

11/06/2016

TE/VI/CBGS/BM/MI-1
Q.P. Code : 565000

[Revised course]

(3 Hours)

[Total Marks : 80]

- N.B. :
- (1) Question No.1 is compulsory
 - (2) Attempt any three questions out of remaining five questions
 - (3) Assume suitable data
 - (4) Assumption should be clearly stated
 - (5) Use legible handwriting. Use black ball pen.

1. State with reason whether following statements are true or false 20
 - (a) As the angle of the anode is made smaller, the apparent focal spot also becomes smaller.
 - (b) Radiographic image contrast is less with Compton reactions than with the photoelectric effect.
 - (c) More the difference in Acoustic impedances of two tissues, more will be reflection of ultrasound from boundary
 - (d) High frequency ultrasound is produced by thinner crystal.
 - (e) Thermography is used for cancer detection
2. (a) Explain the filament circuit and high voltage circuit of X-ray generator with neat diagrams. 10
 - (b) Find the intensity of incident X-ray photons if the number of photons transmitted is 900 when it strikes 1 cm thickness of water with the attenuation coefficient at 0.25 cm^{-1} . 5
 - (c) What is the minimum wavelength produced in an X-ray tube when the potential difference across the tube is 110 KVp. 5
($h = 6.6 \times 10^{-34} \text{ Js}$, $c = 3 \times 10^8 \text{ m/sec}$, $e = 1.6 \times 10^{-19} \text{ C}$)
3. (a) Explain with the help of a block diagram the working principle of Mammography. What kinds of abnormalities Mammography can detect? 10
 - (b) Explain construction and working of Image Intensifier in detail. Also, explain the Vidicon camera. 10

[TURN OVER]

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4. (a) Explain with block diagram Computed Radiography system in detail. 10
(b) Explain the different types of collimators used in X-ray system and the role they play in patient protection. 10
5. (a) Explain Doppler Effect. Calculate the Doppler shift if Blood is flowing at 20 cm/sec, operating frequency of transducer is 6 MHz and the angle that the sound beam makes with vessel lumen is 60° (Velocity of Ultrasound in blood = 1540 m/sec) 10
(b) With suitable diagram describe electronic array scanning system 10
6. Write short notes on (Any four) 20
(a) Bremsstrahlung radiation
(b) Formation of latent image
(c) Applications of Endoscopy
(d) Ultrasound transducer
(e) B-Mode of Ultrasound imaging

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