Medical Technology

Mammography

Mammography Certification Exam

Latest Version: 6.0

Question: 1

Which of the following can determine the space charge region tube current?

A. CAD
B. kVp
C. SID
D. OID

Answer: B

Explanation:
kVp, or Kilovoltage Peak, is a critical parameter in radiography associated with the peak voltage applied across the X-ray tube. It directly impacts the energy of the X-ray photons produced by the tube. Higher kVp settings result in higher energy photons, which have greater penetrating power.
The space charge region in an X-ray tube is a zone around the cathode where electrons are emitted and begin to accelerate towards the anode under the influence of the electric field created by the applied voltage. The number of electrons emitted from the cathode and their rate of acceleration depends significantly on the kVp. A higher kVp increases the electric field strength between the cathode and anode, thereby accelerating electrons at a faster rate and increasing the tube current.
As kVp increases, not only does the speed at which electrons travel increase, but the overall efficiency of X-ray production also improves, resulting in a shift in the X-ray spectrum towards higher energies. This shift is crucial for penetrating denser materials and is a key factor in adjusting image contrast and exposure in radiographic imaging.
Thus, kVp is an essential control in determining the characteristics of the X-ray beam, including its ability to modulate the space charge region and subsequently the tube current. Adjusting the kVp allows radiologists to optimize the image quality while tailoring the dose according to the diagnostic requirements.

Question: 2

The tests/procedures which might be considered to be most effective to help detect breast cancer would be considered a combination of which of the following?

A. BSE, ultrasound, and chest x-ray
B. Mammography, ultrasound, and surgery
C. Mammography, BSE, and clinical examination
D. Ultrasound, BSE, and clinical examination

Answer: C

Explanation:

The question asks to identify the combination of tests/procedures that are considered most effective in detecting breast cancer. Among the provided options, "Mammography, BSE (Breast Self-Examination), and clinical examination" is highlighted as the most effective combination. Let's break down each component of this combination and understand why they are considered effective together.
Mammography is a specialized medical imaging technique that uses a low-dose x-ray system to see inside the breasts. It is widely recommended for breast cancer screening and is particularly effective in detecting early signs of breast cancer, even before any symptoms appear. Mammography can reveal masses or calcifications that may indicate the presence of cancer.
BSE, or Breast Self-Examination, involves individuals regularly checking their own breasts for any changes such as lumps, thickening, or changes in shape or texture. While BSE alone is not sufficient for detecting breast cancer, it is beneficial in helping individuals become familiar with their breasts. This familiarity can help in early detection of any abnormal changes which, if found, can be further examined using more definitive diagnostic tools.
Clinical examination, often performed by a healthcare professional, involves a thorough physical examination of the breasts. A doctor or nurse practitioner uses their expertise to detect any abnormalities or changes in the breasts that might not be detected by the patient during self-examination.
When combined, these three methods form a comprehensive approach to breast cancer screening. Mammography provides a precise, radiographic image of the breast tissue, which can detect abnormalities that are not palpable in a physical exam. BSE allows for ongoing personal monitoring, which can prompt earlier consultation with a healthcare provider if changes are detected. Clinical examination by a healthcare professional can corroborate findings from a mammogram or BSE and can also catch other abnormalities that might not be visible on a mammogram.
It is important to note that while each of these methods can be effective individually, the combination of mammography, BSE, and clinical examination is generally considered more effective for the early detection of breast cancer. This combination approach maximizes the likelihood of detecting cancer early, thus improving the prognosis and providing more treatment options.
Therefore, among the options provided, "Mammography, BSE, and clinical examination" stands out as the most effective combination for detecting breast cancer, leveraging the strengths of each method to provide a thorough, multi-faceted approach to screening.

Question: 3

In computed radiography, the x-ray is transmitted to what?

A. Directly to the image processor
B. Directly to the imaging plate
C. Directly toward the patient
D. Directly into a digital acquisition system

