Reading Hospital Medical Imaging Program
MI 132 – Imaging Principles and Equipment
Unit 4 – Filtration and Emission Spectrum (Class Preparation Assignment #8)
2022-2023

Due: Monday 10/17/2022
Textbook Chapter 6 (p. 62-73)
Objectives:

1. *Describe the principles of and use of inherent, added and compensating filters.*
2. *Explain how beam filtration affects x-ray beam intensity, beam quality and patient exposure.*
3. *Explain beam quantity and beam quality and identify the factors that influence them.*
4. *Describe the change in the half-value layer when filtration is added or removed.*
5. *Describe and interpret the discrete, continuous and x-ray emission spectrums.*
6. *Explain the effects of mA, kVp, filtration, generator type and target material on the x-ray emission spectrum. (beam quantity and quality)*

Questions:

1. Explain the purpose of added filtration.

2. What is the purpose of compensating filters?

3. Define beam quantity and beam quality.

4. Identify four factors that influence beam quantity.
    a. Explain the relationships that exist between the factors and beam quantity.

5. Identify the two factors that influence beam quality.
    a. Explain the relationships that exist between the factors and beam quality.

6. Define HVL.

7. Differentiate between the primary and remnant beam.

8. Explain what an x-ray emission spectrum represents. Explain the difference between the discrete and continuous emission spectrum.

9. Draw the x-ray emission spectrum, labeling both the x and y-axis, the bremsstrahlung x-rays, the characteristic x-rays, the maximum energy and the average energy.

10. How is a change in beam quantity represented on the emission spectrum? Beam quality?

11. Explain how an increase in mA will affect the continuous spectrum and discrete spectrum?

12. Explain how an increase in kVp will affect the continuous spectrum and discrete spectrum?

13. Explain how a decrease in filtration will affect the continuous spectrum and discrete spectrum?

14. Explain how an increase in target material atomic number will affect the continuous spectrum and discrete spectrum?

15. Explain how changing from single phase to three phase will affect the continuous spectrum and discrete spectrum?