Biology Syllabus for 1st & 2nd year / A - Level

Instructions:

The objective of "Champion of Subject" is to test the conceptual abilities of the students and candidates regarding the subject.

- This is the comprehensive syllabus for the "Champion of Subject".
- Candidates are advised to thoroughly go through and study the syllabus
- The test will comprise of 120 MCQs.
- The time allowed for the test will be 120 min.
- MCQs will cover part or all the syllabus mentioned below.
- Munzill reserved the right to conduct an online or physical test.

Chapter 1: Cell Structure and Functions

1.1: Techniques used in Cell Biology

- Tissue Culture
- Types of Tissue Culture

1.2: Cell wall and Plasma Membrane

- Cell wall
- Cell Membrane

1.3: Cytoplasm and Organelles

- Cytoplasm, Cytoskeleton
- More on Cytoplasm, Cell organelles
- Endoplasmic Reticulum (ER),Ribosomes
- More on Endoplasmic Reticulum (ER)
- Ribosomes
- Golgi Apparatus and Lysosomes
- More on Golgi Apparatus
- Lysosomes
- Peroxisomes and Glyoxisomes
- Vacuoles
- More on Vacuoles
- Mitochondria
- Mitochondria Convert Energy
- Plastids
- More on Plastids

- Structure and Function of Chloroplasts
- Chloroplasts, The Sites of Photosynthesis
- Centrioles
- Cytoskeleton
- Cilia and Flagella
- Nucleus
- More on Nucleus
- Chromosomes, Nucleolus

1.4: Prokaryotic and Eukaryotic Cells

- Difference between Prokaryotic and Eukaryotic Cells
- More Difference between Prokaryotic and Eukaryotic Cells
- Structure of Bacteria Capsule, Slime and Pilli

Chapter 2: Biological Molecules

2.1: Biological Molecules in Protoplasm

- Chemical composition of protoplasm
- Composition of Water
- Hydrolysis
- Condensation

2.2: Importance of Water

- Polarity and Dielectric Constant of Water
- More on Physical Properties of Water
- Thermal Stability of Water
- Anomalous Behaviour of Water
- More on Anamolous Behaviour of Water

2.3: Carbohydrates

- Carbohydrates
- Classification of Carbohydrates
- Monosaccharides
- Disaccharides
- Polysaccharides
- Functions of Carbohydrates

2.4: Proteins

- Structure of Amino Acid
- Peptide Linkage
- Structure of Protein
- More on Structure of Protein
- Significance of Sequences of Amino Acids
- Classification of Protein
- Function of Protein

2.5: Lipids

- Lipids Characteristics
- Classification of Lipids
- Saturated and Unsaturated Fats
- Waxes and Terpenoids
- Phospholipids
- Steroids and Carotenoids
- Prostaglandins

2.6: Nucleic Acid

- Structure and Role of Nucleic Acids
- Mononucleotide
- Nucleotide and Polynucleotide
- Dinucleotide (NAD)
- Classification of Nucleotide
- Watson-Crick Model of DNA
- Types of RNA
- Gene and Genome, Chromosome, Chromatin
- RNA as a Carrier of Genetics Information

2.7: Conjugated Molecules

- Conjugated Molecules, Glyco-Protein, Glyco-Lipids
- Lipo-Protein, Nucleo-Protein
- Comparison of DNA and RNA

Chapter 3: Enzymes

3.1: Enzymes Structure

- Enzyme
- Types of Cofactors

3.2: Mechanisms of Enzyme Action

- Mechanism of Enzymes
- Characteristics of Enzymes
- Lock and Key Model
- Induced Fit Model
- Factors Affecting the Rate of Enzyme Action

3.3: Factors Affecting the Rate of Enzymatic

- Factors Affecting the Rate of Enzyme Action

3.4: Enzyme Inhibition

- Inhibitors
- Feedback Inhibition
- Enzymes Nature
- Uses of Enzymes
- Specificity of Enzymes
- Venom Inhibitors

