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Question Paper Code: R2B04

B.E./B.Tech. DEGREE EXAMINATION, DEC 2025

First Semester

R21UBM204- HUMAN ANATOMY AND PHYSIOLOGY

Biomedical Engineering

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What is an action potential? CO1- U
2. Summarize the functions of cell membrane of the cell. CO1-U
3. Name the different types of chemoreceptors involved in the regulation of respiration and their respective locations. CO1- U
4. What is cardiac cycle? CO1- U
5. Label the structure and function of a neuron. CO1- U
6. Difference between the somatic and autonomic nervous systems. CO1- U
7. List the primary function of the kidneys in the human body? CO1- U
8. Label the main organs involved in the digestive system? CO1- U
9. Write the main types of bones in the human body? CO1- U
10. Interpret the role of the cochlea in the auditory system? CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) Draw a diagram that illustrates the organization and function of the organelles in a cell. CO1- U (16)
- Or
- (b) Draw a diagram that illustrates the events that occur during meiosis, including the stages of the cell cycle and the distribution of chromosomes to daughter cells. CO1- U (16)

12. (a) Explain the structure of the heart, including its chambers, valves, and major blood vessels. CO1- U (16)
- Or
- (b) Explain with neat diagram of the anatomy and physiology of respiratory system. CO1- U (16)
13. (a) A child diagnosed with congenital malformation affecting the medulla exhibits poor feeding, impaired swallowing, weak crying, and unstable vital signs. Analyze how congenital defects in the medulla oblongata affect the development of vital autonomic functions such as swallowing, heart rate, and respiratory rhythm generation. CO5- Ana (16)
- Or
- (b) A patient with diabetic peripheral neuropathy presents with loss of sensation in the feet, diminished reflexes, and gait instability. Analyze how peripheral nerve damage leads to these motor and sensory impairments. Identify which components of the PNS are likely affected and how each contributes to the observed symptoms. CO5- Ana (16)
14. (a) Explain the different organs involved in the digestive system and their respective roles in the digestion and absorption of nutrients. CO2- U (16)
- Or
- (b) Explain the mechanisms of reabsorption and secretion that occur in different segments of the nephron. CO2- U (16)
15. (a) Explain the structural differences between a hinge joint and a ball-and-socket joint, and how these differences contribute to their range of motion. CO2- U (16)
- Or
- (b) Draw a neat diagram and mention the main parts of the eye and their functions. CO2- U (16)