3, C4 and CAM Pathway, factors affecting photosynthesis. Respiration in plants- Exchange of gases, Cellular respiration- glycolysis, TCA cycle and electron transport system, respiratory quotient. Plant growth and development - Seed germination, plant growth regulators Sexual reproduction in flowering plants.- flower Structure, development of male and female gametophytes, pollination, double fertilization, embryo and endosperm development. development of seed and fruit, apomixis, Parthenocarpy, polyembryony,
UNIT-4	<ul style="list-style-type: none"> Animal kingdom - salient feature and Classification of animals, non chordates up to phyla level and chordates up to class level. Structural Organization in Animals - Morphology and Anatomy of earthworm, cockroach, frog and human. Body fluids and Circulation - Composition of blood, blood groups, coagulation of blood. Composition of lymph and its function. Human circulatory System - structure of human heart, cardiac cycle, ECG, double circulation, disorders of circulatory System. Excretory Products and their Eliminations-Excretion, excretory product, human excretory system, Urine formation, Osmoregulation, disorders of "excretory system, kidney transplant. Digestion and absorption, alimentary canal and digestive gland, role of digestive enzyme and hormone, whole process of digestion, absorption, digestive disorder- constipation, vomiting, jaundice, diarrhea, indigestion Human respiration- respiratory organ in different animal, structure of respiratory system in human, process of breathing gaseous exchange in human, respiratory volumes, respiratory disorder –asthma, emphysema.
UNIT-5	<ul style="list-style-type: none"> Locomotion and Movement- types of movements types of muscles, muscles contraction, joints, disorders of muscular and skeletal systems. Neural control and Co-ordination - Neuron and nerves, Nervous system in humans, generation and conduction of nerve impulse, reflex action, structure and functions of brain and spinal cord. Structure and functions of ear and eyes. Human endocrine System: - Endocrines glands and hormones and hormonal disorder.
UNIT-6	<ul style="list-style-type: none"> Human Reproduction- Male and female reproductive system, gametogenesis, menstrual cycle, fertilization, embryo development process from blastocyst, implantation, pregnancy and placenta formation, parturition, lactation Need of reproductive health and prevention of sexually Transmitted Diseases (STD), birth Control need and methods

	<ul style="list-style-type: none"> Medical termination of pregnancy (MTP), amniocentesis, infertility and assisted reproductive technologies- IVF, ZIFT, GIFT
UNIT-7	<ul style="list-style-type: none"> Structure and function of cell- the basic unit of life, difference between prokaryotes and Eukaryotic, difference between Plant cell and Animal cell and structure, cell wall, cell membrane different model of cell membrane structure, membrane transport. Different cell organelles such as- structure and function of mitochondria, lysosomes, Golgi body, endoplasmic reticulum, vacuoles, ribosome, plastid, and micro bodies, structure and function of nucleus and nucleolus. Cyto skeleton system- structure of cilia, flagella. Cell division- mitosis and meiosis cell division, crossing over and linkage process and factors affecting it. Tissue- types of animal tissue- types of epithelial tissue, connective tissue, skeleton tissue, cartilage and Bone, vascular tissue- blood and lymph, muscular tissue and types of nervous tissue its structure. Types of plant tissue- meristemic tissue, simple tissue, Complex tissue, special types of tissue Simple tissue- parenchyma, collenchymas, sclerenchyma Complex tissue- xylem and phloem and its functions different types of special tissue and glandular tissue Biomolecules- structure and function of Carbohydrate, protein, lipid, enzyme and vitamin, mechanism of enzyme action, discovery of enzyme, general features of enzyme, chemical nature of enzyme and factor affecting activity of enzyme and coenzyme reaction.
UNIT-8	<ul style="list-style-type: none"> Heredity and variation, Mendelian inheritance, deviations from the Mendalism, chromosome theory of inheritance, chromosomes and gene, linkage and crossing over, sex determination in human being, inheritance, Genetic disorders. Structure of DNA and RNA. DNA Packaging, DNA replication, central –dogma theory, transcription, translation, genetic code, gene expression, regulation, lac operon, Human genome project, DNA finger printing. Origin of life, biological evolution and evidences of biological evolution, adaptive radiation, Lamarckism, Darwin's theory of evolution, Variations, Natural selection, Gene flow and genetic drift, Hardy- Weinberg's principle, human evolution.
UNIT-9	<ul style="list-style-type: none"> Environmental issue- pollution and its type, water pollution, air pollution, sound pollution and its causes and control, agriculture Chemicals and impact on environment, garbage management, solid wastage management, radioactive garbage management, greenhouse effect, climate change, global warming, Ozone depletion and other environmental issue Ecosystem, productivity and decomposition, energy flow, ecological pyramids. Biodiversity- concept, patterns, importance, loss of biodiversity, biodiversity Conservation, hotspots, endangered organisms, extinction, Red Data Book, Biosphere reserves, national parks, wild life Sanctuaries and Ramsar sites. strategy for enhancement in food production- enhancement in crop production, plant reproduction, tissue culture, single cell protein, bio fortification, animal husbandry and beekeeping, Pearl culture and lac culture microbes in human welfare- microbes in household products, industrial product, sewage treatment production of energy, bio control agents biofertilizers, antibody production and other uses.
UNIT-10	<ul style="list-style-type: none"> Application of biotechnology in health and agriculture, genetically modified organisms - Bt crops, human insulin, gene-therapy, transgenic animals, bio piracy, and patents. Biology in human welfare- human health and pathogens, parasites causing human diseases- Malaria, dengue, Chikengunya, elephantiasis, ascariasis, typhoid, pneumonia, cold, Amoebiasis, ringworm and preventive measure, Basic concept of immunology, vaccine, cancer, HIV, AIDS, Problem of adolescence, drug and alcohol addiction Importance and need of reproductive health and prevention of sexually transmitted diseases.