3.5: Classification of Enzymes

- Three Groups of Enzymes
- Nomenclature of Enzymes
- Classification of Enzymes
- Uses of Enzymes

Chapter 4: Bioenergetics

4.1: Photosynthesis

- Basic Introduction
- Photosynthesis
- Oxidation-Reduction Reaction
- Role of Chlorophyll and Light
- Role of Photosynthetic Pigments, Carotenoids
- Absorption Spectrum
- Role of Carbon Dioxide and Water in Photosynthesis
- Water and Photosynthesis
- More on Photosynthesis

- Mechanism of Photosynthesis
- Light Reaction
- More on Light Reaction
- Noncyclic Phosphorylation
- Synthesis of ATP, Chemiosmosis
- Cyclic Phosphorylation
- Dark Reaction

4.2: Cellular Respiration

- Types of Anaerobic Respiration (Fermentation)
- Types of Fermentation
- Importance of Fermentation
- Aerobic Respiration
- Mechanism of Respiration, Glycolysis
- Oxidation of Pyruvic Acid and Krebs Cycle
- Respiratory chain
- Metabolic Pool Concept
- Cellular Respiration of Fats and Proteins

4.3: Photorespiration

- Photorespiration
- Alternative Mechanisms of Carbon Fixation
- Malic Acid, C4 plants with Kranz Anatomy
- CAM plants

Chapter 5: Acellular Life

5.1: Viruses-Discovery and Structure

- History of Virus
- Viruses, Size, Shape and Characteristics
- Characteristics of Virus
- Structure of Viruses
- Structure of Bacteriophage
- More on Structure of Viruses, Bacteriophage
- Structure of Influenza
- Structure of HIV, Retrovirus
- Classification of Virus
- Classification of Viruses, Enveloped, Retrovirus

5.2: Parasitic Nature of Virus

- Status of Viruses
- Viruses living or Non-living

5.3: Bacteriophage

- More on Structure of Viruses, Bacteriophage
- Lytic Cycle
- Lysogenic Cycle
- Use of Bacteriophage in Genetic Engineering

5.4: Human Immunodeficiency Virus (HIV)

- Life Cycle of HIV
- Symtomps and Treatment of AIDS

5.5: Viral Diseases

- Hepatitis A, B, C
- Hepatitis D, E, F
- Herpes
- Poliomyelitis
- Cotton Leaf Curl Disease

5.6: Prions and Viroids

- Prions
- Viroids

Chapter 6: Prokaryotes

6.1: Taxonomy of Prokaryotes

- Taxonomy of Prokaryotes
- Phylogeny of Prokaryotes

6.2: Archaea

- Features of Archaea
- Archaea Inhabit Extreme Environments

6.3: Bacterial Ecology and Diversity

- Discovery of Bacteria
- Occurrence of Bacteria
- Cyanobacteria
- Cyanobacteria

6.4: Structure: Shape and Size of Bacteria

- Structure of Bacteria Capsule, Slime and Pilli
- Structure of Bacteria
- Cell Wall of Bacteria
- Kinds of Bacteria
- More on the Structure of Bacteria
- Genomic Organization of Bacteria

6.5: Motility in Bacteria

- Flagella and Its Structure

Chapter 7: Protists and Fungi

7.1: Protits-The Evolutionary Relationship

- General Characteristics of Protists

7.2: Major Groups of Protists

- Animal-like protists
- Amoebas and zooflagellates
- Foraminifera and Actinopods
- Plants like Protist
- Algae, General Characteristics
- Euglenoids, Dinoflagellates and Diatoms
- Brown Algae, Red Algae and Green Algae
- Fungi like Protists: Myxomycota
- Oomycota

7.3: Importance of Protists to Humans

- importance of protists
- Economic Importance of Algae

7.4: General Characteristics of Fungi

- Characteristics of Fungi
- Mode of Nutrition in Fungi
- Taxonomic Status of Fungi
- Mutualistic Fungi
- Mycorrhizae
- Reproduction in Fungi

