GATE Syllabus

Part II – LIFE SCIENCE (XL)

Section–XL-Q Biochemistry

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SECTION – XL-Q: BIOCHEMISTRY

Course Syllabus

Unit: 1

- Organization of life
- Importance of water
- Structure and function of biomolecules:
  - Amino acids
  - Carbohydrates
  - Lipids
  - Proteins
  - Nucleic acids
- Protein structure, folding and function:
  - Myoglobin
  - Hemoglobin
  - Lysozyme
  - Ribonuclease A
  - Carboxypeptidase
  - Chymotrypsin

Unit: 2

- Enzyme kinetics including its regulation and inhibition, Vitamins and Coenzymes
- Metabolism and bioenergetics
- Generation and utilization of ATP
- Metabolic pathways and their regulation:
  - Glycolysis
  - TCA cycle
  - Pentose phosphate pathway
  - Oxidative phosphorylation
  - Gluconeogenesis
  - Glycogen
  - Fatty acid metabolism
- Metabolism of Nitrogen containing compounds:
  - Nitrogen fixation
  - Amino acids
  - Nucleotides
- Photosynthesis
  - Calvin cycle

Unit: 3

- Biochemical separation techniques:
  - Ion exchange
  - Size exclusion and affinity chromatography
  - Characterization of biomolecules by electrophoresis
  - UV-visible and fluorescence spectroscopy and Mass spectrometry

Unit: 4

- Cell structure and organelles
- Biological membranes
- Transport across membranes
- Signal transduction
- Hormones and neurotransmitters

Unit: 5

- DNA replication, transcription and translation
- Biochemical regulation of gene expression
- Recombinant DNA technology and applications:
  - PCR, site directed mutagenesis and DNA-microarray

Unit: 6

- Immune system:
  - Active and passive immunity
  - Complement system
  - Antibody structure, function and diversity
- Cells of the immune system:
  - T, B and macrophages
  - T and B cell activation
  - Major histocompatibilty complex
  - T cell receptor
- Immunological techniques:
  - Immunodiffusion
  - Immunoelectrophoresis
  - RIA
  - ELISA