

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Second Semester**Biomedical Engineering***BM3252 / UPHT24206 - Medical Physics***Regulations - 2021 & 2024**Duration : 3 Hrs**Maximum: 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Name three common sources of non-ionizing radiation and ionizing radiation.	L1	1	2
2.	How would you measure the electrical conductivity of a specific type of tissue?	L2	1	2
3.	Define Spontaneous emission.	L1	2	2
4.	Explain the connection between a radioactive isotope's stability and half-life.	L2	2	2
5.	Define the term LET.	L2	3	2
6.	How pair production occurs.	L2	3	2
7.	List the two groups of biological effects of radiation and its cause.	L2	4	2
8.	State the formula for the inverse square law.	L2	4	2
9.	State the significance of acoustic impedance in ultrasonic imaging.	L2	5	2
10.	Define piezo electric effect.	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Explain how the wavelength of light affects its color.	L2	1	8
	ii Compare and contrast the safety regulations for non-ionizing and ionizing radiation.	L2	1	8
	Or			
	b i Compare the effectiveness of thermography with other diagnostic techniques in medical applications.	L2	1	8
	ii Compare the effects of low-frequency and high-frequency electric fields on biological tissues. What mechanisms account for the differences observed?	L2	1	8
12.	a Describe the basic principle behind the construction of a cyclotron and production of radio isotopes.	L2	2	16
	Or			
	b Explain the working of Technetium generator. Write about the applications of Technetium.	L2	2	16

13.	a	Explain the interaction of charged particles with matter and Compare the interactions of electrons and alpha particles with matter.	L2	3	16
		Or			
	b	Compare the interaction mechanisms of gamma rays and neutrons with matter, What factors influence the attenuation of gamma rays in a material?	L2	3	16
14.	a	Compare the effects of low-dose radiation versus high-dose radiation on human health.	L2	4	16
		Or			
	b i	Explain how variables such as age, sex, and health status of test subjects may influence LD50.	L2	4	8
	ii	Given a scenario where a person is exposed to high levels of radiation, what immediate medical interventions would you recommend?	L2	4	8
15.	a	Explain the effectiveness of Doppler ultrasound in diagnosing vascular diseases compared to other imaging modalities.	L2	5	16
		Or			
	b	Compare the interaction of ultrasound with soft tissue versus bone. Assess the effectiveness of ultrasound scanning in diagnosing.	L2	5	16