7.5: Diversity among Fungi

- Classification of Fungi
- Classification of Fungi, Zygomycota
- Ascomycota
- Basidiomycota

7.6: Importance of Fungi

- importance of Fungi
- Harmful Aspects of Fungi
- Some Common Diseases Caused by Fungal Pathogens
- Edible Fungi

Chapter 8: Diversity Among Plants

8.1: The Evolutionary Origin of Plants

- General Characteristics
- The phyletic lineage of Classification

8.2: Non-Vascular Plants

- Division Bryophyta
- Moss
- Life Cycle of Moss
- The Land Adaptions of Bryophytes

8.3: Seedless Vascular Plants

- Classification of Plantae
- Seedless Vascular Plants
- Psilopsida
- Evolution of Leaf
- Lycopsida
- Sphenosida

- Pteropsida
- Life Cycle of Adiantum
- Importance of Seedless Vascular Plants

8.4: Seed Plants

- Seed bearing Vascular Plants
- Evolution of Seed Habit
- Gymnosperms
- Angiosperms
- Life Cycle of Flowering Plants
- Seed and Fruit Formation

8.5: Vascular Plants-Successful Land Plants

- Vascular Plants-Successful Land Plants
- More on Vascular Plants-Successful Land Plants
- Inflorescence and its Major Types
- Racemoss Inflorescence
- Cymose Inflorescence
- Importance of Angiosperms
- Cereal Crops

Chapter 9: Diversity Among Animals

9.1: Characteristics of Animals

- Characteristics of Animals
- More on Characteristics of Animals

9.2: Criteria for Animal Classification

- Criteria for Animal Classification
- Grade Radiata, Bilateria
- Diploblastic and Triploblastic Organization

9.3: Diversity in Animals

- Phylum Porifera, Sycon
- Hydra, Jelly Fish
- Generalized Sponge Anatomy
- Phylum Coelenterata
- Advance Phylum Coelenterata

- Phylum Platyhelminthes
- More on Phylum Platyhelminthes
- Liver Fluke, Tapeworm
- Phylum Nematoda, Ascaris
- More on Phylum Nematoda
- Phylum Mollusca, Fresh Water Mussel, Snail
- More on Phylum Mollusca
- Phylum Annelida, Leech, Earthworm
- More on Phylum Annelida
- Classes of Annelida
- Phylum Arthropoda
- More on Phylum Arthropoda
- Classification of Arthropods
- Metamorphosis
- Echinodermata, Star Fish, Sea Urchin
- More on Phylum Echinodermata
- Phylum Hemichordata
- General Features of Chordates
- The notochord, Pharyngeal, Hollow Dosral Nervous System
- Subphylum, Uro and Cephalo Chordates
- Subphylum Vertebrata (Craniata), Jawless Fish
- Class Chondrichthyes
- Class Osteichthyes
- Class Pisces, Fishes, Rohu
- Class Amphibia, Frog, Toad
- Class Reptilia, Wall Lizard, Snake
- Class Aves, Birds
- Flying Birds and Running Birds
- Class Mammalia, Mammals
- Egg laying and Pouched Mammals
- Placental Mammals
- Sub-Class Prothotheria and Metatheria
- Sub-Class Eutheria

Chapter 10: Form And Functions in plants

10.1: Nutrition In Plants

- Macronutrients, Micronutrients

- Minerals Requirement in Plants
- Role of Nitrogen and Magnesium
- Minerals Requirement, Nitrogen
- Minerals Requirement, Phosphorus
- Minerals Requirement, Potassium
- Minerals Requirement, Magnesium
- Nutrition in Carnivorous Plants

10.2: Gaseous Exchange in Plants

- Gaseous Exchange in Plants
- Gaseous Exchange in Plants
- Types of Mesophyll in Dicot and Monocot Leaves
- Stomatal Transpiration
- Stomata, Exchange in Leaves
- Patterns of Exchange of Gases Between plant and Environment

