

Paper Solution**Sub: Medical Imaging-I, CBSGS**

Q.1

A] - True-01, Explanation-03

B] True-01, Explanation-03

C] False-01, Explanation-03

D] True-01, Explanation-03

E] True-01, Explanation-03

Q.2

A] Initial wavelength of X-ray photon

$$= 1.24/\text{Energy}$$

$$= 1.24/200$$

$$= 0.0062\text{nm}$$

Change in wavelength = $0.0024(1-\cos\theta)$

$$= 0.0024(1-\cos 80)$$

$$= 0.002\text{nm}$$

But wavelength of scatter photon = Initial wavelength + Change in wavelength

$$= 0.0062 + 0.002$$

$$= 0.0082\text{nm}$$

Therefore, Energy of scattered photon

$$= 1.24/0.0082$$

$$= 151.21\text{Kev}$$

Energy of Compton electron = Initial energy of X-ray photon - Energy of scattered photon

$$= 200 - 151.21 = 48.78\text{Kev}$$

B] Explanation of saturation voltage and line focus principle – 5marks each

Q.3

A] Computed Radiography: Diagram-04, Explanation-06

B] Digital Mammography: Block Diagram-04, Explanation-04, Application-02

Q.4

A] List of modes of display-01, Explanation of each type of mode with diagram-03

B] Doppler Shift = $2F_T u \cos\theta / v$

$$= 2 * 5 * 10^6 * 0.2 * \cos 45 / 1540$$

$$= 918 \text{ Hz}$$

C] Size of apparent focal spot = Size of actual focal spot * $\sin\theta$

$$= 2 \text{ mm} * \sin 17$$

Q.5

A] Electronic real time scanners: Diagram-05, Explanation-05

B] Principle and construction of IITV 5 marks and Vidicon camera is 5 marks each

Q.6

A] Thermography: Working principle-03, Application-02

B] Each application-01

C] Filters: Diagram-02, Explanation-03

D] Photoelectric Effect: Working principle-03, Application-02

E] Characteristic Radiation: Diagram-01, Explanation-04

General