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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

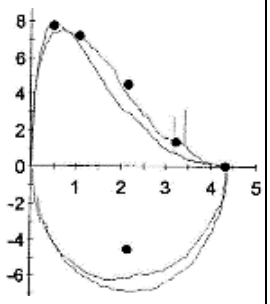
Programme: B.E. **Semester: III**

Branch: Medical Electronics Engineering **Duration: 3 hrs.**

Course Code: 19ML3ESHPM **Max Marks: 100**

Course: Human Physiology and Medical Physics

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	*CO*	*PO*	Marks
1	a)	A 65-year-old man undergoes pulmonary function testing as part of a routine health-screening test. He had no pulmonary complaints. He is a lifelong non-smoker and had a prior history of asbestos exposure while serving in the Navy. His pulmonary function test results are as follows: **Test** / **Actual** / **Predicted** / **% Predicted** FVC (L) / / 4.32 / FEV1 (L) / 3.20 / 3.37 / 95 EV1/FVC (%) / / 78 / FRC (L) / / 3.25 / ERV (L) / 0.63 / 0.93 / 68 RV (L) / 2.54 / 2.32 / 109 TLC (L) / / 6.09 /  Calculate actual and predicted values of lung capacities and interpret the test result.	*CO1*	*PO1*	**10**
	b)	Explain the working principle of spirometer. Using mathematical expression explain the measurement of Functional Residual Capacity and Residual Volume	*CO1*	*PO1*	**10**
		OR			
2	a)	With neat diagram explain the anatomical structure of the respiratory tract.	*CO1*	*PO1*	**10**
	b)	What is hypoxia? What are the different types of hypoxia commonly observed in human beings?	*CO1*	*PO1*	**10**
		UNIT - II			
3	a)	Discuss the resistance and compliance vessel model of blood flow in cardio vascular system using necessary mathematical equations.	*CO2*	*PO2*	**10**

			Also derive an expression for the pressure drop across any vessel in a given level of flow.			
		b)	Explain clinical Electrocardiography. Summarize various techniques used for the calculation of heart rate from the ECG.	*CO2*	*PO2*	**10**
			OR			
	4	a)	Prove that the work and energy expenditure of the left heart is greater compared to the right heart.	*CO2*	*PO2*	**10**
		b)	Discuss the properties of heart muscle with a neat sketch of cardiac muscle cell.	*CO2*	*PO2*	**10**
			UNIT - III			
	5	a)	Explain BMR Measurement Benedict-Roth closed circuit method with necessary expressions.	*CO3*	*PO3*	**10**
		b)	Elaborate on different modes of heat losses from the body with the relevant mathematical expressions.	*CO3*	*PO3*	**10**
			OR			
	6	a)	Explain the different methods followed in the determination of metabolic rate	*CO2*	*PO2*	**10**
		b)	What is respiratory quotient and BMR? What are the factors influencing the BMR	*CO2*	*PO2*	**10**
			UNIT - IV			
	7	a)	Discuss on the distribution and functions of smooth muscles in different organ systems of human body.	*CO4*	*PO4*	**10**
		b)	Summarize the sequence of events involved in muscle contraction from the "at rest state" to the "return to rest state". Indicate the roles of calcium and ATP.	*CO4*	*PO4*	**10**
			OR			
	8	a)	What are the functions of muscular tissue? Brief them	*CO1*	*PO1*	**10**
		b)	Mention the types of muscular tissue and explain their location, function, appearance and control.	*CO1*	*PO1*	**10**
			UNIT - V			
	9	a)	Discuss how the properties and behavior of sound altered when it propagates from one medium into another.	*CO5*	*PO6*	**10**
		b)	Mention the various modes of retinal damage. Briefly explain.	*CO5*	*PO6*	**10**
			OR			
	10	a)	Analyze the Eye as a compound lens considering the Eye Model with relevant sketches	*CO5*	*PO6*	**10**
		b)	Elaborate on the neuromuscular systems in voice production with a neat block diagram.	*CO5*	*PO6*	**10**

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