10.3: Transport in Plants

- Transport in Plants
- Opening and Closing of Stomata
- More on Osmosis
- Water Relation of Plant Cell (More on Water Potential)
- Water Potentials
- More on Water Potential
- Solute Potential
- Osmotic Potential
- Apoplast Pathway
- Symplast Pathway
- Vacuolar Pathway
- Xylem
- Xylem Tissues
- Phloem
- Ascent of Sap
- More on Ascent of Sap
- Transpiration
- Transpiration Pull
- Cohesion and Tension Theory
- Opening and Closing of Stomata
- Strach Sugar Hypothesis

- Influx of K+ Ions
- Translocation

10.4: Homeostasis in Plants

- Osmotic Adjustments in Plants
- Osmoregulation, Thermoregulation and Excretion
- Adaptations in Plants to High Temperature
- Adaptations in Plants to Low Temperature

10.5: Support In Plants

- Turgor Pressure in Plants
- Parenchyma Tissues
- Collenchyma Tissues
- Sclerenchyma Tissues

10.6: Growth And Development In Plants

- Meristematic Tissues
- Apical Meristems, Intercalary Meristems and Lateral Meristems
- Primary Growth
- Secondary Growth
- Role of Lateral Meristems in Secondary Growth

10.7: Growth Responses In Plants

- Plant Growth Regulators(PRGs), Auxins
- Role of Plant Growth Substance in Plant Movement
- Auxins, Gibberellins
- Cytokinin, Abscisic Acid, Ethylene
- Comparison of effects of Plant Growth Regulators on Different Plant P
- Types of Movements
- Tropic Movements
- More on Tropic Movements
- Photoperiodism
- Mechanism of Photoperiodism
- Vernalisation

Chapter 11: Digestion

11.1: Digestive System of Man

- The digestive system of Human
- Alimentary Canal
- More on Alimentary Canal Structure
- More on the Digestive System of Man
- Oral Cavity
- Mechanical and Chemical Digestion
- Pharynx and Oesophagus
- Stomach Digestion
- Digestive gland
- More on Digestion of Food in the Stomach
- Role of the Nervous System and gastrin Hormone on the Secretion of Gastric
- Small intestine
- More on Small intestine
- More on Digestion and Absorption of Food in the Small Intestine
- Digestion in Duodenum and Enzyme Precursors
- More on Jejunum
- Absorption of Digested from the lumen of Intestine
- Absorption of Protein in Small Intestine
- Large intestine
- More onLarge Intestine
- Role of Liver
- Functions of Liver
- Enzymes
- More on Pancreas
- Pancreas as an Exocrine Gland
- Secretion of Pancreatic Juice is Related to Secretin Hormone

11.2: Disorders: Digestive System and Food Ha

- Bulimia Nervosa, Ulcer
- Dyspepsia, Food Poisoning
- Obesity, Anorexia Nervosa

Chapter 12: Circulation

12.1: Blood Circulatory System of Man

- Structure of the Human Heart
- More on Structure of Human Heart
- More on Structure of Human Heart

- Valves of Heart
- More on Valves of Heart
- Circulation of Blood inside Heart
- Passage of Blood Through Heart
- Heartbeat
- Cardiac Cycle
- S-A Node, PaceMaker, AV Node
- Artificial Pacemaker
- Reason For Slight Delay Between Atrial & Ventricular Contraction

12.2: Blood Vessels

- Blood Vessels, Arteries
- Capillaries, Veins
- More on Blood Vessels, Arteries
- Capillaries
- Veins
- Arterioles
- Control of Capillary Beds
- Comparison of Arteries, Capillaries and Veins
- Role of Precapillary Sphincter
- Valves in Veins
- Pulmonary and Systemic Circulation
- More on Pulmonary Circulation
- More on Systemic Circulation
- Coronary Circulation
- Hepatic Portal System
- Renal Circulation

