

SYLLABUS FOR PHD ENTRANCE EXAMINATION 2017

SCHOOL OF BIO – CHEMISTRY

PART – A

Marks 50

- 1. Atoms and Molecules** – The Atomic Theory ; Structure of an Atom ; Quantum Theory ; Atomic Spectra ; Ionization Potential ; Chemical Bonds ; Secondary Bonds.
- 2. Physical Properties of Molecules** - Diffusion and Osmosis; Buffers; Isomerism and Optical Activity.
- 3. Carbohydrates** – Classification; Physical Properties; Biological Oxidation of Carbohydrates; Biomedical Importance of carbohydrates.
- 4. Lipids** – Classification; Biological significance of lipids and fat metabolism.
- 5. Amino Acids** – Structure and classification ; Biosynthesis of amino acids ; Catabolism of Amino Acid and Urea cycle.
- 6. Proteins** – Chemical structure of proteins; Properties of protein; Biological significance of proteins; Mechanism of protein synthesis and glycoprotein's.
- 7. Nucleic acids** – Chemical Composition of Nucleic Acids ; Properties of Nucleic Acids ; Biological significance of Nucleic Acids ; Biosynthesis of Nucleotides.
- 8. Enzymes and Co-Enzymes** – Classification and nomenclature of Enzymes ; Isolation of Enzymes ; Physico- chemical Nature of Enzymes; Enzyme Kinetics ; Mechanism of Enzyme Action and co-enzymes.
- 9. Vitamins** – Classification and Bio-medical importance.
- 10. Minerals** – Classification and Bio-medical importance.
- 11. Genetic Code** – Nature of Genetic Code; Characteristics of Genetic Code and Evolution of Genetic Code.

12. Bio-chemical techniques - Homogenization; Chromatography; Classification; Electrophoresis and ultracentrifugation (Principle, Working model and Application). electrophoresis, Pulse field gel electrophoresis, Capillary electrophoresis. Spectroscopic techniques: UV/visible, fluorescence, circular dichroism, NMR, ESR spectroscopy, X-ray diffraction, mass spectrometry.

PART – B

Marks 50

RESEARCH METHODOLOGY

Research and Types of research: Meaning of Research- Objectives of Research- Motivation in Research. Research methods vs Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical. Research Process. Criteria of good Research.

Research Formulation – Defining and formulating the research problem - Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem – Literature review – Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Identifying gap areas from literature review - Development of working hypothesis.

Data Collection and analysis: Execution of the research - Observation and Collection of data - Methods of data collection – Modeling, Mathematical Models for research, Sampling Methods- Data processing and Analysis strategies. Data Analysis with Statistical Packages – Hypothesis-testing, Generalization-and-Interpretation.

Reference Books:

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. *An introduction to Research Methodology*, RBSA Publishers.
2. Kothari, C.R., 1990. *Research Methodology: Methods and Techniques*. New Age International. 418p.
3. Sinha, S.C. and Dhiman, A.K., 2002. *Research Methodology*, Ess Ess Publications. 2 volumes.
4. Trochim, W.M.K., 2005. *Research Methods: the concise knowledge base*, Atomic Dog Publishing. 270p.
5. Wadehra, B.L. 2000. *Law relating to patents, trade marks, copyright designs and geographical indications*. Universal Law Publishing.
6. Leedy, P.D. and Ormrod, J.E., 2004 *Practical Research: Planning and Design*, Prentice Hall.
7. Satarkar, S.V., 2000. *Intellectual property rights and Copy right*. Ess Ess Publications
