

BIOCHEMISTRY

Content Of Dr. Murali Bharadwaz's E-Learning Material

Bio Chemistry Mock Test			
Topic	Lecture	Duration	Size (MB)
AIIMS Bio-Chemistry	Lec-01	0:37:12	127
	Lec-02	0:41:43	142
	Lec-03	0:40:22	138
	Lec-04	0:21:36	74.3
Bio-Chemistry Test 569	Lec-01	0:42:07	144
	Lec-02	0:38:54	133
	Lec-03	0:34:58	119

Bio Chemistry Notes	
Bio Chemistry Notes	No. of Pages = 90

Subject Name	Lecture Number	Lecture Content	Lecture Duration	File Size
BIOCHEMISTRY Amino Acids	Lec 01	<ul style="list-style-type: none"> ♦ Classify the amino acids ♦ Non-Polar Amino Acids ♦ Amino acid with uncharged polar side chains ♦ Amino acids with acidic side chains ♦ optical properties of amino acids ♦ ACIDIC AND BASIC PROPERTIES OF AMINO ACIDS ♦ Henderson-Hasselbalch equation. 	0:29:55	102
	Lec 02	<ul style="list-style-type: none"> ♦ Buffers ♦ Titration of an amino acid ♦ Isoelectric point ♦ applications of the Henderson Hasselbalch equation 	0:28:12	97
Structure of Proteins	Lec 03	<ul style="list-style-type: none"> ♦ Structure of Proteins ♦ Peptide bonds ♦ Characteristics of the peptide bond ♦ Polarity of the peptide bond ♦ Determination of a protein's primary structure by DNA sequencing ♦ SECONDARY STRUCTURE OF PROTEINS ♦ α-helix, β-sheet, β-bend ♦ Parallel and antiparallel sheets ♦ Nonrepetitive secondary structure ♦ Supersecondary structure (motifs) ♦ TERTIARY STRUCTURE OF GLOBULAR PROTEINS ♦ Domains ♦ Interactions stabilizing tertiary structure ♦ A disulfide bond ♦ Hydrophobic interactions: ♦ Hydrogen bonds ♦ Ionic interactions: ♦ Protein folding ♦ Role of chaperones in protein folding 	0:39:13	134
Structure & Globular Proteins	Lec 04	<ul style="list-style-type: none"> ♦ Quality of structure of proteins ♦ Denature of Proteins ♦ Protein Misfolding ♦ Amyloidoses ♦ Alzheimer disease ♦ Prion disease ♦ Structure and function of hemoglobin Hemoglobin A ♦ Quaternary structure of hemoglobin ♦ T form ♦ R form ♦ Binding of oxygen to myoglobin and hemoglobin ♦ Oxygen dissociation curve ♦ Cooperativity of Oxygen ♦ Significance of the sigmoidal O₂ dissociation curve ♦ Bohr effect ♦ Mechanism of the bohr effect ♦ effect of 2/3-bisphosphoglycerate on oxygen affinity 	0:41:22	141

Subject Name	Lecture Number	Lecture Content	Lecture Duration	File Size
BIOCHEMISTRY Globular Proteins	Lec 05	<ul style="list-style-type: none"> ◆ Shift of the oxygen -dissociation curve ◆ Response of 2,3-BPG Levels to chronic hypoxia or anemia: ◆ Binding of co2 ◆ Response of 2,3-BPG Levels to chronic hypoxia or anemia: ◆ Bindinhg of CO ◆ Fetal hemoglobin(Hbf) ◆ Hba synthesis ◆ Hemoglobin A2(HbA2): ◆ Hemoglobin A1c ◆ ORGANIZATION OF THE GLOBI GENES α-Gene family ◆ β-Gene family ◆ steps in globin chain synthesis ◆ HEMOGLOBINOPATHIES ◆ Sickle-cell anemia (Hbs) ◆ Thalassemia syndromes ◆ Sickle cell disease(hemoglobin S disease) ◆ sickle cell trait ◆ Amino acid substitution in Hbs ◆ Variables that increase sickling ◆ Hemoglobin C disease ◆ hemoglobin SC disease ◆ D.Methemoglobinemias ◆ Thalassemias ◆ β-Thalassemias ◆ α-Thalassemias 	0:42:17	144
Globular & Fibrous Proteins	lecture 06	<ul style="list-style-type: none"> ◆ COLLAGEN ◆ Fibril-forming collagens ◆ netwrok-forming collagens ◆ strucutral of collagen ◆ Biosynthesis of collagen ◆ Extracellular cleavage of procollagen molecules: ◆ gradation of collagen ◆ Ehlers-danlos syndrome(EDS) ◆ Osteogenesis imperfecta(OI) ◆ Structure of elastin ◆ Tropoelastin ◆ Mutations in the fibrilling gene ◆ α-Antitrypsin ◆ Emphysema resulting from α1-AT deficiency 	0:27:48	95