12.3: Blood Pressure

- Blood Pressure, Measuring of Blood Pressure
- Baroreceptors
- Baroreceptor Reflexes
- Comparison of Arteries, Capillaries and Veins

12.4: Cardiovascular Disorders

- Thrombosis
- Arteriolosclerosis

- More on Atherosclerosis
- Angina Pectoris
- Heart Failure, PDA
- Congenital Heart Problems
- Blue Babies or Cyanosis
- More on Myocardial Infarction
- Angioplasty
- Open Heart Surgery
- Hypertension
- Prevention and Treatment of Hypertension
- Hypotension
- Blood Cells
- White Blood Cells and Platelets

12.5: Lymphatic System of Man

- Lymphatic System
- Lymphatic System of Man
- lymphatic vessels
- Lymphatic capillaries
- Spleen as a Lymphatic Organ

Chapter 13: Immunity

13.1: First Line of Defence

- Immunity, Immunology
- First Line of Defence
- Chemical components of the Skin's Defense
- Cilia and Mucus

13.2: Second Line of Defence

- Second Line of Defence
- Killing Cells of Blood, Macrophages
- Neutrophils, Natural Killer Cells
- Complement System
- Interferon
- Inflammatory Response as one of the non-specific Defenses
- Pyrexia and Pyrogens
- Ways the Fever kills Microbes

13.3: Third Line of Defence

- The Specific Defences (Third Line of Defence)
- Cell-Mediated Immune Response
- T-Lymphocytes
- Function of T-Lymphocytes
- Antigen, Antibody
- The Antibody-Mediated Immune Response
- Structure Model of Antibodies
- Role of Memory Cell in Immunity
- Inborn and Acquired Immunity
- Types of Immunity, Active Immunity
- Passive Immunity
- Vaccination a Mean to Develop Active Acquired Immunity
- Allergies
- Autoimmune Disease
- Role of T-Cells and b-Cells in Transplant Rejection

Chapter 14: Respiration

14.1: Respiratory System of Man

- Properties of Respiratory Surfaces
- Upper Respiratory Tract (Nose)
- Pharynx
- Lower Respiratory Tract (Larynx and Trachea)
- Bronchi and Bronchioles
- Alveolar Ducts and Alveoli
- External Structure of lungs
- Mechanism of Breathing in man
- Inspiration
- Expiration
- Lungs Volumes and Capacities
- Control of Breathing (ventilation)

14.2: Transport of Gases

- Transport of Oxygen
- Transport of (CO_2)
- As Carboxyhaemoglobin, AS a Dissolved Carbon Dioxide in Plasma
- Myoglobin
- Haemoglobin

14.3: Respiratory Disorder

- Upper Respiratory Disorders, Sinusitis
- Otitis Media
- Pneumonia, Asthma
- Pulmonary Tuberculosis (T.B)
- Emphysema
- Lung Cancer
- Bad Effects of Smoking

Chapter 15: Homeostasis

15.1: Mechanism of Homeostasis

- Coordinated Action, Stimuli, Receptors
- Concept of Feedback

15.2: Osmoregulation

- Osmoregulation in Animals
- Osmoregulation in Different Environments
- Marine Environments
- Terrestrial Environments

15.3: Excretion

- Nature of Excretory Products in Relation to Habitats
- Urea
- Uric Acid

15.4: Excretory system of Man

- Excretory System
- Urinary system
- Structure of Kidney
- Structure of Nephron
- Blood Circulation to Nephron
- Type of Nephron
- Function of Kidney
- Functions of Kidney
- Urea Formation, Kidney Filteration
- The concentration of Excretory Product

- Role of hormone in excretory products
- Kidney as Osmoregulatory Organ

15.5: Disorders of Urinary Tract

- Urinary Tract Infections (UTIs)
- Kidney Stone
- Kidney (Renal) Failure, Dialysis
- Removal of Kidney Stone
- Peritoneal Dialysis
- Kidney Transplant
- Kidney Transplant

