Q. Code: 414297

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Second Semester

PH22251 – PHYSICS FOR BIOTECHNOLOGIST

(Bio Technology)

(Regulation 2022)

TIME: 1 HOUR 30 MINUTES **MAX. MARKS: 50**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Enable to explore how High frequency sound is produced, propagated and understand the detectors and methods used to monitor radiation dose and biological damage.	**3**
CO 2	Apply a broad knowledge of different types of biomaterials including metals, polymers, ceramics and composites and their use in typical biomedical devices and clinical applications	**3**
CO 3	Explain the action of various types of microscopes, imaging and spectroscopic techniques.	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What is the Principle of GM counter?	**1**	**2**
2.	List out the difference between Ultrasonic image and X-ray radio graphical image.	**1**	**2**
3.	A. G.M counter collects 107 electron per discharge. The average current in the circuit is 1.333×10^{-11} A. Find the counting rate per minute. Given $e=1.6 \times 10^{-19}$ C.	**1**	**3**
4.	Can Phone Camera see Radiation? Justify.	**1**	**3**
5.	What is the basic principle of scintillation detector?	**2**	**2**
6.	Applying the concept of smart fluid how does MR fluid differs from ER fluid?	**2**	**3**
7.	List out few applications of ceramic materials.	**2**	**2**
8.	State Beer Lambert's law.	**3**	**2**
9.	Distinguish between Rayleigh Scattering and Raman Scattering.	**3**	**2**
10.	What are the three regions of IR Spectrum?	**3**	**2**

PART- B (2 x 10 = 20 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Applying the principle of NDT, Draw the block diagram of basic pulse echo system and explain each of its functions.	**(10)**	**1**	**3**

(OR)

(b) In a test, the number of counts per second from a radioactive source is measured 100 times. After applying correction for background radiation counts, the results are **(10) 1 3**

Counting rate/sec	12	14	16	18	20	22	24	26	28
Frequency	1	3	12	23	37	16	4	2	2

Calculate (a) Arithmetic mean, b) Standard deviation, C) probable error in the measurement and d) Express the result with uncertainties.

12. (a) With a neat diagram, explain the construction, working and applications of UV-Vis double beam spectrophotometer. **(10) 3 2**

(OR)

(b) Explain with a neat diagram the working of Atomic Force microscopy. **(10) 3 2**

PART- C (1 x 10 = 10 Marks)

(Q.No.13 is compulsory)

		Marks	CO	RBT LEVEL
13.	In nuclear imaging system, the gamma ray radiation from the particular organ which is supplied with the injected radio isotopes are counted using a scintillation counter. The gross count for 1 minute is 500 and the back ground count for 1 minute is 50. 1) Calculate the net count and its standard deviation 2) What is the net counting rate its standard deviation if the gross count for 5 minutes is 2500 and the background count for 5 minutes is 250. 3) How do you increase the accuracy of the measurement.	**(10)**	**1**	**3**

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