

ASNT Radiographic Testing (RT) Level II Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

- 1. What is the primary purpose of the x-ray generator controls on the equipment?**
 - A. To limit doses of radiation**
 - B. To enable desired intensity, quality, and duration of exposure**
 - C. To monitor film quality**
 - D. To calibrate x-ray tubes**
- 2. What factors influence film selection for an x-ray exposure?**
 - A. Type of radiation and temperature**
 - B. Thickness of the part and material of the specimen**
 - C. Operator's experience and exposure time**
 - D. Voltage range alone**
- 3. What type of photographic material is often used in micro radiographic techniques?**
 - A. Ordinary x-ray film**
 - B. Coarse-grain film**
 - C. Finer-grained photographic material**
 - D. Digital imaging sensors**
- 4. In radiographic testing, an increase in source size generally leads to what effect on the image?**
 - A. An increase in density**
 - B. An increase in sharpness**
 - C. A decrease in clarity**
 - D. No noticeable effect**
- 5. What does the term inherent filtration refer to?**
 - A. The absorption of the useful beam caused by the X-ray tube wall**
 - B. The amount of radiation used in a single exposure**
 - C. The filtration of radiation through lead screens**
 - D. The quality control measures in film processing**

- 6. What is one method of reducing radiographic contrast?**
- A. Increase the radiation source size**
 - B. Decrease the exposure time**
 - C. Decrease the wavelength of the radiation**
 - D. Use thicker film**
- 7. When radiographing steel with a thickness of less than one inch, which x-ray source provides greater radiographic sensitivity?**
- A. A 100 kV x-ray machine**
 - B. A 250 kV x-ray machine**
 - C. A cobalt 60 source**
 - D. A 75 kV x-ray machine**
- 8. In fluoroscopic testing, what method can be used to increase image brightness?**
- A. Using a larger film!**
 - B. Employing a digital camera system**
 - C. Utilizing an image amplifier or intensifier**
 - D. Increasing the radiation dose**
- 9. An x-ray film that has wide latitude is characterized by which property?**
- A. High contrast**
 - B. Low contrast**
 - C. Increased density**
 - D. Increased sensitivity**
- 10. Why is having a small focal spot important in x-ray imaging?**
- A. To increase the temperature of the anode**
 - B. To minimize image blur and improve resolution**
 - C. To decrease the exposure time needed**
 - D. To ensure safety during imaging**

Answers

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1. B
2. B
3. C
4. C
5. A
6. C
7. B
8. C
9. B
10. B

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Explanations

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1. What is the primary purpose of the x-ray generator controls on the equipment?

- A. To limit doses of radiation**
- B. To enable desired intensity, quality, and duration of exposure**
- C. To monitor film quality**
- D. To calibrate x-ray tubes**

The primary purpose of the x-ray generator controls on radiographic equipment is to enable the desired intensity, quality, and duration of exposure. This function is critical since the controls allow the operator to adjust parameters such as voltage (kV), current (mA), and exposure time (seconds) to produce x-rays with specific characteristics that are optimal for the material being inspected. The intensity refers to the amount of x-rays produced, which affects the exposure on the film or digital detector. The quality pertains to the penetrating power of the x-rays, influenced by the voltage; for instance, higher energy x-rays can penetrate denser materials more effectively. Finally, the duration of exposure is crucial in ensuring that the film or detector receives enough radiation to create a clear and discernible image, enabling accurate interpretation of results. While limiting doses of radiation, monitoring film quality, and calibrating x-ray tubes are important responsibilities in radiographic testing, they are secondary to the primary function of controlling the exposure parameters. The generator controls directly influence the radiographic image quality, making it essential for achieving the desired results in inspections.

2. What factors influence film selection for an x-ray exposure?

- A. Type of radiation and temperature**
- B. Thickness of the part and material of the specimen**
- C. Operator's experience and exposure time**
- D. Voltage range alone**

The factors that influence film selection for an x-ray exposure primarily relate to the specific characteristics of the material being examined and the examination technique. The thickness of the part and the material of the specimen are critical because they determine how much radiation is required to produce a quality radiograph. Different materials absorb radiation to varying degrees; for instance, denser materials require higher exposures to ensure the x-ray can penetrate sufficiently to create a clear image. Additionally, the thickness of the part affects the amount of scatter radiation present, which can influence image quality. Thicker sections necessitate adjustments in exposure parameters, including the type of film used. Therefore, selecting the appropriate film not only ensures adequate sensitivity to the x-ray radiation but also maximizes the clarity and diagnostic value of the radiograph, which is vital in assessing the integrity of the specimen. Considering other factors mentioned in the options, while they may play roles in the radiographic process overall, they do not have the same direct impact on film selection as the thickness and material of the specimen do.