15.6: Thermoregulation

- Temperature Classification of Animals
- Regulation of Heat Exchange Between Animals and Environment
- Regulatory Strategies
- Thermostat Function and Feedback Controls in Human and Fever

Chapter 16: Support and Movement

16.1: Human Skeleton

- Bones
- Cartilages
- Human Skeleton, Axial Skeleton
- Skull
- Ribs
- Vertebral Column
- Appendicular Skeleton
- Pelvic Girdle and hind limb
- Types of Joints
- More on Joints
- Synovial Joint

16.2: Disorders of Skeleton

- Disc-Slip
- Spondylosis
- Sciatica

- Genetic Causes
- Hormonal Causes of Skeleton Deformities
- Arthritis and its Types
- Arthritis and its Types
- Repair of Broken Bones

16.3: Muscles

- Muscular System
- Muscles and Movements
- Smooth and Cardiac Muscles
- Skeletal Muscles, Skeletal Muscle Fibre
- More on Skeletal Muscles, Skeletal Muscle Fibre
- Ultra Structure of Microfilaments
- Sliding Filament Model
- How Bridges are Controlled
- Controlling the Actin-Myosin Interaction by Ca++ ions
- Arrangement of Skeletal Muscles for Skeletal Movement
- Origin, Insertion, Belly, Ligaments and Tendons
- Actions of Flexors and Extensor as a Pair of Opposing Muscles
- Roles of Tendons and Ligaments
- Defects of Skeletal System, Osteoporosis, Dislocation of Joints
- Energy for Muscle Contraction, Muscle Fatigue
- Tetany, Cramp

Chapter 17: Nervous Coordination

17.1: Steps involved in Nervous Coordination

- Stimuli, Receptors, Effectors, Response
- Coordinated Action, Stimuli, Receptors
- Steps Involved in Coordination
- Coordinators and Effectors, Response

17.2: Neurons

- Nerve Cell or Neuron
- Nerve Types
- Neuron Types
- Nervous Tissue
- Reflex Arc

17.3: Nerve Impulse

- Nerve Impulse and Resting and Active Membrane Potential

17.4: Synapse

17.5: Basic Organization of Human Nervous sys

- Central Nervous System (CNS) Brain
- The Divisions of Brain, Forebrain
- Mind Brain and Hind Brain
- Spinal Cord
- More on Spinal Cord
- Peripheral Nervous System (PNS)
- More on Peripheral Nervous System (PNS)
- Other Senses, Smell, Taste and Touch
- Working of Sensory Receptors with Special Reference to Skin

17.6: Disorders of Nervous System and Diagnostic Tests

- Stroke
- Meningitis
- Brain Tumors
- Headache
- Epilepsy
- Alzheimer's Disease
- Electroencephalography

Chapter 18: Chemical Coordination

18.1: Hormones- The Chemical Messengers

- Chemical Nature of Hormone
- Mode of Hormone Action

18.2: Endocrine System of Man

- Important Endocrine Glands
- Pituitary Gland
- Pituitary's Median lobe and posterior lobe
- Thyroid Gland
- Parathyroid Glands
- Pancreas

- Adrenal Glands
- Gonads
- Feedback Mechanisms

Chapter 19: Behaviour

19.1: The Nature of Behaviour

- Relationship Between Stimuli and Behaviour
- Biological Clocks and Circadian Rhythms

19.2: Innate Behaviour

- Innate Behaviour
- More on Innate Behaviour
- More on Innate Behaviour

19.3: Learning

- Learning Behaviour
- More on Learning Behaviour

19.4: Social Behaviour

- Social Behaviours
- Agonistic Behaviour

Chapter 20: Reproduction

20.1: Reproductive System of Man

- Male Reproductive System
- More on Male Reproductive System
- Functions of male Reproductive System
- Hormonal Control of Male Reproductive System
- Female Reproductive System
- Functions of the Female Reproductive System
- Menstrual Cycle
- Hormonal Control of Reproductive Cycles
- AIDS, A Sexually Transmitted Disease

