SELF-ASSESSMENT QUIZ: COMPUTER

The Continuing Education Committee presents this quiz for self-evaluation on computers. The questions are not designed to test all your skills, and by no means claim to cover all aspects of computer theory. The Committee thanks all item writers for their questions.

Answers can be found on page 54. Where possible, references are included for your use on questions that seem unclear. We encourage you to further your professional growth and development by reading up on the subject.

Be sure and select the BEST answer for each question.

1. *The smallest subdivision of a memory location is one binary digit called a _____.*
   a. Byte.
   b. Word.
   c. Register.
   d. Bit. Ref 1 p. 189

2. *The term software refers to:*
   a. An interface between detector and console.
   b. The programming that controls the computer.
   c. An interface known as the analog to digital converter.
   d. The physical pieces of equipment that constitute any computer system. Ref 2 p. 22

3. *Which of the following storage devices has the longest access time?*
   a. Floppy disk.
   b. Single cartridge disk.
   c. Multiplatter disk pack.
   d. Magnetic tape. Ref 1 pp. 198–203

4. *Which of the following storage devices has the least capacity?*
   a. Magnetic tape.
   b. Floppy disk.
   c. Single cartridge disk.
   d. Multiplatter disk pack. Ref 1 pp. 198–203

5. *One image acquired in a 64 × 64 byte mode matrix requires how many words of memory assuming a 16-bit word length?*
   a. 512.
   b. 1,024.
   c. 2,048.
   d. 4,096. Ref 2 p. 55

6. *An analog to digital converter is positioned:*
   a. Between the gamma camera head and the gamma camera console.
   b. In the gamma camera imaging head.
   c. Between the gamma camera and the central processing unit.
   d. Between the central processing unit and the image display terminal. Ref 2 p. 22

7. *How many 16-bit words of memory are required by a 128 × 128 byte mode image?*
   a. 32,768.
   b. 16,384.
   c. 8,192.
   d. 4,096. Ref 2 p. 55

8. *In a 16-bit computer, a study acquired in word mode can accommodate:*
   a. 255 cts/pixel.
   b. 512 cts/pixel.
   c. 32,768 cts/pixel.
   d. 65,535 cts/pixel. Ref 1 p. 205

9. *When selecting a framing rate for a particular dynamic study, it should be:*
   a. Slow enough to achieve an adequate count rate per frame.
   b. Slow enough to integrate significant dynamic events.
   c. A minimum of 1 frame/sec.
   d. At the system's fastest acquisition speed. Ref 2 p. 101

10. *The main advantage of list mode over frame mode acquisition is:*
    a. Flexibility in reformatting images.
    b. Decreased storage space.
    c. Decreased image processing time.
    d. Display of data during acquisition. Ref 2 p. 53

11. *A parametric image is one which:*
    a. Is normalized to another image.
    b. Displays a dynamic process.
    c. Includes a region of interest analysis.
    d. Displays mathematically determined organ functions. Ref 3 p. 2

12. *The process utilized to remove statistical fluctuations from data by modifying individual pixels within the image is called _____.*
    a. Profile selecting.
    b. Image retrieval.
    c. Image transformation.
    d. Interpolation smoothing. Ref 2 p. 81

13. *If an image was acquired in a 128 × 128 matrix and had an average of 50 counts/pixel, what would be the average counts/pixel if the image had been acquired in a 64 × 64 matrix?*
    a. 25.
    b. 50.
    c. 100.
    d. 200. Ref 4 p. 107

14. *In a dynamic study, what is the effect of normalizing all the frames?*
    a. Determines the average for background subtraction.
    b. Allows quantification of volume.
    c. Makes all frames the same intensity.
    d. Averages all counts between frames. Ref 4 p. 91

15. *What type of frame processing can be used to eliminate the "flicker" in a cardiac cine or playback mode?*
    a. Spatial smoothing.
    b. Temporal smoothing.
    c. Contrast enhancement.
    d. Background subtraction. Ref 4 p. 92

16. *In a dynamic renal study when the following two frame rates are used, how would you plot the curves so there are no discontinuities?*
    Given: Arterial frame rate = 2 frames/sec.
    Excretion frame rate = 1 frame/30 sec.
    a. Multiply the excretion data by 30.
    b. Multiply the arterial data by 30.
    c. Divide the arterial data by 60.
    d. Divide the excretion data by 60. Ref 4 p. 88

17. *The purpose of gated acquisition is to:*
    a. Allow to image at a faster frame rate.
    b. Capture the vascular phase of the radiopharmaceutical bolus.
    c. Synchronize the images to organ motion.
    d. Correct for patient motion. Ref 1 p. 208

18. *What is the effect of using too much background subtraction in the calculation of an ejection fraction?*
    a. Increases the ejection fraction.
    b. Decreases the ejection fraction.
    c. No change.
    d. No change but degrades the statistics. Ref 4 p. 117

19. *Fourier transform analysis is used to:*
    a. Convert cartesian to polar coordinates.
    b. Analyze circular profiles such as thallium images.
    c. Convert analog to digital signals.
    d. Analyze shapes in terms of frequency wave forms. Ref 2 p. 134

20. *Phase analysis of gated cardiac images is used to demonstrate:*
    a. Valvular disease.
    b. Aortic stenosis.
    c. Regional wall motion abnormalities.
    d. Ventricular volume changes with drug intervention. Ref 3 p. 129

21. *In a gated acquisition, which of the following causes the computer to return to the first frame?*
    a. Reaching the end of the preset R-R interval.
    b. A new R-wave signal.
    c. Pixel overload.
    d. A premature ventricular contraction. Ref 1 p. 208

22. *First-pass radionuclide angiocardiography for the detection of left-to-right cardiac shunts involves quantification of a time activity curve obtained from a region of interest (ROI) drawn over the _____.*
    a. Aorta.
    b. Left heart.
    c. Right heart.
    d. Lungs. Ref 2 p. 174

23. *For a first-pass acquisition for left ventricular ejection fraction, the framing rate should be at least:*
    a. 2 frames/sec.
    b. 10 frames/sec.
    c. 20 frames/sec.
    d. 50 frames/sec. Ref 1 p. 298

24. *The one major problem associated with acquisition of gated equilibrium left ventricular function studies is:*
    a. Poor statistics.
    b. Disk space requirements.
    c. Count rate limitations.
    d. Patient arrhythmias. Ref 1 pp. 207–8

25. *An ECG simulator allows which of the following quality controls to be monitored:*
    1. *Paper strip gain adjustment*
    2. *QRS complex discrimination*
    3. *Computer clock timing*
    4. *Computer detection of QRS complex*

    a. 2 and 4.
    b. 1 and 4.
    c. 1 and 2.
    d. All of the above. Ref 4 p. 226

References

1. Bernier DB, Langan JK, Wells LD, eds. *Nuclear Medicine Technology and Techniques.* St. Louis: CV Mosby, 1980.
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3. Esser PD. *Functional Mapping of Organ Systems.* New York: Society of Nuclear Medicine, 1981.
4. Erickson JJ, Rollo FD. *Digital Nuclear Medicine.* Philadelphia: JB Lippincott, 1983.