

DEVI AHILYA VISHWAVIDYALAYA, INDORE

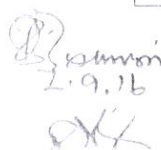
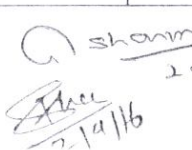
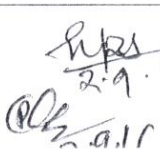
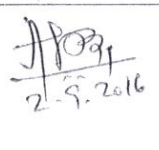
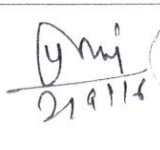
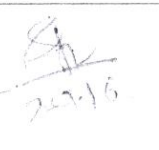
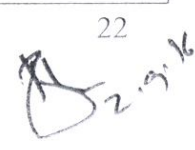
M.Sc. CHEMISTRY (SEMESTER –IV)

Paper No.
Compulsory / Optional
Max. Marks

: **III (Code-MCH-512)**
: **Compulsory**
: **100**

PAPER III: BIOCHEMISTRY

Unit-1	<p>Metal Ions in Biological Systems Bulk and trace metals with special reference to Na, K, Mg, Ca, Fe, Cu, Zn, Co, and K⁺/Na⁺ pump.</p> <p>Bioenergetics and ATP Cycle. DNA polymerisation, glucose storage, metal complexes in transmission of energy; chlorophyll's, photosystem I and photosystem II in cleavage of water.</p> <p>Transport and Storage of Dioxygen Haem proteins and oxygen uptake structure and function of haemoglobin's, myoglobin, haemocyanins and hemerythrin, model synthetic complexes of iron, cobalt and copper.</p>
Unit-2	<p>Electron Transfer in Biology Structure and function of metal of proteins in electron transport processes cytochrome's and iron-sulphur proteins, synthetic models.</p> <p>Nitrogen fixation Biological nitrogen fixation, and its mechanism, nitrogenase, Chemical nitrogen fixation.</p>
Unit-3	<p>Enzymes Introduction and historical perspective, chemical and biological catalysis, remarkable properties of enzymes like catalytic power, specificity and regulation. Nomenclature and classification, extraction and purification. Fischer's lock and key and Koshland's induced fit hypothesis, concept and identification of active site by the use of inhibitors, affinity labeling and enzyme modification by site-directed mutagenesis. Enzyme kinetics, Michaelis-Menten and Lineweaver Burk plots, reversible and irreversible inhibition.</p> <p>Mechanism of Enzyme Action Transition-state theory, orientation and Steric effect, acid-base catalysis, covalent catalysis, strain or distortion. Examples of some typical enzyme mechanisms for chymotrypsin, ribonuclease, lysozyme and carboxypeptidase.</p> <p>Kinds of Reactions Catalysed by Enzymes Nucleophilic displacement on a phosphorus atom, multiple displacement reactions and the coupling of ATP cleavage to endergonic processes. Transfer of sulphate, addition and elimination reactions, enolic intermediates in isomerisation reactions, β-Cleavage and condensation, some isomerization and rearrangement reactions. Enzyme catalyzed carboxylation and decarboxylation.</p>
Unit-4	<p>Co-Enzyme Chemistry Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD⁺, NADP⁺, FMN, FAD, lipoic acid, vitamin B12. Mechanisms of reactions catalyzed by the above cofactors. Enzyme Models Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality Biometric chemistry, crown ether, cryptates. Cyclodextrins, cyclodextrin-based enzyme models, clixarenes, ionospheres, micelles synthetic enzymes or synzymes.</p>

 P. K. Sharma
 A. Sharma
 R. K. Sharma
 J. K. Sharma
 D. K. Sharma
 S. K. Sharma
 B. K. Sharma

