A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 94B03

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Fourth Semester

Biomedical Engineering

19UBM403- MEDICAL PHYSICS

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. The velocity of sound in air medium CO1-U

   (a) 340 m/s (b)1500 m/s (c) $3x10^8$ m/s (d) 6500 m/s

2. The monitoring and measuring of a person's exposure to radiation is called: CO1-U

   (a) Densitometry (b) Dosimetry (c) Senitometry (d) ALARA

3. What is the whole body dose equivalent limit for the occupational exposure according to the National Council on Radiation Protection (NCRP)? CO2-U

   (a) 5000 mSv (500 rem) (b) 500 mSv (50 rem)

   (c) 50 mSv (5 rem) (d) 5 mSv (0.5 rem)

4. Which type of ionizing radiation will have the LEAST biological effect? CO2-U

   (a) alpha particles (b) fast neutrons (c) 25 MeV x-rays (d) Diagnostic x-rays

5. Direct effects of irradiation are those that CO3-U

   (a) cause immediate cell death

   (b) affect structures distant from irradiated structures

   (c) affect the site of irradiation

   (d) cause the least biological effect

6. Which type pf cell is most sensitive to irradiation? CO3-U

   (a) Red blood cells (b) White blood cells (c) Epithelial cells (d) Muscle cells

7. A radiation monitor device should be worn by a CO4-U

(a) radiographer undergoing a radiographic procedure

(b) nurse working in an area where mobile radiography is performed

(c) family member assisting a patient during a radiographic procedure

(d) radiographer performing fluoroscopic procedures

8. What is the maximum monthly radiation exposure dose allowed for the pregnant radiation worker? CO4-U

(a) 0.5 mSv (b) 1mSv (c) 5 mSv (d) 50 mSv

9. The SI unit of exposure is ---------- CO5-U

(a) C/Kg (b) Roentgen (c) keV (d) radian

10. Which of the following devices are used to protect the patient from unnecessary radiation exposure? CO5-U

(a) Collimators, filters, grids

(b) Immobilisation devices, filters, high kVp techniques

(c) Shields, direct exposure systems, increased SID

(d) Short source to skin distance, fast screens, cones

PART – B (5 x 2= 10 Marks)

11. Define fibrillation. CO1-U

12. Define Attenuation of Gamma-rays CO2-U

13. What did you understatnd from Tissue as a leaky dielectric CO3-U

14. State the Effects of UV-IR CO4-U

15. Define Heritable radiation effects. CO5-U

PART – C (5 x 16= 80 Marks)

16. (a) Explain the dielectric properties of tissue depend upon the frequency of electromagnetic radiation? CO1-App (16)

Or

(b) Explain one method of operation of Radiation protection with neat diagram CO1-App (16)

17. (a) Describe the theory, construction and working of thermography camera. Discuss its clinical applications. CO2-App (16)

Or

(b) Discuss in detail various Health Effects of Radiation Exposures CO2-Ana (16)

18.	(a)	Explain principle of operation of instrument used for Measurement of Ultraviolet Radiation with neat diagram	CO3-Ana	(16)
		Or		
	(b)	Explain in detail about the Energetics of Nuclear Reactions	CO3-Ana	(16)
19.	(a)	With neat diagram ,explain the principle of operation of Electrical Impedance Tomography (EIT)	CO4-U	(16)
		Or		
	(b)	Explain in detail about the Biomedical Laser Beam Delivery Systems	CO4-Ana	(16)
20.	(a)	Explain in detail about Exposure, KERMA and absorbed dose.	CO5-U	(16)
		Or		
	(b)	Explain in detail about the System for radiation protection	CO5-U	(16)