

BIOMEDICAL - Unit 4 and 5 MCQs

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May 5, 2024

1 UNIT-4 1 mark MCQ

1. What is the primary physical principle behind MRI?

- A. Piezoelectric effect
 - B. X-ray attenuation
 - C. **Nuclear magnetic resonance**
 - D. Ultrasonic waves
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2. Which component is crucial for detecting the X-rays in computed tomography (CT)?

- A. Cathode ray tube
 - B. X-ray tube
 - C. Photomultiplier tube
 - D. **Detector array**
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3. In ultrasonography, what determines the resolution of the image?

- A. **Frequency of the ultrasound waves**
 - B. Amplitude of the ultrasound waves
 - C. Speed of sound in air
 - D. Intensity of the ultrasound waves
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4. Which imaging technique uses thermal sensors to detect radiation emitted by the body?

- A. MRI
 - B. CT
 - C. **Thermography**
 - D. Fluoroscopy
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5. What is the main advantage of fluoroscopic imaging over traditional radiography?

- A. Higher resolution images
 - B. Faster image processing
 - C. **Real-time moving images**
 - D. Lower radiation dose
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6. In endoscopy, what type of imaging technology is commonly used?

- A. Infrared imaging
 - B. **Fiber optic cameras**
 - C. Thermal imaging
 - D. Ultrasonic imaging
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7. What is a key feature of retinal imaging?

- A. It uses low-frequency sound waves.
 - B. **It can directly visualize vascular structures.**
 - C. It requires the injection of contrast media.
 - D. It is primarily used for diagnosing brain disorders.
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8. Which type of biotelemetry system would be most appropriate for monitoring heart rate and rhythm?

- A. EEG telemetry
 - B. **ECG telemetry**
 - C. EMG telemetry
 - D. Temperature telemetry
-

9. What distinguishes a digital image analysis in medical applications?

- A. Use of analog signals
 - B. Manual interpretation of images
 - C. **Quantitative measurement of image features**
 - D. Lower resolution images
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10. In biometric systems, which imaging application is commonly used for identity verification?

- A. Thermography
 - B. **Retinal imaging**
 - C. MRI
 - D. Ultrasound
-

11. How does computed tomography generate images?

- A. By detecting reflected sound waves
 - B. By recording electrical activity
 - C. **By using rotating X-ray sources and detectors**
 - D. By applying strong magnetic fields
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12. Which imaging modality is considered safest for imaging fetuses?

- A. X-ray
- B. MRI

- C. **Ultrasound**
 - D. CT
-

13. **What is the primary use of thermography in medical diagnostics?**

- A. To measure bone density
 - B. **To detect areas of heat and inflammation**
 - C. To visualize brain activity
 - D. To check for arterial blockages
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14. **Which imaging technique is most effective for visualizing soft tissues contrast?**

- A. X-ray
 - B. **MRI**
 - C. CT
 - D. Ultrasonography
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15. **What is a common use of fluoroscopy in clinical settings?**

- A. Long-term imaging
 - B. Capturing static images
 - C. **Guiding minimally invasive surgeries**
 - D. Whole-body scans
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16. **What role does the piezoelectric effect play in medical imaging?**

- A. It is used to generate X-rays in CT scanners.
 - B. It is used in MRI to align hydrogen atoms.
 - C. **It is used in ultrasonography to generate and detect ultrasound waves.**
 - D. It is used in thermography to detect heat.
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17. **In digital image analysis, what is segmentation used for?**

- A. Enhancing the contrast of the image
 - B. Reducing the noise in the image
 - C. **Dividing the image into meaningful regions**
 - D. Compressing the image size
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18. **Why is MRI preferred over CT in imaging of brain tissues?**

- A. Lower cost
 - B. Faster imaging time
 - C. **No ionizing radiation exposure**
 - D. Higher availability
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19. **What is an essential aspect of image processing in retinal imaging?**

- A. **Motion correction**
 - B. Temperature mapping
 - C. Sound wave analysis
 - D. Electrical activity recording
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20. In biotelemetry, what is the primary purpose of data encryption?

