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Question Paper Code : 80049



B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth Semester

Biomedical Engineering

BM 8401 — MEDICAL PHYSICS

(Regulation 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the electrical properties of tissues.
2. What is the role of ultra-violet radiations in therapy?
3. Define intensity of sound and characteristic impedance.
4. Write the Weber- Fechner equation and what does it predict.
5. Define spontaneous emission. Give an example.
6. What do you mean by half-life?
7. Mention any two applications of x-rays.
8. How does pair production occur?
9. What does a scintillator do?
10. What is the principle of liquid scintillation counter?

PART B — (5 × 13 = 65 marks)

11. (a) (i) What is the effect of electromagnetic waves on human body? (5)
(ii) Discuss the behavior of low- frequency effects on tissues. (8)

Or

- (b) (i) Distinguish between interference and diffraction. (8)
(ii) How high frequency radiations are used in diathermy machines? (5)

12. (a) Explain how the different receptors respond to their stimuli. (13)

Or

(b) (i) Draw the anatomical structure of the eye and describe the different layers of eye. (10)

(ii) What is the difference between place theory and frequency theory of hearing? (3)

13. (a) (i) What is radioactive decay? Explain alpha, beta and gamma decay with suitable examples. (8)

(ii) What is artificial radioactivity? Give two examples each for transmutation by alpha particles and neutrons. (5)

Or

(b) Explain the construction and working of cyclotron particle accelerator with neat diagram. Give its limitations. (13)

14. (a) (i) Describe briefly different mechanisms through which x-rays and gamma rays are absorbed in matter? (8)

(ii) Write short note on annihilation radiation. (5)

Or

(b) Explain photoelectric effect with simple experimental arrangement and derive the equation for photoelectric effect. (13)

15. (a) (i) Illustrate with neat diagram the construction and working of scintillation counter. (8)

(ii) Describe the construction and working of gamma well counter. (5)

Or

(b) How is Geiger- Muller counter used for measuring beta particles? State the basic principle involved in it. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain Compton effect? Derive the expression for Compton shift? (15)

Or

(b) (i) What are radionuclides? How they are produced using nuclear reactor? (10)

(ii) Mention their applications in science and technology. (5)