Subject Name	Lecture Number	Lecture Content	Lecture Duration	File Size
BIO CHEMISTRY Enzymes	Lec 07	<ul style="list-style-type: none"> ♦ PROPERTIES OF ENZYMES ♦ ribozyme ♦ Active sites ♦ Cofactors ♦ Regulation ♦ HOW ENZYMES WORK ♦ FACTORS AFFECTING REACTION VELOCITY ♦ MAXIMAL VELOCITY ♦ Hyper shape of the enzyme kinetics curve ♦ Effect of PH on the ionization of the activesite: ♦ Effect of PH on enzyme denaturation: ♦ MICHAELIS-METEN EQUATION ♦ Michaelis-Menten equation ♦ steady-state assumption: ♦ Important conclusion about Michae;ostmenten kinetics ♦ Characteristics of Km,small Km,Large km ♦ relationship of velocity of enzyme concentration: ♦ Order of reaction: ♦ Lineweaver-Burket plot ♦ INHIBITION OF ENZYME ACTIVITY Reversible inhibitors ♦ Irreversible inhibition ♦ Competitive inhibition ♦ Effect of km ♦ Effect on lineweaver-Burke plot: ♦ Statin drugs--examples of competitive inhibitors ♦ Noncompetitive inhibition ♦ Effect on Vmax 	0:33:22	114
Enzymes	Lec 08	<ul style="list-style-type: none"> ♦ Effect on Km ♦ Enzyme inhibitors as drugs ♦ REGULATION OF ENZYME ACTIVITY ♦ Allosteric binding sites ♦ Homotropic effec tors: ♦ Heterotropic effectors ♦ Feedback inhibition ♦ Regulation of enzymes by covalent modification ♦ phosphorylation and dephosphorylation ♦ Induction & repression of enzymes synthesis ♦ ENZYMES IN CLINICAL DIAGNOSIS ♦ Isoenzymes and disease of the heart ♦ Diagnosis of myocardial infarction 	0:38:42	132
Glycolysis tobe	Lec 09	<ul style="list-style-type: none"> ♦ glycolytic pathway ♦ Aerobic glycolysis ♦ Transport of Glucose into the cells ♦ Tissue specificity of GLUT gene expression ♦ Na⁺- monosaccharide cotransporter system ♦ reactions of glycolysis,Hexokinase: ♦ ilucokinase ♦ Regulation by fructose 6-phosphate and glucose: ♦ Regulation by insulin,pfk-1 ♦ regulation by energy levels within the cell: ♦ regulation by fructose 2,-6 bisphosphate: ♦ Synthesis of 2,3-bisphosphoglycerate in red blood cells, stravation 	0:40:13	137

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BIOCHEMISTRY Glycolysis to be	Lec 10	<ul style="list-style-type: none"> ♦ substrate-level phosphorylation ♦ Covalent modulation of pyruvate kinase: ♦ pyruvate kinase deficiency: ♦ Reduction of pyruvate to lactate 	0:41:50	143
	Lec 11	<ul style="list-style-type: none"> ♦ Lactate formation in muscle: ♦ Lactate consumption: ♦ Lactic acidosis: ♦ Energy yield from glycolysis ♦ HORMONAL REGULATION OF GLYCOLYSIS ♦ ALTERNATE FATES OF PYRUVATE ♦ Reduction of pyruvate to ethanol (microorganisms) 	0:18:35	64
Gluconeogenesis	lecture 12	<ul style="list-style-type: none"> ♦ gluconeogenies ♦ substrates for gluconeogenesis ♦ The Cori Cycle ♦ Reactions unique to gluconeogenesis ♦ Summary of the reactions of glycolysis and gluconeogenesis ♦ Regulation of Gluconeogenesis 	0:47:43	163
Glycogen Metabolism to be	Lec 13	<ul style="list-style-type: none"> ♦ Glycogen Metabolism to be ♦ Synthesis of Glycogen ♦ Glycogen Synthase ♦ Formation of branches in glycogen ♦ glycogenolysis ♦ Lysosomal degradation of glycogen ♦ Regulation of Glycogen synthesis and Degradation ♦ Glycogen storage Diseases 	0:31:17	107
Tricarboxylic acid and fructose metabolism	Lec 14	<ul style="list-style-type: none"> ♦ Tricarboxylic Acid Cycle ♦ Reactions of the Tca cycle ♦ Mechanism of arsenic poisoning ♦ Energy produced by the tca cycle ♦ regulation of the tca cycle ♦ Fructose Metabolism ♦ Fructokinase ♦ aldolase A aldolase B ♦ Sorbitol Metabolism ♦ III Galactose Metabolism ♦ Role of UDP-galactose in biosynthetic reactions ♦ LACTOSE SYNTHESIS 	0:45:05	154