20.2: Sexually Transmitted Diseases (STDs)

- AIDS, A Sexually Transmitted Disease

Chapter 21: Development and Aging

21.1: Embryonic Development

- Embryo, Embryology and Cleavage
- Different Patterns of Cleavage Based Upon Amount of Yolk
- Gastrulation
- Neurulation in Human Embryo
- Formation of Neural Crest And its Role in Development

21.2: Control of Development

- Hans Spemann's Experiment
- Roux-Weismann Hypothesis and Hans Drieschs Experiment

21.3: Human Embryonic Development

Human Embryonic Development

Chapter 22: Inheritance

22.1: Mendelian Inheritance

- Mendels Law of Segregation
- Mendels Law of Independent Assortment
- Mendel's Interpretation
- Punnet Square, Test Cross
- Punnet Square

22.2: Exceptions to Mendelian Inheritance

- Complete Dominance
- Incomplete Dominance
- Co-Dominance
- Multiple Alleles

22.3: Blood Group Systems

- ABO-Blood Group System
- Rh Blood Group System
- erythroblastosis fetalis

22.4: Polygenetic Inheritance and Epistasis

Wheat Grain Colour
Human Skin Colour
Epistasis
Qualitative Traits
Quantitative Traits

22.5: Gene Linkage and Crossing Over

- Gene Linkage
- Sex Linkage in Drosophila
- Crossing Over
- Genetic Recombination

22.6: Sex Determination

- Sex Determination, Chromosome in Drosophila
- Chromosome in Man
- Comparison of Chromosomal Determination of Sex Between Drosophila and
- Patterns of Sex Determination

22.7: Sex-Linkage

- Sex Linkage
- Sex Linkage in Drosophila
- Sex-Linkage in Human
- X- linked Recessive Inheritance
- X- linked Dominant Inheritance
- Y- linked Inheritance
- Haemophilia
- More on Haemophilia
- Sex-Linked Inheritance, Colour Blindness
- Sex-Linked Inheritance, Colour Blindness
- Sex Limited Trait, Sex Influenced trait

Chapter 23: Chromosomes And DNA

23.1: The Chromosomal Theory of Inheritance

- The Chromosomal Theory of Inheritance

- Types of Chromosomes
- Composition of Chromosome
- Concept of Gene
- Gametes, Organisms have Number of Chromosomes Specific to their Speci
- Number and Structure of Chromosome

23.2: DNA as the Hereditary Material

- DNA as Hereditary Material, vehicle
- More on DNA as Hereditary Material, vehicle

23.3: DNA Replication

- Types of Replication
- Replication of DNA
- The Meselson-Stahl Experiment
- Mechanism of DNA Replication
- More on the Mechanism of DNA Replication

23.4: Gene Expression

- Advance Transcription
- Advance Transcription
- More on Transcription
- Post-Transcriptional Modification of mRNA
- Genetic Code
- Translation
- Advance Translation, Protein Synthesis
- More on Translation
- Difference between Translation in Prokaryotes and Eukaryotes

23.5: Regulation of Gene Expression

- Regulation of Gene Expression
- Methods of Regulation of Gene Expression

23.6: Mutations

- Mutations
- Importance of Mutation
- Chromosomal Mutations
- Turner Syndrome

- Point Mutation

Chapter 24: Evolution

24.1: The Evolution of The Concept of Evolution

- Concept of Evolution VS Special Creation

24.2: Evolution From Prokaryotes to Eukaryotes

- Evolution From Prokaryotes to Eukaryotes

24.3: Lamarckism

- Inheritance of Acquired Characteristics
- Objections on Lamarckian Theory

24.4: Darwinism

- Alfred Russell Wallace
- Theory of Natural Selection
- More on Theory of Natural Selection

