

AEC 2

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- When using AEC, the radiographer is responsible for determining:
 - kVp
 - mAs
 - exposure time
 - none of the above
- The predetermined level of radiation exposure needed to terminate the exposure when using AEC is set by:
 - the radiologist
 - the technologist
 - people who service the equipment
 - the manufacturer
- There is typically a configuration of at least _____ AEC detectors in place.
 - 2
 - 3
 - 4
 - 5
- The device that converts the light energy to an electrical signal is the:
 - photodiode
 - photocathode
 - photomultiplier tube
 - A and C
- Phototimer AEC detectors are usually exit-type devices because:
 - the x-rays must exit the patient to get to the detectors
 - the x-rays must exit the grid to get to the detectors
 - the x-rays must exit the image receptor to get to the detectors
 - none of the above
- An ionization chamber is a hollow device that contains:
 - water
 - lead
 - tungsten
 - air
- Ion chamber AEC detectors are entrance-type devices because the x-rays must:
 - enter the detector after passing through the IR
 - enter the detector before entering the patient
 - enter the detector before getting to the IR
 - none of the above
- When the x-rays enter the ionization chamber:
 - atoms become ions
 - atoms give up electrons
 - electrons and positive ions become electricity
 - all of the above
- Once the electric charge from an AEC detector reaches a preset point:
 - the patient can leave
 - the kVp will be reduced to 0
 - the exposure will stop
 - all of the above
- The shortest exposure time that a radiographic tube with AEC can have is the:
 - mAs readout
 - back-up time
 - minimum response time
 - density controls
- The maximum length of time that an exposure lasts when using AEC is the:
 - mAs readout
 - back-up time
 - minimum response time
 - density controls
- The actual amount of exposure used for an image when AEC is being used is the:
 - mAs readout
 - back-up time
 - minimum response time
 - density controls
- These can be adjusted to increase or decrease the amount of radiation needed to terminate the exposure using AEC.
 - mAs readout
 - back-up time
 - minimum response time
 - density controls
- When using AEC, the kVp:

- a. is set higher than usual
 - b. is set lower than usual
 - c. is set as appropriate for the study
 - d. is determined by the AEC system
15. Using a lower mA station during an AEC examination results in:
- a. reduced patient exposure
 - b. increased exposure time
 - c. decreased exposure time
 - d. A and B
16. In imaging a child, a short exposure time is needed for an examination using AEC. The mA setting should:
- a. be low
 - b. be mid-range
 - c. be high
 - d. it doesn't matter—the AEC device will control the exposure time
17. If the back-up time is shorter than the actual exposure time needed for a properly exposed image:
- a. the image receptor will be overexposed
 - b. the image receptor will be underexposed
 - c. the exposure will be appropriate
18. If the patient for an AP thoracic spine image is centered so that the spine is not over the top of the detector:
- a. the film image will be too dark
 - b. the film image will be too light
 - c. the IR will be overexposed
 - d. A and C
19. When using AEC with digital imaging, errors resulting in overexposure to the IR result in:
- a. images that are dark
 - b. images with appropriate brightness
 - c. overexposed patients
 - d. B and C
20. With digital system imaging using AEC, if an AP thoracic spine is imaged using 110 kVp instead of 80 kVp, the brightness in the area of interest will be _____ and the image contrast will be _____. (Assume all other factors are appropriate.)
- a. light; lower
 - b. dark; higher
 - c. the same; lower
 - d. the same; higher

AEC 2

Answer Section

MULTIPLE CHOICE

1. ANS: A

In that AEC controls exposure time, it also controls mAs. The radiographer must set an appropriate kVp.

PTS: 1 OBJ: 3

2. ANS: C

Although it may initially be set by the manufacturer, the service personnel make the final determination following testing.

PTS: 1 OBJ: 3

3. ANS: B

Three radiation-measuring detectors are commonly used.

PTS: 1 OBJ: 4

4. ANS: D

The older photomultiplier tube and the new photodiode both convert light energy to an electrical signal.

PTS: 1 OBJ: 4

5. ANS: C

Exit-type detectors are located behind the IR, requiring the radiation to exit the IR before interacting with the detectors.

PTS: 1 OBJ: 4

6. ANS: D

Ionization chambers typically contain air or some other gas.

PTS: 1 OBJ: 4

7. ANS: C

The entrance-type detector is positioned immediately in front of the IR.

PTS: 1 OBJ: 4

8. ANS: D

As the x-rays expose the air in the ionization chamber, electrons are knocked off of atoms, producing ions. This creates an electric charge.

PTS: 1 OBJ: 4

9. ANS: C

Once a predetermined electric charge has been reached (resulting from a set amount of radiation being absorbed by the detector), the exposure is terminated.

PTS: 1 OBJ: 4

10. ANS: C

Minimum response time is the minimum time for the exposure to start and then end.

PTS: 1 OBJ: 4

11. ANS: B
Whether set by the radiographer or inherent in the equipment, the back-up time is the longest time the exposure can go on when using AEC.
- PTS: 1 OBJ: 4
12. ANS: A
It may appear for a brief time, but the mAs readout shows exactly how much mAs was used to produce an image.
- PTS: 1 OBJ: 4
13. ANS: D
Density controls change the exposure time by a specific amount.
- PTS: 1 OBJ: 4
14. ANS: C
kVp must be set at the level appropriate for the examination.
- PTS: 1 OBJ: 7
15. ANS: B
Lowering the mA does not affect the mAs (and patient exposure) but does result in an increase in exposure time so the detector has time to reach its preset level.
- PTS: 1 OBJ: 7
16. ANS: C
The mA should be set on the high side so that the exposure time is reduced.
- PTS: 1 OBJ: 7
17. ANS: B
If the back-up time is too short, the exposure will terminate prematurely, resulting in the image receptor being underexposed.
- PTS: 1 OBJ: 7
18. ANS: B
If the spine is not over top of the detector, then the lung is, allowing the radiation to easily penetrate and the exposure will be terminated quickly. The result is that the lungs are correctly exposed but the spine is underexposed, producing a light film image.
- PTS: 1 OBJ: 6
19. ANS: D
As is typical, the computer can compensate for overexposure to the digital IR, displaying an image with appropriate brightness. However, the overexposure to the patient cannot be adjusted and it is up to the radiographer to maintain vigilance in using the AEC system properly.
- PTS: 1 OBJ: 11
20. ANS: C
Increasing the kVp will not affect the brightness because the detector will still wait for the preset level to be reached. However, the increase in kVp will produce an image with lower contrast.
- PTS: 1 OBJ: 9