1. (a) Define Medical Imaging and why do use medical imaging techniques?

(b) How do we describe attenuation of X-Rays by body? Explain with necessary mathematical equations and symbols if necessary and prove that, =

(c) Determine and draw the medical diagnostic system.

1. (a) Describe the underlying mechanism for creation of an ultrasound image.

(b) What precautions we have to take for reducing X-ray radiation?

(c) Compare the Doppler ultrasound and contrast ultrasound system with proper description.

1. (a) Describe the mechanism of B-mode and D-mode operations of ultrasound imaging.

(b) Explain the speckle noise in ultrasound. Describe a generalized noise model incorporating different kind of noises.

1. (a) What is brain scanning technique? Illustrate the working principle of CT.

(b) Compare the X-ray, CT and MRI system based on their advantages, disadvantages and applications.

(c) Explain the artifacts in CT.

1. (a) Describe the working principle of MRI.

(b) Mention the advantages and disadvantages of MRI.

(c) Write down the difference between MRI and fMRI.

1. (a) What is nuclear medicine? Mention the uses of nuclear medicine.

(b) Write the advantages and disadvantages of DTI (Diffusion tensor imaging) and DOT (Diffuse optical tomography)

(c) Explain the iterative reconstructions methods.

1. (a) With appropriate figure describe the Otsu method of thresholding.

(b) Describe the watershed segmentation algorithm.

(c) Explain Homomorphic transform.

1. (a) Demonstrate the working principle of medical thermography with proper diagram

(b) What can a diagnostic mammography show? Explain with working principle this technique.