

PHYSIOLOGY

PAPER-I

Time : 3 hours
Max. Marks : 100

PHYSIO/D/11/36/I

Attempt all questions in order.
Each question carries 10 marks.

1. What is mismatched blood transfusion? What are its hazards? What precautionary measures are to be taken to prevent it? 2+4+4
2. Define immunity. Give its classification. Describe how an immune system is developed in an individual after birth. 2+2+6
3. Name different waves and time intervals of normal ECG. Give their normal values. What is mean electrical axis and what is its significance? 4+2+4
4. What is hypovolemic shock? Describe the pathophysiology relating to its signs and symptoms. Describe various compensatory mechanisms operating during this shock. 2+4+4
5. How does cardiac muscle form a functional syncytium? Explain the role of Ca^{++} in cardiac muscle contraction. Which law of heart explains intrinsic modulation of contraction? 2+4+4
6. Define the term ventilation-perfusion ratio. Give its physiological significance. Describe briefly the various physiological and pathological factors affecting it. 2+3+5
7. Draw and label oxygen hemoglobin dissociation curve. Why is it sigmoid in shape? Explain the various factors affecting it. 4+2+4
8. Name the physiological problems which occur when an individual ascends back suddenly to sea level after sufficient exposure to deep down in the sea. What preventive measures should be taken to avoid them? 5+5
9. What do you understand by potassium homeostasis? Describe the role of kidney for this. 4+6
10. What do you understand by micturition? Describe briefly the mechanism of voluntary micturition and its reflex control. 1+9

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PAPER- II

Time : 3 hours
Max. Marks : 100

PHYSIO/D/11/36/II

Attempt all questions in order.
Each question carries 10 marks.

1. Define stress. Enumerate and explain the responses to known and unknown stress stimuli. 1+3+6
2. How much is the total body iron, what is its distribution? Describe briefly the mechanisms of absorption of iron in the small intestine. Add a note on its regulation. 1+2+4+3
3. What are the causes of diabetes mellitus? Draw a flow chart to depict its pathophysiology. Add a note on the complications associated with it. 2+5+3
4. Name the hormones of placenta. Give the characteristic features of each of them. Add a note on their clinical importance. 3+4+3
5. Define the term 'Contraception'. Describe in detail, contraceptive measures in females. Give an account of their relative effectiveness and failure rate. 1+6+3
6. What is free energy? Discuss chemistry, functions and importance of adenosine-tri-phosphate (ATP) in human body. 2+3+3+2
7. Define remodeling of bones. Mention in brief mechanism of bone formation and absorption. What is its importance? 2+3+3+2
8. What is Basic Electric Rhythm (BER)? Describe briefly physiological basis of motility of gut. Describe briefly the factors affecting/ regulating it. 3+3+4
9. Give the nutritional needs of the body in terms of calories. How this varies with physical activity? List the factors affecting calorie requirements. 3+3+4
10. What are the vasopressin receptors? How anti-diuretic hormone acts through these receptors? Add a note on its applied aspect. 2+3+5

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PAPER- III

Time : 3 hours
Max. Marks : 100

PHYSIO/D/11/36/III

Attempt all questions in order.
Each question carries 10 marks.

1. Mention the structures located in the middle ear. Describe in detail, the role of each in hearing. What is conductive deafness? 2+5+3
2. Name the receptors of vision. Describe briefly the photochemistry of vision. What is nyctalopia? 1+7+2
3. Describe briefly the mechanism of release of neurotransmitter substance from pre-synaptic terminal and its action on post-synaptic neuron. What is synaptic plasticity? 4+3+3
4. Define normal posture in humans. Describe briefly the levels of motor control system. What happens to the body in spinal man and why? 2+6+2
5. What are the sources of energy for the muscle contraction during rest and exercise? What is Rigor Mortis? 4+4+2
6. Define and explain the mechanism of decerebrate rigidity. Describe the effects of de-afferentation on muscle tone. 5+5
7. Explain the physiological basis of learning and memory. Add a note on disorders associated with them. 4+4+2
8. Compare and contrast with the help of diagrams:
(a) Skeletal and cardiac muscle.
(b) The isometric and isotonic contractions.
What is optimum length of the muscle? 4+4+2
9. Describe the composition, formation, flow and functions of cerebrospinal fluid in health and disease. 3+4+3
10. Draw a diagram to trace the pathway for crude touch. Explain the neurological deficit produced by lesion of thalamus and primary sensory cortex. 4+6

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PAPER- IV

Time : 3 hours
Max. Marks : 100

PHYSIO/D/11/36/IV

Attempt all questions in order.
Each question carries 10 marks.

1. Briefly explain the micro-anatomy of components of juxtaglomerular apparatus with labeled diagram(s). Discuss the role of each in control of systemic arterial blood pressure. 5+5
2. Name and define the gas laws. Describe their role in the movement of gases in respiratory physiology. 5+5
3. What is endocytosis? What are different processes of endocytosis? How are the endocytosed substances digested by the cell? What is autolysis? 2+2+4+2
4. What are the types of ion channels based on gating stimulus? Briefly describe the basic functional structure of voltage gated channels. What is the mechanism of ionic selectivity? 2+4+4
5. Briefly describe the diagnostic applications of radio-activity. Add a note on radiation hazards. 8+2
6. What is injury current? Briefly explain physiological basis of monophasic and biphasic action potential. Give its clinical significance. 2+3+3+2
7. Name the fluid compartments of body giving their size and one major substance to measure them. Briefly describe the principle for measuring them. 5+5
8. Describe the sodium-potassium pump. Explain its contribution in genesis of resting membrane potential (RMP). Give the normal range of RMP in the body. 4+5+1
9. Describe the process of transcription and translation of genetic material in the body with the help of suitable diagram(s) and examples. 4+6
10. What is normal serum bilirubin level? What are the causes of conjugated hyperbilirubinemia? What are the signs and symptoms of obstructive jaundice? What biochemical abnormalities are seen in chronic liver disease? 1+2+4+3
