Hybrid PET/CT and SPECT/CT

1. What modality uses radioactive probes commonly referred to as tracers for the diagnosis and treatment of disease?
    a. SPECT
    b. PET
    c. Nuclear Medicine
    d. MRI
2. What is the visualization, characterization, and measurement of biological processes at the molecular and cellular level in humans and other living systems called?
    a. Molecular imaging
    b. Organic imaging
    c. Atomic imaging
    d. Biological imaging
3. Tracer imaging in _____ has the highest molecular sensitivity.
    a. PET
    b. SPECT
    c. MRI
    d. Nuclear medicine
4. The advantage of functional imaging is the increasing _____ because metabolic changes precede anatomical changes.
    a. Specificity
    b. Sensitivity
    c. Accuracy
    d. Detection
5. The advantage of anatomical imaging by _____ is its high anatomical resolution and usually good topographical information.
    a. Nuclear medicine
    b. CT
    c. PET
    d. SPECT
6. The cost-effectiveness of PET plus CT was shown as early as the late _____.
    a. 1970s
    b. 1980s
    c. 1990s
    d. 2000s
7. True or false. In nuclear medicine, imaging can be performed as whole-body imaging or dual-phase imaging without additional radiology exposure.
    a. True
    b. False
8. In PET/CT the biggest advantage was improving _____.
    a. Image reconstruction
    b. Anatomical imaging
    c. Clinical imaging
    d. B & C

9. The spectrum of photon energy from the anode of the x-ray tubes used in CT range from ____ keV up to peak energy.
    a. 0
    b. 1
    c. 2
    d. 3
10. The origins of PET, SPECT, and CT date back to the early _____.
    a. 1960s
    b. 1970s
    c. 1980s
    d. 1990s
11. Who developed a multi-crystal positron camera in 1972?
    a. Hoffman
    b. Ter-Pogossian
    c. Phelps
    d. Burnham
12. The first PET/CT scanner design reduced the number of detectors from 144 to _____.
    a. 120
    b. 80
    c. 64
    d. 32
13. What was the first company to use a slip ring for its gamma camera gantry, allowing > 360 degrees?
    a. Siemens
    b. General Electric
    c. Phillips
    d. Picker
14. What year was the first PET/MR system installed by Siemens?
    a. 2001
    b. 2005
    c. 2008
    d. 2010
15. The absorbed dose in CT is dependent on which of the following operator-dependent factors?
    a. mAs
    b. kVp
    c. Pitch
    d. all the above
16. At the time the text was written, a diagnostic CT of the chest, abdomen, and pelvis will give an effective dose of _____mSv.
    a. 8
    b. 11
    c. 13
    d. 15
17. 99m_Tc labeled white blood cells has one of the highest effective dose of _____mSv.
    a. 15.5
    b. 16.5
    c. 17.5
    d. 18.5

For questions 18 through 21, choose the appropriate ACR radiation level definition based on the effective dose range listed.

18. Effective dose range of <0.1 mSv
    a. High
    b. Low
    c. Minimal
    d. Medium
19. Effective dose range of 0.1–1 mSv
    a. High
    b. Low
    c. Minimal
    d. Medium
20. Effective dose range of >10 mSv
    a. High
    b. Low
    c. Minimal
    d. Medium
21. Effective dose range of 1–10 mSv
    a. High
    b. Low
    c. Minimal
    d. Medium
22. True or false. The most important way to reduce radiation dose in hybrid systems is to optimize CT protocols.
    a. True
    b. False
23. According to the text, it has been reported that integrated PET/CT devices provided additional information in approximately _____ of all lesions.
    a. 6-7%
    b. 8-9%
    c. 10-11%
    d. 12-13%
24. PET is most frequently used in _____.
    a. Neurology
    b. Cardiology
    c. Oncology
    d. Radiation therapy planning
25. What percentage of cervical metastasis are below one centimeter in diameter?
    a. 30%
    b. 40%
    c. 45%
    d. 50%
26. What is superior to PET/CT for T staging and in identifying locoregional nodes from esophageal cancer?
    a. FDG PET-CT
    b. PET
    c. Endoscopic ultrasound
    d. CT

27. At the time the text was written, transrectal ultrasound and _____ provide much better anatomic resolution for colorectal cancer than PET/CT.
    a. CT
    b. PET
    c. Nuclear medicine
    d. MRI
28. True or false. PET/CT **is not** the method of choice for the staging of gastrointestinal stromal tumors.
    a. True
    b. False