

# SYLLABUS, ToS & OSPE

M.B.B.S.

FIRST PROFESSIONAL

PART-I

**PHYSIOLOGY**

# **PHYSIOLOGY (MBBS 1<sup>st</sup> Prof. Part-I)**

**At the end of the course the student should be able to:**

## **Basic and Cell Physiology**

1. *Understand functional organization of human body*
2. Describe homeostasis / control systems in the body
3. Describe *structure*, functions of cell membrane and its transport mechanisms
4. List cell organelles and describe their functions
5. Understand basic concepts about DNA and RNA

## **Blood**

1. Describe the composition and general functions of blood
2. Enumerate plasma proteins, give their properties, their sites of production and explain their functions
3. Explain erythropoiesis and factors affecting erythropoiesis
4. Explain the functions of red blood cell
5. Understand the structure; describe functions of hemoglobin and enumerate its different types.
6. Describe the role of various elements especially iron in hemoglobin synthesis.
7. Enumerate and define various blood indices
8. Explain leucopoiesis and describe types and functions of white blood cells
9. Describe monocyte-macrophage system and functions of spleen
10. Explain various types of immunity
11. Explain thrombocytopoiesis and describe functions of platelets
12. Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants
13. Explain the blood groups and their role in blood transfusion
14. Understand fate of red blood cells and bilirubin formation

## **Applied Physiology**

Understands:

1. Anemia, its types and the effects on human body
2. Polycythemia, its types and effects on the human body

3. Blood indices in various disorders
4. Clotting and bleeding disorders
5. Hazards of blood transfusion
6. Rh incompatibility
7. Abnormal immune responses
8. Jaundice

## **Nerve and Muscle**

1. Understand the *structure of the neuron* and describe the properties of nerve fibres
2. Classify the nerve fibres
3. Describe the physiological basis of resting membrane potential
4. Describe the genesis of action potential and compound action potential
5. Describe the propagation of action potential
6. Outline the structural-functional relationship of skeletal muscle
7. Describe neuromuscular junction and transmission
8. Explain and compare the mechanism and characteristics of contraction of the three muscle types.
9. Differentiate between the isometric and isotonic contraction
10. Understands the difference between tetany and tetanization
11. Excitation contraction coupling
12. Understand chemical changes during muscle contraction and muscle fatigue

## **Applied Physiology**

Understands:

1. Peripheral nerve injuries
2. Myasthenia gravis
3. Muscular dystrophy
4. Muscular hypertrophy / atrophy
5. Rigor mortis / contracture
6. Drugs / poisons affecting neuromuscular junctions

## **Cardiovascular System**

1. Describe scheme of circulation through the heart and body
2. Describe the properties of cardiac muscle
3. Explain the generation of cardiac impulse and its conduction

4. Compare and contrast action potential of SA node and ventricular myocardium
5. Describe the various events in cardiac cycle
6. Explain the mechanism for production of heart sounds
7. Describe the lead systems for a 12 lead ECG
8. Define, draw and label normal ECG and explain the physiologic basis of waves, segments and intervals
9. List types of blood vessels and their function
10. Describe the haemodynamics of blood flow (local control systemic circulation its regulation and control)
11. Explain the microcirculation and capillary dynamics.
12. Discuss peripheral resistance its regulation and effect on circulation
13. Describe the arterial pulse
14. Define venous return and explain the factors affecting it.
15. Explain cardiac output and its control
16. Describe blood pressure and its regulation
17. Describe coronary circulation and factors affecting it
18. Describe the factors regulating cerebral and cutaneous circulations
19. Define shock and its various types with their physiological / pathophysiological basis
20. Describe the various stages of shock and their physiological compensation.

