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BIOCHEMISTRY CURRICULUM

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Dated: 06-06-17

COURSE TOPIC: 1. BIOCHEMISTRY OF CELL

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Introduction to Biochemistry	Explain importance of Biochemistry in Dentistry	Lecture	Class Test (BCQ+EMQ)
2	Cell- Biochemical Composition & cell Organelles.	Describe the important micro and macro molecules found in the cell and the major functions of Organelles.	Lecture	Class Test (BCQ+EMQ)
3	Cell Membrane	Explain the biochemical structure and functions of cell membrane	Lecture	Class Test (BCQ+EMQ)
4	Water	Explain the biochemical structure and properties of water	Lecture	Class Test (BCQ+EMQ)
5	pH & Buffers	Explain the definition types and mechanism of action of Buffers, Acidosis & Alkalosis	Lecture	Class Test (BCQ+EMQ)

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COURSE TOPIC: 2. CARBOHYDRATE CHEMISTRY

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Introduction of Carbohydrates	Define, classify and give the sources & biomedical importance of carbohydrates.	Lecture	Class Test (BCQ+EMQ)
2	Monosaccharides Disaccharides and Oligo saccharides	Define & classify monosaccharides and describe isomerism in it. Define Disaccharides, Oligosaccharides & explain their biomedical importance.	Lecture	Class Test (BCQ+EMQ)
3	Polysaccharides	Define and classify Polysaccharides & explain their functions	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 3. LIPID CHEMISTRY

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Introduction of Lipids & Lipid Peroxidation	Define, classify and discuss the functions of lipids & their biomedical importance	Lecture	Class Test (BCQ+EMQ)
2	Fatty Acids & Eicosanoids & Derived Lipids	Define & classify fatty acids and explain their properties, functions & nutritional importance	Lecture	Class Test (BCQ+EMQ)

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3	Compound Lipids & Cholesterol	Discuss & classify compound lipids with functions and biomedical importance of each (PL, LP, GL, Sphingo lipid)	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 4. PROTEIN CHEMISTRY

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Amino Acids	Describe the properties, functions and chemical reactions shown by amino acids	Lecture	Class Test (BCQ+EMQ)
2	Introduction of Protein, Protein Structure & Collagen & Elastin	Explain the structure, function & biomedical importance	Lecture	Class Test (BCQ+EMQ)
3	Plasma Proteins & Immunoglobulins	Define, classify & discuss biomedical importance of simple proteins (plasma protein)	Lecture	Class Test (BCQ+EMQ)

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COURSE TOPIC: 5. ENZYMES

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Introduction of Enzymes & Mechanism of Action of Enzymes	Define & explain structure and classification of enzymes. Discuss the mechanism of action enzymes & MM equation	Lecture	Class Test (BCQ+EMQ)
2	Factors & Inhibitors	discuss the factors affecting enzyme activity & regulation of enzyme activity	Lecture	Class Test (BCQ+EMQ)
3	Clinical Enzymology	Discuss the clinical importance of enzymes in diagnosis	Lecture	Class Test (BCQ+EMQ)

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COURSE TOPIC: 6. NUCLEOPROTEINS

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Nucleotides	Define & explain the chemical structure & significance of nucleoproteins	Lecture	Class Test (BCQ+EMQ)
2	DNA & RNA	Describe the chemical structure, properties and functions of DNA & RNA	Lecture	Class Test (BCQ+EMQ)
3	Central Dogma of Molecular Biology	Discuss the central dogma of molecular biology	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 7. HEMOGLOBIN CHEMISTRY

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Heme-Structure	Discuss, structure, functions, & types of hemoglobin	Lecture	Class Test (BCQ+EMQ)
2	Heme-Synthesis & Porphyrias	Explain heme synthesis & its disorders	Lecture	Class Test (BCQ+EMQ)
3	Hemoglobinopathies	Discuss the types, biochemical defects & clinical manifestation of	Lecture	Class Test (BCQ+EMQ)

		hemolytic anemia (Thalassemia, Sickle cell Anemia etc:)		
4	Heme- Degradation & Jaundice	Discuss Bilirubin synthesis, types and fate. Classify Jaundice & LFTs	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 8. VITAMINS

