

# Swami Rama Himalayan University

## Ph.D. Syllabus for Entrance Examination

### Physiology

#### Unit 1: Neurophysiology

- Experimental basis of action potential (AP) recording in nerve & ionic basis of its generation.
- Understanding neuromuscular transmission & mechanisms of contraction of muscles.
- Understanding the organization of the nervous system.
- Basic functions of synapses & neurotransmitters.
- Concept of various sensory receptors, ascending & descending tracts of spinal cord.
- Functional aspects of autonomic nervous system, hypothalamus, cerebellum & basal ganglia.
- Recent advances in neurophysiology.

#### Unit 2: Endocrinology

- General principles of endocrinology including classification.
- Mechanism of actions and feedback control of hormones.
- Hormonal aspects of growth, development & obesity
- Concept of insulin, pathophysiology of Diabetes Mellitus
- Understanding hormonal regulation of calcium balance.

#### Unit 3: Cardiovascular System, Exercise Physiology & Yoga

- Physiological anatomy of cardiac muscle including excitation contraction coupling.
- Control of excitation by autonomic system.
- Concept of ECG & cardiac vector.
- Basic concept of cardiac cycle and cardiac output
- Biophysical aspect in circulatory system.
- Concept of blood pressure, its measurement & various mechanisms that control blood pressure.
- Exercise physiology.
- Yoga and lifestyle modification

#### Unit 4: Respiratory Physiology

- Understanding the mechanics of respiration including concept of compliance
- Understanding pulmonary volumes-capacities & their measurement by spirometer
- Concept of gaseous exchange in lungs & how transport of gases occur in blood.
- Basic understanding of chemical & neuronal control of respiration.

- High altitude pulmonary physiology, respiratory alteration in deep-sea diving & space physiology.

**Unit 5: Renal and Gastrointestinal physiology:**

- Concept of body fluid & its regulation.
- Functional anatomy of Kidney
- Urine formation mechanisms
- Urinary concentration mechanisms including countercurrent system
- Concepts of acid base balance.
- Functional anatomy of gastrointestinal tract (GIT).
- Concept of various types of motility & its regulation
- Overview of various secretions, including digestion & absorption of various nutrients.

**Reference Books:**

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1. Ganong's Review of Medical Physiology (25<sup>th</sup> Edition) by Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen L. Brooks. *McGraw Hill Education*.
2. Guyton and Hall Textbook of Medical Physiology (13<sup>th</sup> Edition) by John E Hall & C Guyton. *Saunders/Elsevier*.
3. Samson Wright's Applied Physiology (13<sup>th</sup> edition) by Keele A. Cyril. *Oxford University Press*.
4. Best & Taylor's Physiological Basis of Medical Practice (12<sup>th</sup> edition) by Charles Herbert Best, Norman Burke Taylor, John R. Brobeck. *Williams & Wilkins Co*.
5. Berne & Levy Physiology (6<sup>th</sup> edition) by Bruce M. Koeppen, Bruce A. Stanton. *Mosby*.