

[Time: 3 Hours]

[Marks: 80]

Please check whether you have got the right question paper.

- N.B:
1. Question no. 1 is compulsory.
 2. Answer any 3 out of remaining 5 questions.
 3. Draw appropriate diagrams wherever necessary.
 4. Assume suitable data wherever required.

1. State if the following statements are true or false and justify with reasons. 20
 - a) Spiral CT better than conventional CT.
 - b) In the photoelectric effect, a photon requires just a single collision to completely disappear while in Compton scattering, it requires several collisions to lose all of its energy.
 - c) Apparent focal spot is larger than actual focal spot.
 - d) Electron focusing in X-ray image intensifier tube inverts and reverses the image.
 - e) Exposure time in fluoroscopy is lesser than Radiography.
2.
 - a) Explain construction and working of Image Intensifier in detail. Also, explain the Brightness gain, Minification gain and Flux gain. 08
 - b) A 210 keV X-ray photon is scattered at the angle of 80 deg during Compton interaction. What are the energies of Compton electron and scattered photon? 07
 - c) A narrow beam containing 1200 mono energetic photons reduced to 800 photons by slab of copper 10^{-2} m thick. Calculate linear attenuation coefficient. 05
3.
 - a) With the help of block diagram explain the Computer Radiography system. 10
 - b) Explain the different types of grids used in X-ray system and the role they play in patient protection. 10
4.
 - a) Explain Filament and High voltage X-ray generator circuit in detail. 10
 - b) Describe Third and Fourth generation of CT with diagrams. 10
5.
 - a) Explain complete block diagram of Digital Mammography. Write any two clinical applications. 10
 - b) Describe working principle of spiral CT. Define pitch factor and explain its types. Also write its clinical applications. 10
6. Write short notes on (Any 4)
 - a) Applications of Linear Accelerator. 05
 - b) CT artifacts. 05
 - c) Solid state CT detector. 05
 - d) General Radiation. 05
 - e) X-ray filters. 05