

**BE Semester- VII (BIOMEDICAL ENGINEERING) Question Bank**

**(Medical Imaging Technology)**

**All questions carry equal marks (10 marks)**

Q.1	Explain interaction of X-ray with matter in detail. State the units of X-rays.
Q.2	Short note on X-ray tube, its internal and external structure. What is rotating anode?
Q.3	What is radioactivity? What are radioisotopes? Explain in detail radioactive decay law.
Q.4	Explain electromagnetic radiation in detail with each spectrum.
Q.5	Explain A, B and M-mode of ultrasonic diagnostic methods.
Q.6	Explain radiation detectors in details. Scintillation detector and ionization chamber.
Q.7	Explain the term: wave particle duality and Attenuation.
Q.8	What is the difference between x-rays and gamma rays? Write Einstein's theory of relativity formula.
Q.9	Write short note on X-ray unit and explain operating console, kVp adjustment, mA control and exposur timer. Also Sketch simplified electric circuit diagram for the x-ray unit.
Q.10	Explain in detail line-focus principle and heel effect.
Q.11	State and explain causes of x-ray tube failure in detail.
Q.12	Explain heat production, Characteristic radiation and bremsstrahlung radiation in detail.
Q.13	Explain in detail X-ray emission spectrum along with factors affecting the x-ray emission spectrum.
Q.14	What is radiographic film? Explain film construction and formation of latent image.
Q.15	Give construction of intensifying screen and explain each layer.
Q.16	Explain the following terms: (i) aperture diaphragm, (ii) CT- number, (iii) Collimator, (iv) ALARA, (v) optical density.
Q.17	Explain image intensification of fluoroscopy: image intensifier and multfield intensification.
Q.18	Explain basic principles of angiography with arterial access, guide wires, catheters,

	and contrast media in detail.
Q.19	Explain each generations of CT with diagram.
Q.20	Explain the following terms for ultrasound system: (i) Reflection, (ii) Refraction, (iii) Attenuation, (iv) Absorption, (v) Scattering.
Q.21	Explain fundamentals of Acoustic propagation in detail and Doppler Effect. Also explain Doppler method as ultrasonic diagnostic method. What is Ultrasonic flow meter?
Q.22	How are ultrasounds generated and detected? Explain Piezoelectric effect and Ultrasonic transducer.
Q.23	Write short note on: (i) Color Doppler flow imaging, (ii) Intracavity Imaging.
Q.24	How tissues are characterized in ultrasound imaging?
Q.25	Explain the following terms: (a) Radionuclide, (b) positron, (c) isotope, (d) Nuclear Activity and Half-Life, (e) SPECT.
Q.26	Write short note on rectilinear scanner and scintillation camera for radionuclide imaging.
Q.27	How Thyroid function test and renal function test are can be done with the use of Radionuclide imaging?
Q.28	Explain the following terms in MRI: (i) Larmor frequency, (ii) Free induction Decay(FID), (iii) Spin-echo imaging, (iv) T2*
Q.29	Write short note on Generation and Detection of NMR signal.
Q.30	Discuss about Thermal and Nonthermal effects due to cavitation in ultrasound fields.
Q.31	Write short note on Transoesophageal, Transrectal scanning.
Q.32	Draw and explain block diagram of basic pulse echo system.
Q.33	Enlist and explain properties of ultrasound. Brief about characteristic impedance.
Q.34	Explain the working principle of magnetic resonance imaging.
Q.35	Write a note on infrared imaging.
Q.36	What is thermogram? Write a note on microwave thermography.
Q.37	Explain the following terms: (a) White radiation, (ii) x-ray film, (iii) Xeroradiography, (iv) image subtraction, (v) Huygen's principle.

Q.38	Write short note on: Digital Radiography and DSA (digital subtraction angiography).
Q.39	Give radiation characteristics of the following: (a) abdominal x-ray, (b) abdominal ultrasound, (c) chest X-ray, (d) Mammography, (e) Head CT.
Q.40	Explain T1 and T2 in MRI.