Physics

Unit -11

Force and Mechanics- Unit system, fundamental and derived units, dimensions of physical quantities, significant figures, distance, displacement, speed, velocity, acceleration, equations of uniformly accelerated motion, laws of motion, momentum, conservation of momentum, impulse, static and kinetic friction, circular motion and centripetal force, work, energy, power, kinetic and potential energy, law of conservation of energy, work-energy theorem, universal law of gravitation, acceleration due to gravity.

Unit -12

Properties of Matter- Elasticity and deformation in solids, pressure in liquids, effect of gravity on pressure, buoyancy, Archimedes' principle, viscosity, Stokes' law, terminal velocity, Bernoulli's theorem and applications, capillary rise, surface tension. Temperature and heat, different scales for measurement of temperature and relation between them, specific heat, conduction, convection, radiation, thermal conductivity, change of state and latent heat, thermal expansion, anomalous expansion of water, Laws of thermodynamics, isothermal, adiabatic, reversible and irreversible processes, heat engine, specific heat at constant pressure, specific heat at constant volume, black body radiation, Newton's law of cooling.

Unit-13

Magnetism and Electricity - Electric charge, Coulomb's law, Electric field lines and their properties, Electric dipole, Electric flux, Electric potential, Capacitance, Capacitor, Electric current, Conductor and insulator, Ohm's law and its limitations, Resistance of conductor, Series and parallel combination of resistance, cell, internal resistance of cell, series and parallel combination of cells, bar magnet, magnetic field, magnetic field lines and their properties, magnetic effect of electric current, Oersted's experiment, force on a moving charge in a uniform magnetic field, force on a current carrying conductor in a uniform magnetic field, Fleming's left hand rule, electric motor (DC), electromagnetic induction, Lenz's law and energy conservation, Fleming's right hand rule, Para, Dia and Ferro magnetic substance, effect of temperature on magnetic properties.

Unit-14

Optics and sound.- Reflection of light and laws, spherical mirror, mirror formula, refraction of light and laws, total internal reflection, optical fiber, lenses, lens formula, power of lens, microscope, telescope, prism, dispersion of light, interference of light, diffraction, Cohesive sources, sound waves, echo, ultrasound and supersonics, progressive and standing waves, interference of sound and beats, Doppler effect.

Unit-15

Dual nature of Light and Electronics - Energy bands in conductors, insulators and semiconductors, intrinsic and extrinsic semiconductors, N-type and P-type semiconductors, P-N junction diode, P-N junction diode as a rectifier, Zener diode, LED, Photovoltaic cell, Laser, logic gate Photoelectric effect and its rules, Einstein's photoelectric equation, dual nature of radiation, de-Broglie wavelength.

Chemistry

Unit 16- State of Matter and Chemical kinetics – Types of Intramolecular forces, Ideal gas, Dalton's law of partial pressure, Kinetic theory of gases, Maxwell Boltzmann of molecular velocity, Real gas and deviation from ideal Gas - Van der Waals equation, First, Second, Third law of thermodynamics, internal energy and enthalpy and application of reaction, Spontaneous Aberration and Gibbs Free Energy.

Unit 17 - Periodicity and Classification of Element, periodicity of properties, Chemical Bonding, Molecular Structure – Electronic configuration of elements, Study of long form of Periodic table, Study of s, p, d, f block elements, Electrovalent, covalent, coordinate bond

Unit 18 - Solutions and Equilibrium – Solution and Types of Solutions, Equilibrium in Physical and Chemical process, Law of Mass affection, Le Chatelier's Principle, Ionic Equilibrium, Ionization of Acid and Base, Strong and Weak electrolyte, Concept of Ph

Unit 19. Organic Chemistry – Basic concept and Techniques, Hydrocarbons, Functional Groups, Polymers, Bio-molecules

Unit 20. Environmental and Daily Life Chemistry- Introduction, Types of pollution, Green Chemistry, Global Warming, Policies to control Environmental Pollution, Medicinal Chemistry, Food Chemistry, Cleansing Agent