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| **Biochemistry** |
| **Sr. No.** | **Core Areas** | **Percentage** |
| 1. | Carbohydrates | 5% |
| 2. | Proteins | 5% |
| 3. | Lipids | 5% |
| 4. | Genetic material (DNA & RNA) | 5% |
| 5. | Enzymology | 10% |
| 6. | Metabolism & Bioenergetics1. Carbohydrate metabolism
2. Lipids metabolism
3. Nitrogen metabolism(Protein, nucleic acid) metabolism
4. Bioenergetics
 | 20% |
| 7. | Nutritional Biochemistry | 5% |
| 8. | Molecular Biology & Biotechnology | 10% |
| 9. | Biochemical Techniques | 10% |
| 10. | Immunochemistry | 5% |
| 11. | Cell Signaling & Membranes | 10% |
| 12. | Endocrinology & Reproduction | 10% |
|  | **Total** | **100%** |

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| **Biochemistry (Detailed)** |
| **Sr. No.** | **Core Areas** | **Percentage** |
| **1.** | **CARBOHYDRATES*** 1. **Classification**
		1. Monosaccharides
		2. Oilgosaccharides
			1. Disaccharides
			2. Others
		3. Polysaccharides
			1. Homopolysacharrides
			2. Heteropolysacharrides
	2. **Structure**
		1. Anomers
		2. Epimers
		3. Enantiomers
		4. Reducing & Non Reducing Sugars
		5. Derived Carbohydrates
		6. D & L and Optical Isomers
		7. Ring Structure (Pyran & Furan)
 | **5%** |
| **2.** | **PROTEINS:**1. **Classification & Biological Role**
2. Based on Solubility
3. Based on Shape

2.1.3.Based on Functions* + - 1. Immunoglobulin

2.1.3.2 Regulatory* + - 1. Contractile
			2. Nutrition
			3. Plasma Proteins

2.1.4.Based on 3 D**2.2. Structure**2.2.1.Levels of Organization* + - 1. Primary
			2. Secondary
			3. Tertiary
			4. Quaternary

**2.3. Amino Acids**2.3.1. Classification based on* + - 1. Nutrition
			2. R Group
			3. Biochemical importance (Glycogenic, Ketogenic)

2.3.2.Properties | **5%** |
| **3.** | **LIPIDS:*** 1. **Classification & Biological Role**

3.1.1 Primary* + 1. Secondary

3.1.3 Derived**3.2. Structure – Fatty Acids*** + 1. Essential – Non Essential
		2. Saturated – Unsaturated

**3.3. Properties of Fatty Acids*** + 1. Rancidity
		2. Peroxidation
		3. ROS (Reactive Oxygen Species)
 | **5%** |
| **4.** | **Chemistry of Nucleic acids (DNA & RNA):****4.1. Nitrogenous Bases****4.2. Nucleosides****4.3. Nucleotides****4.4. Nucleic Acids****4.5. Nucleoprotein complexes** | **5%** |
| **5.** | **ENZYMOLOGY:****5.1. Normenclature, Units of enzyme activity, Coenzymes, Cofactors****5.2. Classification****5.3. Factor affecting enzyme activity****5.4. Regulatory Enzymes*** + 1. Allosteric Activity
		2. Covalent Modification
		3. Isoenzymes
		4. Inhibition of Enzymes

**5.5. RNA as an Enzyme****5.6. Clinical and industrial importance of Enzymes****5.7. Kinetics of Enzymes*** + 1. Michaelis Menton Equation
		2. Linweaver Burk Equation

**5.8. Immobilization of Enzymes** | **10%** |

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| **6.** | **METABOLISM & BIOENERGETICS:****6.1. Overview of Metabolism****6.2. Digestion, Absorption, Transport & Incorporation of:**6.2.1. Carbohydrates* + 1. Proteins
		2. Lipids
		3. Nucleoproteins

**6.3. Metabolic pathways of carbohydrates & their regulation*** + 1. Glycolysis
		2. TCA
		3. Gluconeogenesis
		4. HMP shunt
		5. Glycogenesis &Glycogenolysis
		6. Advanced Glycation end Products (AGES)
		7. Glycogen Storage Diseases
		8. Photosynthesis
1. chlorophylls
2. light harvesting
3. light and dark reactions
4. C3, C4 and CAM metabolism
5. photorespiration
6. Storage materials and their synthesis
7. Nitrogen fixation

**6.4. Metabolic Pathways of Lipids & their regulation*** + 1. Synthesis of Fatty Acids
		2. Oxidation of Fatty Acids
		3. Phospholipids
		4. Cholesterol Synthesis (Steroids & prostagladins)
		5. Lipid storage and associated disorders

