

## **Paper 3A**

### **Animal Physiology, Endocrinology and Biochemistry (Theory)**

**Marks: 75**

**Time: 3 Hours**

#### **Unit-1:**

Physiology of digestion and absorption of carbohydrates, proteins and lipids; Vitamins: Types, sources and their significance. Respiration: Breathing and gaseous exchange in vertebrate lung. Composition and functions of blood; Types of heart in vertebrates; Structure of mammalian heart.

#### **Unit-2:**

Structure of mammalian kidney and nephron; Physiology of urine formation. Ultrastructure of skeletal muscle; Mechanism of skeletal muscle contraction. Ultrastructure of neuron; Nerve impulse conduction and synaptic transmission; Reflex action.

- Unit-3:** Structure and functions of major endocrine glands: Hypothalamus, pituitary, thyroid, parathyroid, pancreas, adrenals, testis and ovary. Introduction to neuroendocrine system in insects.
- Unit-4:** Classification and significance of carbohydrates, proteins and lipids. Amino acids: Essential and non-essential. Glycolysis and TCA cycle;  $\beta$ -Oxidation of fatty acids.
- Unit-5:** Enzymes: Properties, classification and nomenclature; Active site and mechanism of enzyme action; Factors affecting enzyme activity; Co-factors and co-enzymes. Nucleic acids: Nucleosides, nucleotides and polynucleotides; Double helical structure of DNA and structure of RNA.

### Suggested Readings:

1. Berg, J., Tymoczko, J., and Stryer, L. (2012). Biochemistry, 7<sup>th</sup> Edition, W. H. Freeman.
2. Campbell, M. K. and Farrell, S. O. (2010). Introduction to Biochemistry. Cengage Learning India.
3. Hadley, M. E. & Levine (2007). Endocrinology, 6<sup>th</sup> Edition. Pearson, Benjamin Cummings.
4. Hall, J. E., (2011). Guyton and Hall Textbook of Medical Physiology, 12<sup>th</sup> Edition (Indian print). Saunders, Elsevier Inc.
5. Hill, R. W., Wyse, G. A. and Anderson, M. (2012). Animal Physiology, 3<sup>rd</sup> Edition, Sinauer Associates Inc.
6. Melmed, S., Polonsky, K. S., Larsen, P. R., and Kronenberg, H. M., (2011). William's Textbook of Endocrinology, 12<sup>th</sup> Edition. Saunders.
7. Murray, R. K. *et al.*, (2011). Harper's Illustrated Biochemistry, 29<sup>th</sup> Edition. McGraw Hill, Lange Publication.
8. Nelson, D. L. and Cox, M. (2012). Lehninger Principles of Biochemistry, 6<sup>th</sup> Edition, W. H. Freeman.
9. Norman, A. W. and Litwack, G. (1997). Hormones, 2<sup>nd</sup> Edition, Academic Press, Elsevier Inc.
10. Norris, D. O. (2007). Vertebrate endocrinology. 6<sup>th</sup> Edition. Academic Press, Elsevier Inc.
11. Prosser, C. L. (1991). Comparative Animal Physiology. W. B. Saunders & Company.
12. Randall, D. and Burggren, W. (2001). Eckert Animal Physiology, 5<sup>th</sup> Edition. W.H. Freeman.
13. Schmidt-Nielsen, K. (2002). Animal Physiology: Adaptation and Environment. Cambridge University Press.
14. Sherwood, L., Klandorf, H., and Yancey, P. (2010). Textbook of Animal Physiology. Cengage Learning.

### Paper 3B (Practical)

#### Animal Physiology, Endocrinology and Biochemistry

Marks: 25  
Time: 4 Hours

1. Preparation of haemin crystals from human blood.
2. Determination of clotting time of human blood.
3. Oxygen consumption in fish with reference to body weight.
4. Study of histology of endocrine glands from permanent slides (pituitary, thyroid, thymus, pancreas, adrenal, testis and ovary).
5. Detection of carbohydrates, lipids and proteins (at least 3 tests each).
6. Estimation of ascorbic acid by titration method.

### **Distribution of Marks**

1. Physiology
2. Biochemistry
3. Spotting
4. *Viva Voce*
5. Laboratory Record

**Total**                      **25 (Internal test – 7 + End semester test - 18)**