24.5: Neo-Darwinism

- Neo-Darwinism - The Modern Evolutionary Synthesis

24.6: Evidence of Evolution

- Pieces of evidence from Comparative Anatomy
- Comparative Embryology and Molecular Biology
- Hardy-Weinberg Theorem
- More on Hardy-Weinberg Theorem
- Factors Affecting Gene Frequency
- Genetic Drift
- Speciation
- Sympatric Speciation
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Chapter 25: Man and His Environments

25.1: Biogeochemical Cycle

- Water cycle

- The Nitrogen Cycle
- More on Nitrogen Cycle

25.2: The Flow of Energy

- Concept of Trophic Levels
- Concept of Productivity
- Energy Relations Between Different Trophic Levels
- Ecological Pyramids
- Ecological Pyramids Biomass
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25.3: Ecological Succession

- Succession
- Kinds of Succession
- Secondary Succession
- Stages of Succession
- Xerosere
- More on Xerosere

25.4: Human Impact on Environment

- Nuclear Power
- Carbon Dioxide and Global warming
- Acid Rain
- Mechanism of Acid Rain
- Effect of Acid Rain
- Depletion of Ozone
- Ozone Depletion due to Oxides of Nitrogen and Sulphur
- Role of Chlorofluorocarbons in Destroying Ozone
- Effect of Ozone Depletion

25.5: Environmental Resources and Depletion

- Renewable and Non-Renewable Resources
- Renewable Resources (Land and Wildlife)
- Conventional Energy Resources
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26.1: Cloning of Gene

- Genetic engineering
- Scope and Importance of Biotechnology
- Recombinant DNA Technology
- Advance Recombinant DNA Technology, How to Get a Gene
- Recombinant DNA Technology Depends on Enzymes
- Molecular Sciccor: Restriction Endonucleases
- Molecular Carrier: Vector
- More on Molecular Carrier: Vector
- DNA Ligase and Expression System
- The Polymerase Chain Reaction
- Components of PCR
- Mechanism of PCR
- Applications of PCR
- Genomic Library
- Using Probe for Searching Gene in Genomic Library

26.2: DNA Sequencing

- Gel Electrophoresis
- Visualization of Fragments
- DNA Sequencing
- Sanger's Method
- Automatic DNA Sequencing
- Maxam-Gilbert Method

26.3: DNA Analysis

- Analyzing DNA
- Procedures of DNA Analysis
- Autoradiography
- Application of DNA Analysis

26.4: Genome Maps

- Genome Analysis
- The Human Genome Project
- Benefits of Human Genome Project

26.5: Tissue Culture

- Tissue Culture
- Types of Tissue Culture

- Animal Cell Culture
- Techniques of Animal Cell Culture
- Application of Animal Cell Culture

26.6: Transgenic Bacteria, Plants and Animals

- Transgenic Bacteria
- Role of Transgenic Bacteria in Human Welfare
- Application of Genetically Modified Bacteria
- Transgenic Plants
- Agrobacterium Mediated Transformation
- Application of Transgenic Plants
- Transgenic Animals

26.7: Biotechnology and Health Care

- Role of Biotechnology in Diagnosis of Diseases
- Gene Therapy
- Gene Therapy (Ex-Vivo)
- Gene Therapy In-Vivo Method
- Cystic Fibrosis

26.8: Scope and Importance of Biotechnology

- Bio-Chips
- Bio-Fertilizers
- Nanotechnology
- Ecological Concerns surrounding Trangenic Bateria

Chapter 27: Biology and Human Welfare

27.1: Vaccination and Integrated Disease Mana

- Immunization and Vaccination

27.2: Roles of Microbes in Human Welfare

- Role of Transgenic Bacteria in Human Welfare
- Ecological Concerns surrounding Trangenic Bateria
- Application of Genetically Modified Bacteria
- Biological Principles of Sewage Treatment
- Bioremediation