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B. M. S. College of Engineering, Bengaluru - 560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: MEDICAL ELECTRONICS **Duration: 3 hrs.**
Course Code: 19ML5PCPMI **Max Marks: 100**
Course: Physics of Medical Imaging **Date: 20.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1.	a)	Which types of interactions between X-rays and matter is desirable for the diagnostic X-ray imaging? Give justification to the answer.		**08**
	b)	Mention the various factors that can affect the intensity of the X-ray beam produced by the generators. Narrate each one briefly.		**07**
	c)	Elaborate on the Physical construction of a photomultiplier tube.		**05**

OR

2.	a)	Compare and Contrast conventional Tomography with computed tomography.		**04**
	b)	Give reason why the majority of CT equipment manufacturers prefer filtered back projection method. Indicate the filter function with its frequency response characteristics.		**06**
	c)	Mention the advantages and disadvantages of DSA over film subtraction angiography. Depict the essential components of DSA system with neat diagram.		**10**

UNIT - II

3.	a)	Demonstrate the sound propagation through a medium depicting the difference between particle velocity and phase velocity in acoustic propagation. Draw the necessary diagrams.		**07**
	b)	Illustrate the transducer beam characteristics with relevant sketches and stating Huygens's principle of beam profile.		**07**
	c)	Elaborate the nonlinear effects of high ultrasonic intensity levels on acoustic phenomena.		**06**

OR

4.	a)	Discuss the factors that affect the amount of infrared radiation from the human body.	**06**
	b)	With a neat spectral responses describe the Characteristics of infrared detectors used in thermographic equipment.	**05**
	c)	Elaborate on the constructional details and working of Pyro electric Vidicon camera with its block diagram.	**09**

UNIT - III

5.	a)	Elucidate on the properties of Ideal radionuclides for medical diagnosis.	**08**
	b)	Narrate the significance of solid state detector with relevant sketches.	**05**
	c)	Describe the coincidence detection of annihilation radiation with a neat sketch in PET system. List the disadvantages of PET Imaging.	**07**

UNIT - IV

6.	a)	Discuss the significance of Free Induction Delay and magnetic Dipole moment in MR Imaging.	**10**
	b)	Elucidate on the any two pulse sequences that are commonly used in spectroscopic studies to measure relaxation times.	**10**

UNIT - V

7.	a)	With a neat block diagram, illustrate the constructional details of the electronic and computer components of MRI system. List out the safety procedures to be followed in clinical MR Imaging techniques.	**10**
	b)	Describe the spin-echo imaging sequence method of imaging in clinical MRI.	**06**
	c)	Compare and Contrast MR imaging with FMR Imaging system.	**04**

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