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Question Paper Code: 1214227

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024
Fourth Semester
Biomedical Engineering
U20BM403 – MEDICAL PHYSICS
(Regulation 2020)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. What is a non- ionizing radiation?

2. An ultrasonic source emits sound of frequency 220 kHz in air. If this sound meets a water surface, what is the wavelength of the transmitted sound?

   (At the atmospheric temperature, speed of sound in air =352ms−1and inwater=1.496ms−1).

3. List some applications of radioisotopes in medicine.

4. State electron capture. Give its expression.

5. Write the working principle of synchronous generator.

6. What protects the X-ray tube?

7. What is a neutron? What are the ways by which a neutron interacts with matter?

8. Distinguish inner and outer bremsstrahlung.

9. List the applications of radio dosimeter.

10. Write the basic principle of MOSFET.

PART – B (5 x 16 = 80 Marks)

11. (a) Define dielectric. Describe how a tissue can act as a leaky dielectric? (16)

(OR)

(b) What is relaxation process? Summarize the two modes of relaxation process. (16)

12. (a) i) Explain the basic characteristics of radioactivity and its decay characteristics. (10)

ii) Write the law of radioactive decay. Decay constant of a radioactive substance is 10−3 per year. Calculate its half-life time in year. (6)

(OR)

(b) Write notes on i) Radionuclide generator ii) Technetium generator. (8+8)

13. (a) Explain the principle,working of X ray radiography equipment. (16)

(OR)

(b) How to calculate X ray dose using mAs and kV without using any detector? (16)

14. (a) Define bremsstrahlung radiation. Sketch the mechanisms of production of bremsstrahlung radiation. (16)

(OR)

(b) Analyze the various interaction of neutron with matter in detail. (16)

15. (a) Write the different types and application of electrometers. (16)

(OR)

(b) What is brachytherapy? Outline the advantages and disadvantages of brachytherapy dosimeter. (16)

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