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BIOCHEMISTRY Pentose Phosphate Pathway and NADPH	Lec 15	<ul style="list-style-type: none"> ♦ PENTOSE PHOSPHATE PATHWAY AND NADPH ♦ Function of PPP ♦ Irreversible Oxidative Reactions ♦ Reversible Non oxidative Reactions ♦ Uses of NADPH ♦ Cytochrome p450 monooxygenase system ♦ Mitochondrial system ♦ Microsomal system ♦ MPO System ♦ NADPH oxidase ♦ Synthesis of nitric oxide ♦ No synthase ♦ GLUCOSE6-P DEHYDROGENASE DEFICIENCY ♦ Role of G6PD in red blood cells ♦ Precipitation factors in G6PD deficiency ♦ Favism ♦ G6PDA, G6PD mediterranean 	0:41:16	141
Fatty Acid and Triacylglycerol Metabolism	Lec 16	<ul style="list-style-type: none"> ♦ Fatty Acid and Triacylglycerol Metabolism ♦ STRUCTURE OF FATTY ACIDS ♦ Saturation of fatty acids ♦ Essential fatty acids ♦ DE NOVO SYNTHESIS OF FATTY ACIDS ♦ Short-term regulation of acetyl CoA carboxylase: ♦ Long-term regulation of acetyl CoA carboxylase ♦ Fatty acid synthase: a multifunctional enzyme in eukaryotes ♦ major sources of the NADPH required for fatty acid synthesis ♦ elongation of fatty acid chains ♦ Desaturation of fatty acid chains ♦ Storage of fatty acids as components of triacylglycerols 	0:34:04	116
	Lec 17	<ul style="list-style-type: none"> ♦ Structure of triacylglycerols (TAG) ♦ Storage of TAG, Glycerol Phosphate Shuttle ♦ Glycerol Phosphate Shuttle ♦ Different fates of TAG in the liver & adipose tissue ♦ Mobilization of Stored Fats and Oxidation of Fatty Acids ♦ Activation of hormone-sensitive lipase ♦ Acetyl CoA Carboxylase ♦ Fate of glycerol, Fate of fatty acids ♦ β-Oxidation of fatty acids ♦ Transport of long-chain fatty acids (LCFA) into the mitochondria ♦ Inhibitor of the carnitine shuttle ♦ sources of carnitine ♦ Additional functions of carnitine ♦ Carnitine deficiencies ♦ Entry of short- and medium-chain fatty acids into the mitochondria ♦ Reactions of β-oxidation ♦ Medium-chain fatty acyl CoA dehydrogenase (MCAD) deficiency 	0:38:47	132

Subject Name	Lecture Number	Lecture Content	Lecture Duration	File Size
BIOCHEMISTRY	Lec 18	<ul style="list-style-type: none"> ♦ Oxidation of fatty acids with an odd number of carbons ♦ Oxidation of unsaturated fatty acids ♦ β-Oxidation in the peroxisome ♦ Zellweger (cerebrohepatorenal) syndrome ♦ α-Oxidation of fatty acids ♦ Refsum disease ♦ Ketone Bodies: An alternative fuel for cells ♦ Synthesis of KETONE bodies by the liver ♦ HMG CoA synthase ♦ Excessive production of ketone bodies in diabetes mellitus 	0:40:00	137
Cholesterol and Steroids	Lec 19	<ul style="list-style-type: none"> ♦ Cholesterol and Steroid Metabolism ♦ Structure of Cholesterol ♦ Cholesterol and Steroid Metabolism ♦ Cholesteryl ester (CE) ♦ Synthesis of Cholesterol ♦ Synthesis of 3-hydroxy-3-methylglutaryl CoA (HMG CoA) ♦ HMG CoA reductase ♦ Synthesis of cholesterol ♦ Biosynthesis of Squalene ♦ Biosynthesis of lanosterol ♦ Biosynthesis of cholesterol ♦ Smith-Lemli-Opitz syndrome (SLOS) ♦ Regulation of cholesterol synthesis ♦ Sterol regulatory element-binding protein, or SREBP ♦ Hormonal regulation, Inhibition by drugs ♦ Degradation of Cholesterol ♦ Bile acids and Bile Salts ♦ Structure of the bile acids ♦ Synthesis of bile acids ♦ rate-limiting step in bile acid synthesis ♦ Synthesis of bile salts ♦ Action of intestinal flora on bile salts ♦ Enterohepatic circulation ♦ Bile salt deficiency: cholelithiasis ♦ obstruction of the biliary tract 	0:40:43	138
Cholesterol and Steroids Metabolism	Lec 20	<ul style="list-style-type: none"> ♦ Plasma lipoproteins ♦ Composition of plasma lipoproteins ♦ Apolipoproteins ♦ Metabolism of chylomicrons ♦ Synthesis of apolipoproteins Apolipoprotein B-48 (apoB-48) ♦ Degradation of triacylglycerol by lipoprotein lipase ♦ type 1 hyperlipoproteinemia ♦ Formation of chylomicron remnants: ♦ Metabolism of very low density lipoproteins ♦ Fatty liver (hepatic steatosis) ♦ Release of VLDLs ♦ abetalipoproteinemia ♦ IDL, Apolipoprotein E ♦ familial type III hyperlipoproteinemia 	0:40:42	139

