

BIOCHEMISTRY OF METABOLIC PROCESSES

Paper 10

THEORY

(48 Periods)

Unit 1: Overview of Metabolism

(6)

Catabolism *vs* Anabolism, Stages of catabolism, Compartmentalization of metabolic pathways, Shuttle systems and membrane transporters; ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms

Unit 2: Carbohydrate Metabolism

(18)

Sequence of reactions and regulation of glycolysis, Citric acid cycle, Phosphate pentose pathway, Gluconeogenesis, Glycogenolysis and Glycogenesis

Unit 3: Lipid Metabolism

(10)

β -oxidation of saturated fatty acids with even and odd number of carbon atoms; Biosynthesis of palmitic acid; Ketogenesis and its regulation

Unit 4: Protein Metabolism

(8)

Catabolism of amino acids: Transamination, Deamination, Urea cycle; Fate of C-skeleton of Glucogenic and Ketogenic amino acids

Unit 5: Oxidative Phosphorylation

(6)

Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System, Respiratory control

BIOCHEMISTRY OF METABOLIC PROCESSES

Paper 10

PRACTICALS

1. Estimation of total protein in given solutions by Lowry's method.
2. Detection of SGOT/SGPT or GST and GSH in serum.
3. Lipolysis by lipase.
4. Proteolysis by trypsin.
5. Study of biological oxidation (SDH) [goat liver]
6. Acid/Alkaline phosphatase assay [Serum].
7. Dry Lab: To trace the labeled C atoms of Acetyl-CoA till they evolve as CO₂ in the TCA cycle.

ESSENTIAL READINGS

- Cox, M.M and Nelson, D.L. (2008). *Lehninger Principles of Biochemistry*, V Edition, W.H. Freeman and Co., New York.
- Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). *Biochemistry*, VI Edition, W.H. Freeman and Co., New York.
- Murray, R.K., Bender, D.A., Botham K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). *Harper's Illustrated Biochemistry* XXVIII Edition, International Edition, The McGraw-Hill Companies Inc.

SUGGESTED READINGS

- Hames, B.D and Hooper, N.M. (2000). *Instant Notes in Biochemistry*, II Edition, BIOS Scientific Publishers Ltd., U.K.