### **Applied Physiology**

Understands:

1. Basic concepts related to electrical axes and cardiac vectors
2. Differentiation between various ECG recordings on the basis of rate and rhythm (bradycardia, tachycardia, heart-blocks, ventricular fibrillation, atrial fibrillation, myocardial ischemia / infarction)
3. Development of Oedema
4. Effects of hypertension and cardiac failure
5. Clinical significance of heart sounds and murmurs
6. Varicose veins

### **Respiratory System**

1. Describe the functional organization of the respiratory tract.
2. Describe respiratory and non-respiratory function of the respiratory tract
3. Explain the mechanics of breathing

4. Describe the production & function of surfactant and compliance of lungs
5. Describe the protective reflexes
6. Explain lung volumes and capacities including dead space
7. Describe pulmonary circulation and pulmonary capillary dynamics
8. Describe the composition of atmospheric, alveolar and expired air
9. Describe the diffusion of gases across the alveolar membrane
10. Explain the relationship between ventilation and perfusion
11. Describe the mechanism of transport of oxygen and carbon dioxide in blood
12. Describe the nervous and chemical regulation of respiration
13. Explain abnormal breathing
14. Define and explain hypoxia, its causes and effects
15. Define and explain cyanosis, its causes and effects

### **Applied Physiology**

Understands:

1. Causes of abnormal ventilation and perfusion
2. Effects of bronchial asthma, pneumothorax, pleural effusion and pneumonia
3. Respiratory failure
4. Artificial respiration and uses & effects of O<sub>2</sub> therapy
5. Clinical significance of hypoxia, asphyxia, cyanosis, and dyspnoea
6. Respiratory distress syndrome
7. Differentiation between obstructive and restrictive lung disorders on the basis of pathophysiology and lung function test
8. Respiratory acidosis and alkalosis.

### **Skin and Body Temperature Regulation**

1. Describe body temperature regulation
2. Describe functions of skin

### **Applied Physiology**

Understands:

Abnormalities of temperature regulation

## **Human Responses in Varied Environments:**

1. Describe cardiovascular, muscular and respiratory adjustments in exercise
2. Explain physiologic responses to high altitude and space
3. Explain physiologic responses to deep sea diving and hyperbaric conditions

## **Applied Physiology**

1. Acute and chronic mountain sickness
2. Nitrogen narcosis and decompression sickness

## **PHYSIOLOGY PRACTICALS**

### **Haematology**

1. Use of the microscope
2. Determination of haemoglobin
3. Osmotic fragility of RBCs
4. Blood groups
5. Determination of erythrocyte sedimentation rate
6. Determination of packed cell volume
7. Determination of bleeding and clotting times
8. RBC count
9. Platelet count
10. Red cell indices
11. Total Leukocyte count
12. Differential leucocyte count

### **Respiratory System**

1. Clinical examination of respiratory system
2. Pulmonary volumes, capacities and their clinical interpretation
3. Recording of respiratory movements using Stethograph

## **Cardiovascular System**

1. Cardiopulmonary resuscitation (to be coordinated with the department of medicine)
2. Examination of arterial pulse
3. Examination of jugular venous pulse
4. ECG recording and interpretation of normal ECG
5. Recording of arterial blood pressure
6. Effects of exercise and posture on blood pressure
7. Apex beat and normal heart sounds
8. Triple response
9. ICU / CCU / Medical ward visit to study the cases of CCF, Murmurs, Hypertension, Myocardial infarction etc.

## **Skin and body temperature regulation**

Recording of body temperature

## **Demonstration of power lab (computerized data acquisition system) related experiments**

### **RECOMMENDED BOOKS**

1. **Textbook of Physiology** by Guyton and Hall, Latest Ed.
2. **Review of Medical Physiology** by William F. Ganong, Latest Ed.

### **REFERENCE BOOKS**

1. **Human Physiology** by Laurali Sherwood
2. **Physiology** by Berne and Levy, Latest Ed.
3. **Essentials of Medical Physiology** by Prof. Dr. Mushtaq Ahmad
4. **Physiology** by Linda and Constanzo

# **MBBS FIRST PROFESSIONAL (Part-I)**

## **PHYSIOLOGY**

### **Objectively Structured Performance Evaluation (OSPE)**

**(Total Marks: 90)**

The structure of OSPE/ Practical/ Viva should be as follows:

➤ **Viva Voce (35 marks)**

- Internal ----- 15 marks
- External ----- 20 marks

➤ **OSPE (25 marks)**

- Non-observed stations      10 of 01 marks each (2 minutes each)
- Observed stations            03 of 05 marks each (4 minutes each)

30% C1 }  
40% C2 } OSPE  
30% C3 }

➤ **Practical (30 marks)**

- Practical                            20 marks
- Procedure Writing                05 marks
- Yearly Workbook Assessment    05 marks