3. What type of photographic material is often used in micro radiographic techniques?

- A. Ordinary x-ray film**
- B. Coarse-grain film**
- C. Finer-grained photographic material**
- D. Digital imaging sensors**

In micro radiographic techniques, finer-grained photographic material is utilized because it allows for higher resolution imaging, which is critical when examining small features or defects in a sample. The finer grain size enhances the level of detail captured in the radiograph, which is essential for accurate analysis and interpretation. This level of detail is particularly important in applications such as materials science, electronics, and quality control, where even minute imperfections can significantly impact the functionality and safety of the component being tested. The other types of photographic materials mentioned do not provide the necessary resolution needed for micro radiography. Ordinary x-ray film typically has a coarser grain size, which would lead to a loss of detail in images, while coarse-grain film is designed for faster exposures at the expense of resolution. Digital imaging sensors, although capable of high-resolution imaging, may not always reach the same level of detail and sensitivity as finely tuned photographic materials specifically designed for micro radiography applications.

4. In radiographic testing, an increase in source size generally leads to what effect on the image?

- A. An increase in density**
- B. An increase in sharpness**
- C. A decrease in clarity**
- D. No noticeable effect**

In radiographic testing, an increase in source size affects the sharpness of the image produced. When the size of the radiation source is larger, it leads to a phenomenon known as penumbra, which is the partial shadow around the edges of an object. This increased penumbra results in a decrease in clarity and sharpness of the radiographic image. The edges of the image become less defined, making it more challenging to discern fine details. Conversely, if the source size were smaller, the image would generally be sharper, as there would be less penumbra effect, resulting in a clearer depiction of the object's features. Thus, an increase in source size is directly linked to a decrease in the clarity of the radiographic image, which supports the correctness of the selected answer.

5. What does the term inherent filtration refer to?

- A. The absorption of the useful beam caused by the X-ray tube wall**
- B. The amount of radiation used in a single exposure**
- C. The filtration of radiation through lead screens**
- D. The quality control measures in film processing**

The term inherent filtration specifically refers to the built-in filtration that occurs as the useful X-ray beam passes through the materials that make up the X-ray tube, particularly the glass envelope and the oil surrounding the tube. This filtration is essential for reducing the low-energy X-rays that do not contribute to diagnostic quality images, as these low-energy photons are more likely to be absorbed by the patient's body rather than penetrate it. Inherent filtration is generally defined in terms of the equivalent thickness of a specific material, often specified in millimeters of aluminum (Al). The glass and other components of the X-ray tube naturally attenuate some of the radiation before it exits the tube, thus filtering out less useful high-energy radiation. The other options do not accurately describe inherent filtration. The absorption of the useful beam due to the X-ray tube wall directly correlates to inherent filtration, while radiation exposure amounts, the use of lead screens, and quality control measures in film processing pertain to different aspects of radiographic testing and imaging. Therefore, recognizing that inherent filtration specifically addresses the characteristics of the X-ray apparatus is crucial in understanding its role in producing diagnostic images.

6. What is one method of reducing radiographic contrast?

- A. Increase the radiation source size**
- B. Decrease the exposure time**
- C. Decrease the wavelength of the radiation**
- D. Use thicker film**

The method of reducing radiographic contrast involves manipulating factors that influence how radiation interacts with the material and the film. The correct answer is centered on the relationship between radiation wavelength and contrast. When the wavelength of the radiation decreases, the energy of the radiation increases. Higher energy radiation tends to have a more uniform penetration ability through different materials, resulting in less contrast between areas of differing densities in the radiographic image. This uniformity means that variations in material density produce a less pronounced difference in the resulting image, effectively reducing contrast. In contrast, increasing the radiation source size typically spreads the radiation over a wider area, which can sometimes enhance definitions and create more blur rather than reduce contrast. Decreasing the exposure time doesn't inherently affect contrast on its own; it simply impacts the amount of radiation that is captured by the film or detector. Similarly, using thicker film can lead to an increase in the absorption of radiation and potentially enhance contrast rather than reduce it. Thus, modifying the wavelength of radiation is a suitable method for achieving lower radiographic contrast, primarily by altering the energy levels and penetration capabilities of the radiation being used.