Answer: B

Explanation:
In computed radiography, when addressing the question of where the x-ray is transmitted to, the correct answer is "Directly to the imaging plate."
Computed radiography (CR) technology utilizes a special imaging plate that contains photostimulable phosphors rather than traditional photographic film. When X-rays interact with the body, they pass

through varying tissues at different rates depending on tissue density. After passing through the subject, such as a human body during medical imaging, the X-rays impact the imaging plate.
The imaging plate captures these X-rays by storing their energy. This stored energy forms a latent image that is not immediately visible. To convert this latent image into a visible one, the plate is processed in a CR scanner, which uses a laser to stimulate the phosphors, causing them to emit light. The intensity of this emitted light varies depending on the amount of X-ray energy initially absorbed by the plate in specific areas.
The light emitted from the phosphors is then detected by photodetectors in the scanner. This light is converted into an electrical signal, which is digitized and processed by a computer to generate a digital image. This digital image can then be viewed on a computer monitor, manipulated for better diagnostic visibility, and stored digitally for future reference.
Thus, the answer to the question emphasizes the crucial role of the imaging plate in computed radiography. It is the primary medium where the X-rays are transmitted directly after passing through the subject. The subsequent steps involve converting the information stored in the imaging plate into a format useful for diagnostic and record-keeping purposes. This highlights the process's efficiency and the technology's ability to facilitate quick access to and manipulation of medical images.

Question: 4

Mammography uses what grid ratio?

A. 5:1
B. 6:1
C. 8:1
D. 10:1

Answer: A

Explanation:
Mammography, a specialized type of medical imaging, utilizes X-rays to create detailed images of the breast. This technique is primarily used for the early detection and diagnosis of breast cancer. An essential component used during the mammography process is the anti-scatter grid. The grid ratio typically employed in mammography is 5:1.
The purpose of the grid in mammography is to improve image quality by reducing the amount of scatter radiation that reaches the digital detector. Scatter radiation occurs when X-rays deviate from their original path after interacting with tissues in the body. This scattered radiation, if not controlled, can degrade the quality of the image by creating fog and reducing contrast, which makes it more challenging to detect abnormalities such as tumors.
The grid ratio refers to the relationship between the height of the grid strips and the distance between them. A 5:1 grid ratio means that the height of the lead strips in the grid is five times the width of the space between them. This ratio is particularly effective in balancing the reduction of scattered radiation while minimizing the absorption of primary radiation (the X-rays that travel directly from the source to the detector without scattering), which is crucial for maintaining image clarity and detail.
While other grid ratios exist, such as 6:1, 8:1, and 10:1, each serving different types of radiographic imaging and balancing between image quality and patient radiation dose, the 5:1 ratio is specifically favored in mammography. This preference is due to its effectiveness in enhancing contrast in the

relatively thin structure of the breast, thereby improving the detectability of small calcifications and other subtle signs of early breast cancer.
In conclusion, in mammography, a 5:1 grid ratio is commonly used to optimize image quality by reducing scatter while preserving the necessary diagnostic details. This grid configuration helps radiologists detect early signs of breast cancer, ultimately contributing to better patient outcomes through early intervention.

Question: 5

Which of the following locations in the breast does lobular carcinoma occur?

A. _The intralobular terminal duct
B. The target
C. A tissue marker
D. The tumor suppressor genes

Answer: A

Explanation:
The terminal duct lobular unit is where most of the benign and malignant breast diseases occur. The origin or site for lobular carcinoma is the terminal duct lobular unit, more specifically, the intralobular terminal duct. The lobules of the breast contain the ducts that produce milk.
Additional locations where breast cancer happens is in the fibrous (connective) tissue, and more rarely in the stromal tissue at the nipple and skin lymphatics of the breast. Breast cancer without a site of origin and does not have a cell type or category for the malignancy is labeled carcinoma not otherwise specified.
The remaining answer choices, the target, a tissue marker, and the tumor suppressor genes, are incorrect answer choices. A tissue marker is a metal piece that is used at the biopsy site. The tissue marker is employed during a stereotactic breast biopsy procedure. The tumor suppressor genes are genes that hinder cell division or produce cell death. The target is a metal plate where the x-ray beam is focused or directed.

Question: 6

How is the breast positioned in an XCCM?

A. The lateral portion of the breast is to be placed in an upward position
B. The lateral portion of the breast is to be placed in a forward position
C. The medial portion of the breast is to be placed in a forward position
D. The medial portion of the breast is to be placed in an upward position

