


<b>Name:</b>	
<b>Enrolment No:</b>	

**UPES**  
**End Semester Examination, December 2023**

**Course: Human physiology and anatomy**  
**Semester : 3rd**  
**Program: B. Tech Biomedical Engineering**  
**Duration : 3 Hours**  
**Course Code: HSCC1023** **Max. Marks: 100**

**Instructions: Attempt all the questions**

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
<b>Q 1</b>	What are the two main divisions of the skeletal system?	<b>1.5</b>	<b>CO4</b>
<b>Q 2</b>	Which type of bone is longer than it is wide and is found in the limbs?	<b>1.5</b>	<b>CO4</b>
<b>Q 3</b>	What is the primary function of the skeletal system?	<b>1.5</b>	<b>CO4</b>
<b>Q 4</b>	What is the central cavity of long bones called, which houses marrow?	<b>1.5</b>	<b>CO3</b>
<b>Q 5</b>	What is the basic functional unit of a muscle fiber?	<b>1.5</b>	<b>CO3</b>
<b>Q 6</b>	During muscle contraction, which protein binds with calcium ions to expose myosin binding sites?	<b>1.5</b>	<b>CO3</b>
<b>Q 7</b>	Where does the neuromuscular junction occur?	<b>1.5</b>	<b>CO2</b>
<b>Q 8</b>	What neurotransmitter is released at the neuromuscular junction to stimulate muscle contraction?	<b>1.5</b>	<b>CO2</b>
<b>Q 9</b>	What is the structural classification of joints that allow limited movement?	<b>1.5</b>	<b>CO1</b>
<b>Q 10</b>	Name a type of joint movement where the angle between bones decreases.	<b>1.5</b>	<b>CO1</b>
<b>Q 11</b>	Define anatomy and physiology.	<b>1.5</b>	<b>CO1</b>
<b>Q 12</b>	What is the primary focus of anatomy?	<b>1.5</b>	<b>CO1</b>

<b>Q 13</b>	What is the smallest level of structural organization in the human body?	<b>1.5</b>	<b>CO1</b>
<b>Q 14</b>	Homeostasis is the body's ability to maintain a stable internal environment despite external changes.	<b>1.5</b>	<b>CO2</b>
<b>Q 15</b>	What is the primary purpose of the process of metabolism?	<b>1.5</b>	<b>CO2</b>
<b>Q 16</b>	What does the term "ventral" in anatomical terminology refer to?	<b>1.5</b>	<b>CO22</b>
<b>Q 17</b>	What is the basic structural and functional unit of life?	<b>1.5</b>	<b>CO2</b>
<b>Q 18</b>	Which organelle is responsible for ATP production within the cell?	<b>1.5</b>	<b>CO3</b>
<b>Q 19</b>	What is the process by which cells engulf large particles or other cells?	<b>1.5</b>	<b>CO3</b>
<b>Q 20</b>	During which phase of the cell cycle does DNA replication occur?	<b>1.5</b>	<b>CO3</b>
<b>Section B</b> <b>(4Qx5M=20 Marks)</b>			
<b>Q 1</b>	Define cardiac output and stroke volume. How do these parameters contribute to overall cardiovascular function, and what factors influence their regulation?	<b>5</b>	<b>CO3</b>
<b>Q 2</b>	Explain the factors influencing blood pressure regulation. How is pulse related to the cardiac cycle, and what physiological mechanisms contribute to variations in pulse amplitude?	<b>5</b>	<b>CO4</b>
<b>Q 3</b>	Discuss the process of hemopoiesis, emphasizing its role in maintaining a healthy blood composition. How does the bone marrow contribute to the formation of blood cells, and what factors influence this process?	<b>5</b>	<b>CO3</b>
<b>Q 4</b>	Explore the intricate mechanisms of blood coagulation. How do the clotting factors and fibrinolysis contribute to the delicate balance between preventing excessive bleeding and avoiding unnecessary clot formation?	<b>5</b>	<b>CO2</b>

<b>Section C</b> <b>(2Qx15M=30 Marks)</b>			
<b>Q 1</b>	Explain the circulation of lymph and the immune functions of lymphatic organs. How do lymphocytes contribute to the body's defense mechanisms, and what role do lymph nodes play in immune responses?	<b>15</b>	<b>CO3</b>
<b>Q 2</b>	Explore common disorders of the blood, particularly focusing on conditions affecting red and white blood cells. How does the reticuloendothelial system contribute to the identification and removal of abnormal blood cells, and what happens when this system is compromised?	<b>15</b>	<b>CO2</b>
<b>Section D</b> <b>(2Qx10M=20 Marks)</b>			
<b>Q 1</b>	<p><b>Case Study:</b></p> <p><b>Patient information:</b> Mr. Johnson, a 45-year-old male, presents with a variety of mysterious symptoms. He complains of excessive sweating, increased heart rate, dilated pupils, and difficulty focusing on close objects. Additionally, he reports occasional digestive issues and a persistent sense of fatigue. Mr. Johnson is generally healthy and has no known pre-existing medical conditions.</p> <ol style="list-style-type: none"> <li>1. Based on Mr. Johnson's symptoms, which division of the autonomic nervous system seems to be predominantly active, and why?</li> <li>2. How might the sympathetic nervous system's overactivity explain the digestive issues reported by Mr. Johnson?</li> <li>3. Mr. Johnson mentions difficulty focusing on close objects. How does the sympathetic nervous system contribute to this symptom?</li> <li>4. What role might the parasympathetic nervous system play in Mr. Johnson's symptoms?</li> <li>5. Considering the origin and functions of spinal and cranial nerves, how might an issue with these nerves contribute to Mr. Johnson's symptoms?</li> </ol>	<b>10</b>	<b>CO4</b>

	<p><b>6.</b> Discuss how a thorough examination of the eye, ear, nose, and tongue might provide additional insights into Mr. Johnson's condition.</p> <p><b>7.</b> What specific eye disorders might be considered in the differential diagnosis for Mr. Johnson?</p> <p><b>8.</b> How might the symptoms reported by Mr. Johnson be connected to disorders of the autonomic nervous system?</p>		
<b>Q 2</b>	<p>Describe the structure and functions of the lymphatic system. How do lymphatic vessels contribute to fluid balance, immune responses, and the transport of fats? Provide an example of a disorder affecting the lymphatic system and its consequences.</p>	<b>10</b>	<b>CO3</b>