Worksheet - Scatter and Beam Restriction – ANSWER KEY

1. What two types of x-rays form the image on the image receptor?

   Transmitted and attenuated photons

2. What type of interaction produces scatter radiation?
   Comptons

3. If the field size is decreased, how should the technical factors be adjusted in order to maintain radiographic density?
   They will need to be increased. Most likely it will be mAs to compensate for the reduction of photons.

4. The three primary factors that influence the relative intensity of scatter radiation reaching the IR are: ***kVp***
   Field size
   Patient thickness

5. Which of the factors listed in Question 4 can be controlled by the technologist? ***kVp and Collimation (field size)***

6. Why does collimation affect the amount of scatter being produced?
   Collimation affects the volume of tissue being irradiated. With more collimation, there will be fewer photons to interact with the tissue, meaning fewer Comptons interactions. This will result in decreased scatter.

7. When kVp is increased, how does this affect the quantity of photoelectric interactions occurring, and why?
   It will decrease because the energy level of the incoming x-ray photon and the binding energy of the k-shell electron are too different. PE interactions only occur if the energy levels are close together, because the x-ray photon will be completely absorbed.

8. If using a lower kVp results in less scatter, why aren't all exposures taken with the lowest kVp possible?
   There would be a significant increase in PE, which would result in increased patient dose. Also, in order to maintain radiographic density on the image, would require a significant increase in mAs – also contributing to increase patient dose.

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