Reading Hospital Medical Imaging Program
MI 132 – Imaging Principles and Equipment
Unit 4 – X-ray Production (Class Preparation Assignment #7)
2022-2023

Due: Tuesday 10/11/2022
Textbook Chapter 6 (p. 62-73)
Objectives:

1. *Compare production of bremsstrahlung radiation, characteristic radiation, and anode heat.*
2. *Calculate the energy of a characteristic x-ray photon given associated binding energies.*
3. *Calculate the energy of a bremsstrahlung x-ray photon given entering and exiting electron energies.*

Questions:

1. Explain how heat is created at the anode.

2. Explain how characteristic photons are created.

3. Explain how the energy of characteristic x-ray photon is calculated. Calculate the following characteristic photon energies.

    a. L to K transition

    b. O to K transition

    c. P to K transition

    d. M to L transition

    e. O to L transition

4. Define characteristic cascade.

5. What kVp setting is required in order to create a K characteristic x-ray? Why?

6. Explain how bremsstrahlung photons are created.

7. What is the minimum and maximum energy of a bremsstrahlung photon? What factor effects this?

8. If an incident electron enters a tungsten atom with 85 keV and exits with 35 keV of energy, what is the energy of the bremsstrahlung photon created?

9. If an incident electron leaves the anode with 5 keV of energy and entered with 85 keV of energy, what is the energy of the bremsstrahlung photon created?

10. Most photons in the x-ray beam are developed from which x-ray production process? Why?