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

Question Paper Code: 54B03

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Biomedical Engineering

15UBM403- MEDICAL PHYSICS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The phenomena of light responsible for the working of the human eye is CO1- R

   (a) Reflection (b) Refraction

   (c) Power of accommodation (d) Persistence of vision

2. Sound is_____ CO1-R

   (a) Electromagnetic wave motion with low frequency

   (b) Electromagnetic wave motion with high energy

   (c) Mechanical wave motion

   (d) Best audible in a vacuum

3. The _____ is the energy imparted by ionizing radiation to a unit mass of absorbing tissue. CO2- R

   (a) Exposure (b) Absorbed Dose

   (c) Source activity (d) Biologically equivalent dose

4. What is the maximum monthly radiation exposure dose allowed for the pregnant radiation worker? CO2- R

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

5. Radiation that does not have sufficient energy toremove an electron from an atom CO3- R

(a) Non-Ionizing Radiation (b) Infrared radiation

(c) Ionizing Radiation (d) X-ray

6. Tissue Reactions also called as_____ CO3- R

(a) Stochastic Effects (b) Severity (c) Deterministic Effects (d) Localized exposure

7. The average energy of cosmic rays is_____ CO4- R

(a) 6000MeV (b) 1200 MeV (c) 124 MeV (d) 720 MeV

8. The ultraviolet radiation of the electromagnetic spectrum will be in the range CO4- R

(a) 760nm-1 mm (b) 100-400 nm (c) 400-760 nm (d) 760nm-1400μm

9. The spontaneous mutation rate of approximately 1 in 100,000 is doubled byapproximately_____ CO5- R

(a)1 Gy (b)0.9 Gy (c)3 Gy (d) 8.6 Gy

10. The value of Radiation weighting factor for Protons and charged pions CO5- R

(a) 1 (b) 20 (c) 2 (d) 2.5

PART – B (5 x 2= 10 Marks)

11. Define visual acuity. CO1- R

12. List the types of radiation measurements. CO2- R

13. Mention the ultraviolet wavelength ranges. CO3-U

14. Define radioactive decay. CO4- R

15. State the need of Radiation Protection. CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) Elaborate on limits of vision and Colourvision? CO1- U (16)

Or

(b) Illustrate the analysis of sound and the defects of hearing. CO1- U (16)

17.	(a)	Describe the principle of Dose measurement in radiography	CO2- U	(16)
		Or		
	(b)	(i) Explain in detail about the Mechanism of Radiation Damage.	CO2- U	(8)
		(ii) Describe the Biological effects of ionizing radiation.	CO2- U	(8)
18.	(a)	Describe the biological effects of different non-ionizing radiations at various frequencies.	CO3- U	(16)
		Or		
	(b)	Explain in detail the variation of dielectric constant and specific conductivity of different tissues.	CO3- U	(16)
19.	(a)	Elaborate LASER Penetration and effect of UV-IR radiation in biologic tissues.	CO4- U	(16)
		Or		
	(b)	Describe the production of radioisotopes.	CO4- U	(16)
20.	(a)	Illustrate the types of Dose Limits for Planned Exposure Situations.	CO5- U	(16)
		Or		
	(b)	Explain the Mechanisms of carcinogenesis.	CO5- U	(16)