Subject Name	Lecture Number	Lecture Content	Lecture Duration	File Size
BIOCHEMISTRY	Lec 21	<ul style="list-style-type: none"> ♦ Metabolism of low-density lipoproteins ♦ Receptors-mediated endocytosis: ♦ Wolman disease ♦ Ninemann-pick disease, type C ♦ Effect of endocytosed cholesterol on cellular cholesterol ♦ CoA:cholesterol acyltransferase(ACAT) ♦ Metabolism of high-density lipoproteins(HDL) ♦ Functions HDL function1 ♦ HDL function2 ♦ HDL function3 ♦ PCAT ♦ FAMILIAL Icat DEFICIENCY ♦ Key components of cholesterol homeostasis ♦ Role of lipoprotein (a) in heart disease 	0:37:00	126
Amino Acids	Lec 22	<ul style="list-style-type: none"> ♦ Amino Acids:Disposal of Nitrogen ♦ Transamination ♦ Trans-deamination ♦ Amino acid pool ♦ Protein degradation: ♦ chemical signals for protein degradation: ♦ PEST sequences ♦ REMOVAL OF NITROGEN FROM AMINO ACIDS ♦ Transamination:the funneling of amino groups to glutamate ♦ Substrate specificity of aminotransferases: ♦ Alanine aminotransferase(ALT) ♦ Glutamate:pyruvate transaminase[GPT] ♦ Aspartate aminotransferase(AST) ♦ Mechanism of action of aminotransferases: ♦ Diagnostic value of plasmaaminotransferases ♦ Ammonia ♦ Glutamate dehydrogenase: ♦ Allosteric regulators ♦ Transport of ammonia to the liver 	0:41:07	140
	Lec 23	<ul style="list-style-type: none"> ♦ glutamine synthetase glutaminase ♦ Glucose/Alanine Cycle ♦ Urea Cycle ♦ Reactions of the Cycle ♦ ARGINASE ♦ Fate of Urea ♦ Overall Stoichiometry of the Urea Cycle ♦ Regulation of the Urea Cycle ♦ Metabolism of Ammonia ♦ Hereditary Hyperammonia Deficiency 	0:32:51	112

Subject Name	Lecture Number	Lecture Content	Lecture Duration	File Size
BIOCHEMISTRY Nucleotide Metabolism	24 & 25	<ul style="list-style-type: none"> ♦ Nucleotide metabolism ♦ Nucleotide Structure ♦ Unusual Bases ♦ Nucleocides ♦ Synthesis of Purine Nucleotides ♦ Synthesis of 5-Phosphoribosyl-1Pyrophosphate(PRPP) ♦ Nine Steps in Purine Nucleotide Biosynthesis ♦ Conversion of IMP To AMP and GMP ♦ Mycophenolic Acid (MPA) ♦ Conversion of nucleoside monophosphates to nucleoside ♦ Salvage pathway for purines ♦ Conversion of purine bases to nucleotides: ♦ Lesch-nyhan syndrome ♦ Synthesis of deoxyribonucleotides ♦ Ribonucleotide reductase ♦ Degradation of purine nucleotides ♦ Degradation of dietary nucleic acids ♦ Diseses associated with purine degradation ♦ Gout ♦ Hyperuricemia ♦ Primary gout ♦ Lesch-nyhan syndrome ♦ Secondary hyperuricemia ♦ Treatment for gout ♦ Allopurinol ♦ Adenosine deaminase deficiency ♦ Severe combined immunodeficiency disease(scid) ♦ Pyrimidine synthesis and degradation ♦ Carbamoyl phosphate synthetase ii ♦ Synthesis of orotic acid ♦ Orotic aciduria ♦ Synthesis of thymidine monophosphate form dump ♦ Salvage of pyrimidines ♦ Degradation of pyrimidine nucleotides 	0:27:12 0:48:23	93 165