Answer: C

Explanation:
In an XCCM, which stands for Exaggerated Craniocaudal Medial mammographic view, particular positioning of the breast is vital to obtain accurate and detailed imaging of the medial portion of the

breast. This specific view is employed primarily to better visualize the structures in the medial part of the breast, which can sometimes be obscured in standard mammographic views.
To achieve this, the patient is positioned such that the lateral portion of the breast is placed in an upward position. Elevating the lateral portion helps in spreading the breast tissue more uniformly over the detector, ensuring that the medial portion is not overshadowed by the denser tissue of the lateral portion. This position aids in minimizing tissue overlap, which can obscure key details in the images.
Simultaneously, the medial portion of the breast, which is the main focus in the XCCM view, needs to be positioned forward. This forward positioning of the medial portion is crucial as it aligns the breast tissues in such a way that the X-ray beam can penetrate this area with minimal obstruction. This alignment enhances the visibility of the medial breast tissues on the mammographic images.
The technical settings of the XCCM view involve a negative tube tilt of 15 degrees. This specific angle is chosen to optimize the imaging of the medial breast quadrant by aligning the X-ray beam to pass perpendicularly through the most significant area of interest in the medial portion. The negative tilt helps in achieving a more detailed and contrasted view of the medial structures, facilitating better identification and assessment of any abnormalities.
Additionally, the nipple is positioned to be in profile in the image. This is important as it provides a clear reference point and helps in ensuring that the medial tissues are positioned correctly relative to the nipple. Displaying the nipple in profile also aids radiologists in identifying any distortions or abnormalities that might affect the nipple and its surrounding tissues.
Overall, the XCCM view is a specialized imaging technique in mammography designed to enhance the visualization of the medial part of the breast. Proper positioning of the breast, along with the appropriate technical settings, is essential to maximizing the effectiveness of this imaging view, thereby aiding in the accurate diagnosis and treatment planning for breast conditions.

Question: 7

For radiologists, which of the following is an advantage of PACS?

A. Copies can be accessed by anyone.
B. Copies can be accessed anywhere.
C. Soft copy images can be accessed instantly.
D. Hard copy images can be accessed instantly.

Answer: C

Explanation:
The question pertains to the advantages of Picture Archiving and Communication Systems (PACS) for radiologists. PACS is an integral component in modern healthcare, particularly within radiology departments. This technology system stores, retrieves, presents, and shares images from various medical imaging instruments, such as X-rays, CT scans, and MRIs. The primary function of PACS is to streamline the imaging process, making it digital, which leads to various benefits for healthcare providers, especially radiologists.
Among the options provided, "Soft copy images can be accessed instantly" is a significant advantage of using PACS. This feature directly impacts the efficiency and effectiveness of medical imaging services. Traditionally, images would be developed as hard copies, which could take considerable time and physical space to manage. With PACS, images are digitized, eliminating the need for physical film and reducing the time from image capture to availability for review.

The instant access to soft copy images facilitates faster diagnosis and decision-making, which is crucial in medical environments where time is often of the essence. For instance, in emergency cases, the ability for a radiologist to instantly retrieve and examine images can significantly impact patient outcomes. Moreover, this capability supports telemedicine, where images need to be reviewed by specialists who may not be physically present in the hospital.
In contrast to the other options provided: - "Copies can be accessed by anyone" is not necessarily an advantage, as it raises concerns about the security and confidentiality of medical images. - "Copies can be accessed anywhere" highlights the system's accessibility, which is indeed beneficial but is a broader advantage that encompasses more than just the accessibility of images. - "Hard copy images can be accessed instantly" is not applicable to PACS, as the system deals with digital images, not hard copies. Therefore, the most precise and relevant advantage of PACS for radiologists, as per the options listed, is that "Soft copy images can be accessed instantly." This feature not only improves the workflow within radiology departments but also enhances the overall healthcare delivery by reducing delays and facilitating immediate access to critical diagnostic information.

Question: 8

In what type of view is posterior tissue from the axilla to inframammary used?

A. MLO
B. CC
C. ML
D. LM

Answer: A

Explanation:
The type of view in which posterior tissue from the axilla to the inframammary fold is used is the MLO view.
MLO stands for mediolateral oblique. This is a specific type of mammographic imaging view that is angled or oblique, as opposed to a straight-on view like the craniocaudal (CC) view. The MLO view is particularly important for comprehensive breast imaging as it allows for a better visualization of the upper outer quadrant of the breast, where a significant portion of breast cancers are found.
In the MLO view, the positioning of the breast is crucial to ensure an effective and comprehensive examination. The positioning criteria for the MLO view include ensuring that the pectoral muscle is visible down to the nipple line, which helps in assessing the tissue symmetry and any abnormalities in the muscle. The breast should appear to be lifted and outwardly projected without any sagging. This helps in spreading the breast tissue evenly and reduces overlapping, which can obscure details. The goal is to have no folds or unsharpness in the image, as these can hide lesions or make the images difficult to interpret.
Another critical aspect of the MLO view is the inclusion of the posterior tissue from the axilla to the inframammary fold. This area includes parts of the breast that might not be well visualized in other views, such as the CC view. By imaging from the axilla (the armpit area) to the inframammary fold (the line beneath the breast), the MLO view helps in examining the breast tissue that extends into the axilla, which can occasionally harbor tumors or other abnormalities.
Overall, the MLO view is a fundamental component of mammography that aids in the thorough examination of the breast, especially in areas that are prone to developing cancers. Its specific

positioning criteria, including the visualization of posterior tissue from the axilla to the inframammary fold, are essential for ensuring that the breast is adequately and accurately assessed.