**6.5. Metabolic Pathways of Proteins & Amino Acids*** + 1. Nitrogen balance (urea cycle)
		2. Detoxification of Ammonia in Birds Reptiles & Mammals
		3. Metabolism of specific amino acids
		4. Inborn errors of Metabolism
		5. Synthesis and degradation of Hemoglobin
		6. Functions of Plasma Proteins

**6.6. Nucleic Acids*** + 1. Biosynthesis and degradation of purines &Pyramidines
		2. Syntheisis of Nucleosides, nucleotides and nucleic acids
		3. Disorders of Nucleoproteins

**6.7. Bioenergetics*** + 1. Oxidative Phosphorylation including Electron Transport Chain (ATPs calculations)
		2. Photophosphorylation
		3. Inhibitors ( Uncouplers)

**6.8. Role of Vitamins & Minerals in Metabolism** | **20%** |
| **7.** | **NUTRITIONAL BIOCHEMISTRY:****7.1. Food in Health and Disease****7.2. Balanced diet****7.3. Diet for**7.3.1. New Born (0-6 Months)7.3.2. Infants (7 – 1 Year)7.3.3. Children (1.1 – 12 years)7.3.4. Teenagers (13-19 Years)7.3.5. Adults (20-45 years)7.3.6. Old Age (46-70 Years)**7.4. Diet for Pregnant & Lactating Women****7.5. Diet for Athletes****7.6. Diet recommended for hypertensive, Cardiac & Renal Patients****7.7. Diet for obese & Patients with malnutrition (Marasmus, Kawashiorkor)****7.8. Diet for Diabetic Patients****7.9. Diet for Diarrohea Patients****7.9. BMR, PM, Caloric Value****7.10. Composition & Caloric value in commercially available commodities** | **5%** |
| **8.** | **MOLECULAR BIOLOGY & BIOTECHNOLOGY:****8.1. Genes, Chromosomes, Central Dogma****8.2. Cell Cycle****8.3. Mandelian laws of inheritance (Pedegree)**8.3.1. Autosomal Inheritance8.3.2. Mitochondrial Inheritance8.3.3. X-linked Diseases8.3.4. Y-Linked Diseases**8.4. Replication & proof reading****8.5. Trancription – post transcriptional modifications****8.6. Translation****8.7. Post translational modifications****8.8. Human genome project & Mutations****8.9. Bioinformatics (Applications)****8.10. Genetic Engineering**8.10.1 Plasmid, vector, Translocation8.10.2 Cloning8.10.3 Recombinant DNA Technology8.10.4. Nucleic Acid Sequencing**8.11. Proteomics** **Biosynthesis and sequencing of proteins****8.12. Metabolomics** | **10%** |
| **9.** | **BIOCHEMICAL TECHNIQUES:****9.1. Solution & buffer system Principles & applications of the following in Bio chemistry:****9.2. NMR****9.3 Amino Acid Analyzer****9.4. Chromatography** **9.5. PCR & Electrophresis****9.6. Western Blotting****9.7. Southern Blotting****9.8. Eastern Blotting****9.9. Northern Blotting****9.10. Fluorescence techniques****9.11. Use of labeled materials in Biochemistry****9.12. Mass Spectroscopy****9.13. ELISA****9.14. Microscopy****9.15. Spectrophotometry****9.16. Atomic Absorption spectrometry****9.17. Flame photometry****9.18. Hematological analyzer****9.19. Microbes based techniques****9.20. Nanotechnology** | **10%** |
| **10.** | **IMMUNOCHEMISTRY:****10.1. Innate & Acquired immunity****10.2. Cell mediated & Humoral Immunity****10.3. Antigens & Antibodies****10.4. Monoclonal & Polyclonal Antibodies****10.5. In situ hybridization****10.6. HLA types & grafting****10.7. Interleukins, Cytokines, Interferons****10.8. Major Histocompatibility Complex (MHC)** | **10%** |
| **11.** | **CELL SIGNALING & MEMBRANES:****11.1. Composition & Chemistry of membranes of the Cells & Organelles****11.2. Receptors & transport channels****11.3. Second messenger system****11.4. Ca, IP3 mechanism****11.5. Role of the G Proteins****11.6. Protein Kinases/Tyrosine Kinases****11.7. Nitric Oxide synthase****11.8. Pheromones****11.9. Plant hormones**  | **10%** |
| **12.** | **ENDOCRINOLOGY & REPRODUCTION:****12.1. Chemistry, Synthesis, degradation, functions, hyper & hypo states of the following hormones:**1. **Insulin**
2. **Glucagon**
3. **Thyroid**
4. **Parathyroid hormone**
5. **Adrenal hormones**
6. **FSH & LH**
7. **ADH, Oxytocin**
8. **Hypothalamic release factors**
9. **HCG**
10. **Steroid hormones (Testosterone, Progesterone, Estrogen)**
 | **5%** |
|  | **Total** | **100%** |