Lavins Radiography for Veterinary Technicians 7th edition Brown Test Bank

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MULTIPLE CHOICE

1. The x-ray tube:
   a. Has a glass envelope which holds the tube suspended in air.
   b. Is a large heat-resistant bubble with an air coolant.
   c. Is a heat resistant glass enclosure containing an anode and a cathode.
   d. Always has a rotating anode for heat dissipation.

   ANS: C
   The x-ray tube consists of a glass enclosure that houses a cathode and an anode. The glass enclosure is a special heat-resistant glass.

2. An effect that occurs when the exposure switch is closed is called:
   a. Electromagnetism
   b. Tube flux
   c. Current boosting
   d. Stator closure

   ANS: A
   When the exposure switch is closed the electrons are drawn across to the anode by electromagnetic force, where they are stopped very suddenly by the density of the metal of the anode.

3. The tube filament is composed of:
   a. Cesium iodide
   b. Tungsten/rhenium alloy
   c. Molybdenum
   d. Tungsten

   ANS: D
   The cathode is a thin tungsten wire that is coiled and placed in a focusing cup.

4. A stationary anode will be used in a:
   a. Mobile unit
   b. Mammography unit
   c. Dental unit
   d. Chest unit

   ANS: C
   Equine portable x-ray units, dental x-ray units, and fluoroscopic C-arms have stationary anodes.

5. The production of radiation for veterinary or medical use:
   a. Is possible within any atom.
   b. Is always initiated by a generator.
   c. Only concerns the inner shells of the atom.
   d. Only concerns the outer shells of the atom.

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ANS: B
The x-ray generator receives its power from the *high voltage transformer* and sends it through the circuit to the rectifiers and then to the x-ray tube creating the energy required to produce an x-ray.

6. Bremsstrahlung means:
   a. Braking action
   b. Starting action
   c. The ability of the target to produce x-rays
   d. Production of x-rays from German tubes

   ANS: A
   In *bremsstrahlung interactions* the incoming electron avoids hitting a tungsten electron but travels very close to its nucleus. In doing this it is redirected into a different path and loses some energy, which is emitted as an x-ray photon. The name comes from the term for "braking," as in losing speed rapidly.

7. In the production of x-rays a certain amount of heat is produced. What percentage of heat is produced compared with the amount of radiation?
   a. 20%
   b. 15%
   c. 99%
   d. 2%

   ANS: C
   When the x-ray beam is generated, the interaction at the Anode produces 1% x-rays and 99% heat.

8. A single-phase unit is:
   a. More efficient than a three-phase unit
   b. Less efficient than a three-phase unit
   c. More sophisticated than a three-phase unit
   d. Can provide shorter times than a three-phase unit

   ANS: B
   Single-phased units lost power as the single waveform rose and fell. The solution was to add two more waveforms and to offset them so that the rise and fall was less significant. This change considerably reduced the ripple effect in the power and made the output of the x-ray unit much more efficient.

9. The target material used in the anode must:
   a. Have a high atomic number.
   b. Have a low atomic number.
   c. Be very thin in order to dissipate heat.
   d. Be made of an alloy for stability.

   ANS: A
   The anode material is tungsten or a tungsten molybdenum alloy. Tungsten has a high atomic number (74) and is well positioned on the table of the elements to absorb electrons and heat.

10. Voltage is selected from:
    a. The autotransformer

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b. The main transformer
c. The rectifying unit
d. The voltage readout meter

ANS: A
The autotransformer is used to provide the kilovoltage voltage selected by the operator on the control panel.

11. Individual generators made by the same manufacturer may produce different amounts of radiation because:
a. The parts are different.
b. Their cable length from generator to x-ray tube is different.
c. The x-ray tube manufacturers are different.
d. They are at different distances from the incoming hydro.

ANS: B
Very long cables that are used in the x-ray unit will "leak" electric current. This is known as line loss. If the cables are excessively long the x-ray image will be seriously affected. Cables should be kept as short as possible.

12. When the exposure reaches a predetermined quantity of radiation:
a. The filament cools and stops thermionic emission.
b. The voltage is switched off, causing x-ray production to cease.
c. The rectification circuit switches to self-rectification and stops x-ray production.
d. kVp is redirected to another circuit.

ANS: B
When the radiation produced has reached the limits set on the generator the timer terminates the exposure

13. KV is selected from:
a. The autotransformer
b. The mains transformer
c. The rectifying unit
d. The voltage readout meter

ANS: A
The autotransformer is used to provide the voltage requested by the operator when he sets the kV on the control panel.

14. kV measurements can be different: We do not use kVp anymore
a. Because the waveform is very uniform.
b. Due to different meter manufacturers' preferences.
c. Due to different cable lengths.
d. Because the waveform is very irregular.

ANS: C
If the cables used to attach the x-ray generator are excessively long, the line loss will seriously affect the factors used to create the x-ray image.
It affects the power which is kV X mA

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15. Calculate the heat units for the following parameters: single phase fully rectified unit 65 kVp; 35 mAs; 0.10 second for 10 exposures:
    a. 2,590 HU
    b. 2,275 HU
    c. 2,200 HU
    d. 3.425 HU

    ANS: B
    To calculate heat units, multiply as follows: kV × mA × Seconds × Number of exposures = Heat units.

16. In the x-ray room, radiation is produced:
    a. Electronically, by means of isotopes and electricity
    b. Using an x-ray tube to heat an electric coil
    c. Within an x-ray tube that has an anode and a cathode
    d. Using natural isotopes to emit electrons

    ANS: C
    When the exposure switch is closed, the electrons that are boiled off the cathode are attracted to the anode at very high speeds, and their energy is transferred to the tungsten atoms in the anode to produce x-rays. Many electrons travel from the cathode to the anode, and many interactions take place during the time of the exposure.

17. Radiography describes images that:
    a. Are produced with the use of an x-ray circuit and electricity.
    b. Can be imaged on a film with the use of holograph.
    c. Are similar to the images produced using photography.
    d. Are produced when radioisotopes decay.

    ANS: A
    Many electrons travel from the cathode to the anode, and many interactions take place during the time of the exposure. This produces an x-ray beam of a number of different energies, and this heterogeneous beam is important for diagnostic images.

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