7. When radiographing steel with a thickness of less than one inch, which x-ray source provides greater radiographic sensitivity?

- A. A 100 kV x-ray machine**
- B. A 250 kV x-ray machine**
- C. A cobalt 60 source**
- D. A 75 kV x-ray machine**

The answer is primarily based on the relationship between penetration power and the ability to produce quality radiographs in thicker materials. In the context of radiographing steel that is less than one inch thick, using a higher kV x-ray machine, such as a 250 kV source, enhances the capability to penetrate the material effectively. Higher kV settings allow the x-rays to have greater energy, which results in deeper penetration through the steel. This is particularly important when looking for subtle defects that might not be detected with lower energy sources, as higher energy radiation produces less scatter and better contrast in the image quality. The increased energy can also reduce the overall thickness of the steel required to achieve an adequate quality radiograph, which further enhances sensitivity to smaller flaws. In comparison, lower kV sources like 100 kV or 75 kV may not penetrate as effectively, leading to potential difficulties in visualizing fine details. Meanwhile, while cobalt-60 can provide a reliable alternative source, it has a lower energy output compared to the high kV x-ray machines, which limits its effectiveness in this application. Therefore, the 250 kV x-ray machine is the most suitable choice for achieving greater radiographic sensitivity when dealing with steel of less than

8. In fluoroscopic testing, what method can be used to increase image brightness?

- A. Using a larger film!**
- B. Employing a digital camera system**
- C. Utilizing an image amplifier or intensifier**
- D. Increasing the radiation dose**

In fluoroscopic testing, utilizing an image amplifier or intensifier is the effective method for increasing image brightness. This device enhances the brightness of the image by amplifying the weak light levels produced during the x-ray exposure. The image intensifier converts x-rays into visible light, and by using a photoconductive material, it significantly increases the brightness of the image, enabling clearer visualization of the structures being examined. This is particularly important in fluoroscopy since operators often need to see real-time images clearly while minimizing radiation exposure. The image intensifier not only improves the quality of the images displayed but also allows for lower doses of radiation because it makes the resulting images much brighter. Other methods listed, such as increasing the radiation dose, can lead to unnecessary exposure and do not necessarily guarantee improved image quality. Employing a digital camera system may enhance image capture, but it primarily pertains to post-processing and does not address the real-time aspect of brightness during fluoroscopy. Using a larger film may affect the size of the image but does not inherently increase the brightness of the displayed image.

9. An x-ray film that has wide latitude is characterized by which property?

- A. High contrast**
- B. Low contrast**
- C. Increased density**
- D. Increased sensitivity**

Wide latitude in an x-ray film refers to its ability to produce acceptable images over a broader range of exposure levels. This property is primarily characterized by low contrast. A film with low contrast can capture a wider variety of shades of gray, resulting in more detail in regions that may have subtle differences in density. This makes it easier to examine complex structures or varying materials without losing critical information, even if the exposure is not perfectly calibrated. In scenarios where wide latitude is essential, such as in the examination of welds or casting where variations in thickness or material type may exist, low contrast allows for sufficient detail in the final radiograph to ensure accurate assessments can be made. Thus, the characteristic of low contrast is the hallmark of x-ray films with wide latitude, enabling them to function effectively in diverse radiographic applications.

10. Why is having a small focal spot important in x-ray imaging?

- A. To increase the temperature of the anode**
- B. To minimize image blur and improve resolution**
- C. To decrease the exposure time needed**
- D. To ensure safety during imaging**

Having a small focal spot in x-ray imaging is crucial for minimizing image blur and improving resolution. The focal spot is the area on the target where the x-ray beam is generated, and when this spot is small, it allows for better definition of the features being imaged. A smaller focal spot produces sharper images because it reduces the geometric penumbra, or the blurry edge effect, resulting in finer details being captured on the radiograph. This is particularly important in applications where precise measurements and clarity are needed, such as in evaluating welds, detecting flaws in materials, or examining intricate structures. In contrast to other aspects of x-ray imaging, such as heat management, exposure time, or safety measures, the primary benefit of a small focal spot directly relates to image clarity and the ability to discern fine details within the substance being examined. Thus, achieving high-quality images that can reveal critical information about the internal structures is a foundational goal in radiographic testing.