


Name:			
Enrolment No:			
UPES			
End Semester Examination, December 2024			
Course: Human Anatomy and Physiology		Semester : 1	
Program: B.Sc. (Clinical Research)		Duration : 3 Hours	
Course Code: HSCC1025		Max. Marks: 100	
Instructions: Read questions carefully			
S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	The correct sequence of levels of biological organization, from the simplest to the most complex is.... A) Atomic → Molecular → Cellular → Tissue → Organ → Organism. B) Molecular → Atomic → Cellular → Organ → Tissue → Organism. C) Atomic → Cellular → Organ → Organism → Tissue. D) Cellular → Atomic → Tissue → Organ → Organism.	1.5	CO1
Q 2	Below statement TRUE about cell-cell communication. A) Cell-cell communication is solely mediated by electrical signals. B) Intracellular signaling pathways involve only ATP as a second messenger. C) Cell signaling pathways can involve molecules like cyclic AMP (cAMP), G-protein coupled receptors and tyrosine kinase. D) Cell-cell communication can only occur through direct physical contact between cells.	1.5	CO1
Q 3	The following is an example of a negative feedback mechanism. A) Release of oxytocin during childbirth, which increases uterine contractions. B) Activation of a clotting cascade in response to blood vessel injury. C) Regulation of blood glucose levels by insulin and glucagon. D) Secretion of adrenaline in response to stress.	1.5	CO1
Q 4	Which phase of the cell cycle involves the division of the cytoplasm, resulting in two distinct daughter cells? A) G1 phase B) S phase C) Telophase D) Cytokinesis	1.5	CO1
Q 5	The most significant risk associated with incompatible blood transfusions is.... A) haemolysis of red blood cells. B) increased platelet count. C) decreased white blood cell count. D) high blood pressure.	1.5	CO2

Q 6	The main function of the lymphatic vessels is... A) to transport oxygen and carbon dioxide. B) to absorb and transport fatty acids from the digestive system. C) to circulate red blood cells. D) to filter blood.	1.5	CO2
Q 7	Following cells is responsible for the production of antibodies in the adaptive immune response. A) T cells B) B cells C) Neutrophils D) Eosinophils	1.5	CO2
Q 8	The part of eye responsible for focusing light onto retina is.... A) cornea. B) lens. C) retina. D) pupil.	1.5	CO2
Q 9	Synapse is.... A) the gap between two neurons where neurotransmitters are released. B) the structure within the cell body where the nucleus is located. C) myelin sheath that insulates nerve fibers. D) structure that produces action potentials.	1.5	CO3
Q 10	The normal resting heart rate (pulse) for an adult is typically... A) 40-60 beats per minute. B) 60-100 beats per minute. C) 100-120 beats per minute. D) 120-140 beats per minute.	1.5	CO3
Q 11	The part of the heart's electrical conduction system responsible for the delay in the transmission of the action potential to allow ventricular filling is ... A) sinoatrial (SA) node. B) atrioventricular (AV) node. C) bundle of His. D) purkinje fibers.	1.5	CO3
Q 12	Which of the following changes in the ECG indicates myocardial ischemia or infarction? A) Shortened PR interval B) Elevated ST segment C) Inverted T waves D) Prolonged QT interval	1.5	CO3
Q 13	Diaphragm is primarily responsible for which part of the respiration process? A) Gas exchange B) Airflow in and out of the lungs C) Oxygen transport in the blood D) Production of surfactant	1.5	CO4

Q 14	The volume of air that can be forcibly exhaled after the end of a normal exhalation is... A) tidal volume. B) vital capacity. C) expiratory reserve volume. D) residual volume.	1.5	CO4
Q 15	Hormones responsible for the "fight or flight" response is... A) insulin. B) cortisol. C) epinephrine. D) progesterone.	1.5	CO4
Q 16	Right lung typically has how many lobes? A) One B) Two C) Three D) Four	1.5	CO4
Q 17	The main function of the kidneys is to: A) Produce hormones B) Regulate blood glucose levels C) Filter waste products from the blood and produce urine D) Absorb nutrients	1.5	CO5
Q 18	Which structure within the cell is responsible for protein synthesis? A) Nucleus B) Mitochondrion C) Ribosome D) Endoplasmic reticulum	1.5	CO5
Q 19 layer is a part of both pericardium and heart wall.	1.5	CO5
Q 20	What is mediastinum?	1.5	CO5
Section B (4Qx5M=20 Marks)			
Q 1	Explain how cells communicate with each other and mention at least two types of signaling mechanisms involved in cell communication.	5	CO1
Q 2	What are the components of blood and their approximate volume in human body?	5	CO2
Q 3	List and briefly explain the main functions of lymphatic system.	5	CO3
Q 4	Compare the structure of the trachea and bronchi. How do their structures relate to their functions?	5	CO4
Section C (2Qx15M=30 Marks)			
Q 1	Discuss how the structure of the heart and blood vessels ensure the efficient flow of blood through the systemic and pulmonary circuits mentioning the anatomy of heart and blood vessels?	15	CO4
Q 2	A) Explain the generation of action potential in response to a stimulus with help of a graph.	10+5	CO5

	B) Suppose that the plasma membrane of a neuron has more Na ⁺ leakage channels than K ⁺ leakage channels. What effect would this have on resting membrane potential?		
Section D (2Qx10M=20 Marks)			
Q 1	Compare clinical features and causes of iron-deficiency anemia and pernicious anemia.	10	CO2
Q 2	Analyze different types of neuroglial cells in the central nervous system, describing their structure and specific functions	10	CO3