Question: 9

If the kVp is lowered during a mammogram, the image will most likely have which of the following?

A. Have less contrast
B. Appear too dark
C. Have more contrast
D. Capture only a portion of the image

Answer: C

Explanation:
The correct effect of lowering the kilovoltage peak (kVp) during a mammogram is that the image will have more contrast. Understanding why involves a basic grasp of how kVp functions in mammographic imaging.
kVp represents the peak voltage applied across the X-ray tube during an X-ray exposure. This setting is crucial because it determines the energy and penetrating power of the X-rays produced. Higher kVp settings generate higher energy X-rays that can penetrate denser tissues more effectively, while lower kVp settings produce softer X-rays that are more readily absorbed by soft tissues.
In mammography, contrast is a critical factor. Contrast in an X-ray image is determined by the difference in the X-ray absorption between different types of tissues. When the kVp is lowered, the X-rays produced are less penetrating. This results in greater absorption differences between dense tissues (like calcifications or tumors) and fatty tissues, thereby enhancing the contrast of the image.
For instance, in patients with smaller or denser breasts, lowering the kVp can help in highlighting subtle differences between normal and abnormal tissues by increasing the image contrast. This makes it easier to detect anomalies like small calcifications, which are crucial for the early detection of breast cancer.
Therefore, when the kVp is lowered during a mammogram, the resultant X-ray image will exhibit more contrast, making it more effective for diagnostic purposes, especially in detecting finer details within the breast tissue. This adjustment of the kVp is a tool that radiologists can use to optimize the quality of the mammogram according to the specific breast composition of the patient.

Question: 10

Which of the following is a non-cancerous solid tumor in the breast that is typically painless and mobile?

A. Invasive lobular carcinoma
B. LCIS
C. Simple breast cyst
D. Breast fibroadenoma

Answer: D

Explanation:

The correct answer to the question is "Breast fibroadenoma."

Breast fibroadenoma is a benign (non-cancerous) condition characterized by the presence of solid tumors within the breast tissue. These tumors are composed of both glandular breast tissue and stromal (connective) tissue. Fibroadenomas are most commonly found in women between the ages of 15 and 35, but they can occur in women of any age. The condition is notably more prevalent among women in their twenties and thirties.

Typically, a fibroadenoma presents as a single lump within the breast but can also occur as multiple small lumps. These lumps are usually painless, firm, and smooth to the touch. One of the distinguishing features of fibroadenomas is their mobility; they often feel like they can be moved slightly within the breast when touched, which has led to the nickname "breast mouse."

Diagnosis of breast fibroadenoma usually involves a combination of physical examination, imaging tests such as ultrasound or mammography, and sometimes a biopsy to confirm the nature of the lump. Although fibroadenomas are benign and do not increase the risk of breast cancer, they are monitored for changes in size or feel, as significant changes may require further evaluation or surgical removal.

It is important to differentiate fibroadenomas from other types of breast lumps, such as simple breast cysts or malignant tumors. Simple breast cysts are fluid-filled sacs within the breast, which are also typically benign but can sometimes cause discomfort. In contrast, malignant tumors, such as invasive lobular carcinoma or ductal carcinoma, are cancerous and constitute a serious health threat, requiring immediate treatment.

In summary, breast fibroadenoma is a common, benign tumor in the breast, particularly among younger women. It is characterized by its solid, painless, and mobile nature. Regular breast examinations and appropriate diagnostic imaging are essential to differentiate these benign lumps from more serious conditions.

Thank You for Trying Our Product

For More Information – Visit link below:

https://www.examsboost.com/

15 USD Discount Coupon Code:

G74JA8UF

FEATURES

- ✓ 90 Days Free Updates
- ✓ Money Back Pass Guarantee
- ✓ Instant Download or Email Attachment
- ✓ 24/7 Live Chat Support
- ✓ PDF file could be used at any Platform
- ✓ 50,000 Happy Customer