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Vitamin A, E & K	Discuss the structure, functions RDA, sources & clinical abnormalities	Lecture	Class Test (BCQ+EMQ)
2	Vitamin D	Discuss the structure, functions RDA, sources & clinical abnormalities of vitamin D	Lecture	Class Test (BCQ+EMQ)
3	Vitamin C	Discuss the structure, functions RDA, sources & clinical abnormalities of vitamin C	Lecture	Class Test (BCQ+EMQ)
4	Vitamin B12 & Folic Acids	Discuss the structure, functions RDA, sources & clinical abnormalities of vitamin B12 & Folic acids	Lecture	Class Test (BCQ+EMQ)
5	Vitamin B1, B2, B3 & B6	Discuss the structure, functions RDA, sources & clinical abnormalities	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 9. MINERALS

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	Iron	Discuss the functions RDA, sources, transport, storage & clinical importance of iron	Lecture	Class Test (BCQ+EMQ)

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2	Calcium, Phosphorus	Discuss the functions RDA, sources, transport, storage & clinical importance of calcium & phosphorus	Lecture	Class Test (BCQ+EMQ)
3	Flouride & Other Minerals	Discuss the functions, RDA, sources & biochemical role of fluoride & other important Minerals.	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 10. CARBOHYDRATE METABOLISM

S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Digestion & Absorption of Carbohydrates	Describe the mechanism by which complex dietary carbohydrates are broken down to simple sugars & their absorption from GIT into portal blood	Lecture	Class Test (BCQ+EMQ)
2	Glycolysis	Define glycolysis & explain the reactions involved in glycolytic pathway along with the fate of pyruvate formed from glucose	Lecture	Class Test (BCQ+EMQ)
3	TCA	Explain the reactions of citric acid cycle & its regulation.	Lecture	Class Test (BCQ+EMQ)
4	Gluconeogenesis	Define glucogeneoesis & explain the reactions and its regulations	Lecture	Class Test (BCQ+EMQ)
5	Glycogen Metabolism	Describe the formation and break down of glycogen & its regulation	Lecture	Class Test (BCQ+EMQ)
6	HMP	Describe the purpose importance & reactions of Hexose Monophosphate Pathway.	Lecture	Class Test (BCQ+EMQ)
7	Regulation Of Blood Glucose & Diabetes Mellitus	Discuss the normal blood glucose level, clinical significance of its variations & metabolic derangements that occur in Diabetes Mellitus	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC:11. LIPID METABOLISM

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S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Digestion & Absorption of Lipids	Describe the mechanism by which complex dietary lipids are broken down to simpler forms and their absorption from GIT.	Lecture	Class Test (BCQ+EMQ)
2	Cholesterol & Lipid Transport (Lipoproteins)	Discuss the chemistry, metabolism and associated clinical disorders of lipoproteins.	Lecture	Class Test (BCQ+EMQ)
3	β Oxidation	Explain the oxidation of fatty acid in the body to give energy	Lecture	Class Test (BCQ+EMQ)
4	Ketone Bodies	Explain the synthesis & utilization of Ketone Bodies in the body.	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 12. Electron Transport Chain

S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Electron Transport Chain	Discuss the structure & functions of Electron Transport Chain & synthesis of ATP.	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 13. PROTEIN METABOLISM

S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Digestion & Absorption of Proteins	Describe the mechanism by which dietary proteins are broken down into simpler forms & their absorption from GIT.	Lecture	Class Test (BCQ+EMQ)
2	Reactions of Amino acids& Urea Cycle and NH3 Toxicity	Explain the reactions of amino acids & Ammonia Metabolism.	Lecture	Class Test (BCQ+EMQ)
3	Phenylalanine, Tyrosine & Tryptophan Metabolism	Discuss the metabolism of specific amino acids & its inborn errors (Phenylalanine & Tyrosine)	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 14. NUTRITION

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S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Introduction of Nutrition	Discuss the biomedical importance of nutrition	Lecture	Class Test (BCQ+EMQ)
2	Balanced diet, Malnutrition & Obesity	Explain the importance of balanced diet & discuss the clinical abnormalities	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC: 15. ENDOCRINOLOGY

