Chapter 27

1. Which of the following is *not* a part of an automatic exposure control circuit?

a. capacitor

b. magnetic relay switch

c. thyratron

d. transformer

e. ion chamber

2. Within the automatic exposure control circuit, which of these is placed in the circuit immediately following the capacitor?

a. ion chamber

b. transformer

c. magnetic relay switch

d. thryatron

3. For an AEC circuit, which of the following electronic devices corresponds to the “density”

control on the console?

a. capacitor

b. magnetic relay switch

c. thyratron

d. transformer

e. ion chamber

4. Even though the AEC is being used, it is still necessary for the radiographer to set the x-ray

machine for:

a. optimum mA

b. optimum kVp

c. detector cell configuration

d. b and c only

e. all of the above

5. When using automatic exposure control, if too high an mA station is used for the particular

patient and body part, the patient will receive excessive exposure *because of:*

a. the high rate of exposure

b. minimum response time for the AEC

c. early termination of the exposure

d. the reduced kVp that is engaged with high mA

6. When using automatic exposure control, which of the following should be approximately doubled from the expected exposure?

a. kVp

b. minimum response time

c. back-up time

d. mA

7. Based upon surveys of recently installed CR units, which of the following was found to be so

frequently extreme that department managers and radiographers are encouraged to

routinely *over-ride* the parameters that have been pre-set by manufacturers and adjust

these settings downward?

a. pre-set AEC back-up times

b. pre-set kVp’s for each procedure

c. pre-set minimum response times

d. pre-set window levels

8. Which of the following is a typical minimum response time for an AEC circuit?

a. 0.01 second

b. 0.1 second

c. 1 second

d. 2 seconds

e. double the expected exposure time

9. Automatic exposure controls stay on longer with larger patients because they are designed to

terminate the exposure only on the basis of the:

a. total dose detected

b. dose rate detected

c. time elapsed

d. HVL of the remnant beam

10. When changing to a higher speed of image receptor plate, or the ratio of the grid in an x-ray

table bucky is changed to a lower ratio, the thyristor of the AEC must be:

a. adjusted to discharge the circuit with less electrical charge build-up

b. adjusted to discharge the circuit when more electrical charge is built up

c. left unchanged

d. turned off

11. The AEC can be rendered unreliable if the speed of the image receptor used is so fast that the

resulting exposure times become shorter than the required:

a. back-up time

b. response time

c. reciprocity time

d. fluoro time

12. Automatic exposure control may be used when:

a. anatomy is complex with high contrast differentials

b. anatomy is large

c. technique charts are not reliable

d. positioning is not reliable

e. all three detector cells are always used

13. On an automatic exposure of the abdomen in erect position, you forget to use 40" (100 cm)

SID and leave the x-ray tube at 180 cm (72") SID. The overall exposure reaching the

image receptor plate will be:

a. underexposed

b. overexposed

c. correctly exposed

14. A projection of an adult lumbar spine is taken with AEC using *60 kVp* and a “density”

setting of “0” or “N”. The digital radiograph demonstrates significant mottle. If the

projection is repeated with a new “density” setting of “+2”, how will the image turn out?

a. correct brightness with no mottle

b. mottle will still be present

c. dark but with no mottle

d. low contrast but with no mottle

15. If an AEC exposure is used for a “frog” lateral hip projection when there is a large metallic

hip prosthesis present, which of the following will most likely result:

a. a digital radiograph will turn out too light

b. a digital radiograph will turn out too dark

c. the patient will be overexposed, and the digital radiograph may be light or dark

d. the patient will be overexposed, but the digital radiograph will have very high contrast

16. When using AEC, the radiographer must use much greater care in:

a. technique calculation

b. positioning

c. radiation protection

d. equipment manipulation

e. patient care

17. For a particular radiograph, the exposure indicator shows that twice too much exposure was

used. If this radiograph was taken using the AEC, what would the exposure or “density”

control be set to in order to correct the exposure the next time this procedure is done on a

similar patient?

a. N

b. -1

c. -2

d. -3

e. +2

18. When it is known in advance that a large prosthesis or large orthopedic device that would

absorb a lot of radiation is present within the anatomy, the best approach for

radiographing this patient is to use:

a. AEC as usual

b. AEC with the central ray carefully centered away from the device

c. AEC with a +1 setting on the “density” control

d. AEC with a +2 setting on the “density” control

e. “manual” technique, with the AEC off

19. On a small pediatric chest using AEC, the radiographer ensures that the detector cells are

fully covered by the anatomy, but leaves the field size open much wider than the

anatomy. The result will be:

a. moderate underexposure to the AEC detectors

b. moderate overexposure to the AEC detectors

c. a dark image after digital processing

d. a blurry image after digital processing

20. Most AEC “density” controls extend or shorten the exposure time in increments of:

a. 5%

b. 10%

c. 15%

d. 25%

e. 50%

21. When using automatic exposure control (AEC) on an adult PA chest projection, which of the

following activated detector cell configurations results in the greatest exposure to the image receptor plate?

a. left cell only

b. left and center cells only

c. all three cells

d. right and left cells only

e. right cell only

22. When using automatic exposure control (AEC) on an adult PA chest projection, which of the

following activated detector cell configurations results in the *least* exposure to the

image receptor plate?

a. right and left cells only

b. all three cells

c. left cell only

d. left and center cells only

e. center cell only

23. Whenever possible the configuration of activated AEC detector cells should be selected such

that:

a. the thickest portion of the anatomy of interest lies over an energized cell

b. the center cell is covered by the tissue of interest

c. the energized cells are covered by the tissue of interest

d. all of the above

e. a and c only

24. Regarding the exposure indicator for CR and DR images, the use of automatic exposure

control (AEC) makes:

a. it less important for radiographers to monitor the exposure indicator

b. it even more important for radiographers to monitor the exposure indicator

c. the exposure indicator becomes irrelevant

d. it is necessary to double the exposure indicator values for interpretation

25. Exposure techniques that are pre-programmed in the x-ray machine should be:

a. consistently used in all situations

b. always cut in half

c. over-ridden and modified on occasion according to the professional judgment of the

radiographer

d. completely de-activated

26. When using automatic exposure control (AEC), which of the following would result in over-

exposure to the image receptor plate?

a. Wrong bucky activated

b. Inadequate collimation

c. Incorrect detector cell configuration, such that activated cell(s) lie under tissue *less*

*dense or thinner* than the tissue of interest

d. Detector cells not fully covered by the tissue of interest

27. When using automatic exposure control (AEC), which of the following would result in

under-exposure to the image receptor plate?

a. Needed exposure time *less* than minimum response time (small anatomy, high mA)

b. Electronic malfunction of the AEC, (back-up buzzer sounds)

c. Incorrect detector cell configuration, such that activated cell(s) lie under tissue *denser*

*or thicker* than the tissue of interest

d. Presence of radiopaque artifacts or appliances

e. Backup time shorter than needed exposure time (esp. on large patient)