S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Introduction of Hormones	Define, classify & discuss the general characteristic & mechanism of action of hormones	Lecture	Class Test (BCQ+EMQ)
2	Hypothalamus, Pituitary & Thyroid	Explain the chemistry, mechanism of action & metabolic role	Lecture	Class Test (BCQ+EMQ)
5	Adrenal & Pancreatic Hormones	Explain the chemistry, mechanism of action & metabolic role	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC:16. NEUROTRANSMITTERS

S.No	LECTURE TOPIC	TOPIC OBJECTIVE	Mode of Teaching	Assessment Tools
1	Neurotransmitters	Explain the chemistry, biosynthesis, mechanism of action & metabolic role of neurotransmitters	Lecture	Class Test (BCQ+EMQ)

COURSE TOPIC 17: BIOCHEMISTRY PRACTICALS

S.No	LECTURE TOPIC	TOPIC OBECTIVE	Mode of Teaching	Assessment Tools
1	**Lab Hazards & Solutions**	**Prepare solutions and perform serial dilution**	**Practical**	**Class Test (OSPE)**
2	**Detection of Carbohydrates (Scheme)**	**Detection of carbohydrates according to the general scheme**	**Practical**	**Class Test (OSPE)**
3	**Detection of Carbohydrates (Sucrose & Starch)**	**Detection of sucrose & starch.**	**Practical**	**Class Test (OSPE)**
4	**Detection of Carbohydrates (Glucose)**	**Detection of glucose**	**Practical**	**Class Test (OSPE)**
5	**Detection of Proteins (Scheme)**	**Detection of proteins & amino acids**	**Practical**	**Class Test (OSPE)**
6	**Detection of Casein**	**Detection of Casein**	**Practical**	**Class Test (OSPE)**

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7	**Detection of Albumin**	**Detection of Albumin**	**Practical**	**Class Test (OSPE)**
8	**Detection of Lipids (Detection of Cholesterol & Bile Salt)**	**Qualitative detection of lipids, cholesterol & bile salt**	**Practical**	**Class Test (OSPE)**
9	**Colorimetry**	**Demonstrate its principle & estimation of blood glucose by spectrophotometer**	**Practical**	**Class Test (OSPE)**
10	**Estimation of Glucose (By Kit & Glucometer)**	**Estimation of blood glucose by kit & glucometer**	**Practical**	**Class Test (OSPE)**
11	**Estimation of Cholesterol by Kit Method**	**Estimation of serum cholesterol by kit**	**Practical**	**Class Test (OSPE)**
12	**Estimation of Protein by Kit Method**	**Estimation of serum protein by kit**	**Practical**	**Class Test (OSPE)**
13	**PH & Tonicity**	**Detection of pH by litmus paper of PH meter, & Hypertonic, Hypotonic & isotonic solutions**	**Practical**	**Class Test (OSPE)**
14	**Normal Urine**	**Detection of normal constituents of urine**	**Practical**	**Class Test (OSPE)**
15	**Pathological Urine (Glucose & Protein)**	**Detection of glucose and protein**	**Practical**	**Class Test (OSPE)**
16	**Pathological Urine (Ketone Bodies & Bile Salts)**	**Detection of ketone bodies & bile salts.**	**Practical**	**Class Test (OSPE)**
17	**Pathological Urine (Blood & Bile Pigments)**	**Detection of blood & bil pigment**	**Practical**	**Class Test (OSPE)**
18	**GTT**	**Detection of normal hypoglycemic & hyperglycemic graphs by GTT**	**Practical**	**Class Test (OSPE)**
19	**L.F.Ts & Bilirubin Estimation**	**Discussion of LFTs & Estimation of Bilirubin**	**Practical**	**Class Test (OSPE)**
20	**ALT Estimation**	**Estimation of ALT by kit method**	**Practical**	**Class Test (OSPE)**
21	**ALP Estimation**	**Estimation of ALP by kit method**	**Practical**	**Class Test (OSPE)**
22	**Electrophoresis (Demonstration)**	**Demonstration of Hemoglobin electrophoresis**	**Practical**	**Class Test (OSPE)**

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23	**Chromatography (Demonstration)**	**Demonstration of chromatography**	**Practical**	**Class Test (OSPE)**

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