- A. To compress the data for faster transmission
 - B. **To prevent unauthorized access to the data**
 - C. To enhance the signal strength
 - D. To convert analog signals to digital
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1.1 UNIT-4 2 mark MCQ

21. Which imaging modality uses a gadolinium-based contrast agent to enhance image quality?

- A. X-ray radiography
 - B. **MRI**
 - C. CT
 - D. Ultrasound
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22. In computed tomography, what is the significance of the Hounsfield scale?

- A. It measures the intensity of the magnetic field used.
 - B. **It is a quantitative scale for describing radiodensity.**
 - C. It determines the frequency of ultrasound used.
 - D. It calibrates the thermal sensors in thermography.
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23. What differentiates a T1-weighted MRI scan from a T2-weighted scan?

- A. **T1 highlights fat better, while T2 highlights fluid.**
 - B. T1 uses lower magnetic fields than T2.
 - C. T1 is quicker than T2.
 - D. T1 is used for bone imaging, while T2 is used for soft tissues.
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24. In digital image processing, what is the primary purpose of using the Fourier Transform?

- A. To compress the images
 - B. To enhance the edges of the images
 - C. **To convert spatial domain data into frequency domain**
 - D. To reduce the color depth of images
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25. How does the principle of echolocation apply to ultrasonography?

- A. It helps in determining the position of the ultrasound device.
 - B. **It is used to measure the depth of the body tissue based on sound reflection.**
 - C. It adjusts the frequency of sound waves.
 - D. It enhances the contrast of the ultrasound images.
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2 UNIT-5 1 mark MCQ

26. What is the primary function of a pacemaker?

- A. To monitor heart rate
 - B. **To regulate heart rhythm**
 - C. To measure blood pressure
 - D. To decrease heart muscle contraction
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27. How does a defibrillator work?

- A. By providing a steady electrical stimulus
 - B. By delivering a therapeutic dose of X-ray radiation
 - C. **By delivering a controlled electric shock to the heart**
 - D. By cooling the heart muscle
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28. What is the main use of ventilators in medical settings?

- A. To provide pain relief
 - B. To administer anesthesia
 - C. **To assist or replace spontaneous breathing**
 - D. To monitor respiratory rate
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29. Which device is used to treat chronic pain and muscle spasms via electrical impulses?

- A. EEG machine
 - B. Ultrasound imager
 - C. **Nerve and muscle stimulators**
 - D. Blood pressure monitor
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30. What is the purpose of diathermy in therapeutic settings?

- A. To measure electrical activity of the heart
 - B. **To induce deep tissue heating**
 - C. To cool body tissues
 - D. To visualize internal organs
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31. What does a heart-lung machine do during cardiac surgeries?

- A. It monitors heart and lung function
 - B. **It replaces the function of the heart and lungs**
 - C. It reduces the heart rate
 - D. It increases oxygen intake
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32. What is the primary function of audiometers?

- A. To measure visual acuity
- B. **To assess hearing acuity**

- C. To record electrical activity of the brain
 - D. To monitor blood oxygen levels
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33. Which device is essential for patients undergoing hemodialysis?

- A. Defibrillator
 - B. Ventilator
 - C. **Dialyzer**
 - D. Pacemaker
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34. What is the primary benefit of using lithotripsy in treating kidney stones?

- A. It surgically removes stones.
 - B. It dissolves stones using a chemical agent.
 - C. **It uses shock waves to break stones into smaller pieces.**
 - D. It uses high-frequency sound waves to visualize stones.
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35. Which component is critical in an ICCU patient monitoring system?

- A. Anesthesia delivery unit
 - B. **Bedside monitors displaying vital signs**
 - C. Surgical instruments
 - D. Medication dispensing system
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36. What is the primary application of nano robots in medicine?

- A. To perform large-scale surgeries
 - B. To enhance imaging clarity
 - C. **To deliver drugs specifically to diseased cells**
 - D. To monitor patient dietary habits
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37. What distinguishes minimally invasive surgical techniques from traditional surgery?

- A. Longer recovery times
 - B. Larger incisions
 - C. **Less post-operative pain and scarring**
 - D. Use of general anesthesia only
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38. How does a defibrillator's function differ from that of a pacemaker?

- A. A defibrillator regulates blood pressure, while a pacemaker does not.
 - B. **A defibrillator can restart the heart, while a pacemaker cannot.**
 - C. A pacemaker uses ultrasound, while a defibrillator uses electrical shocks.
 - D. A pacemaker measures oxygen saturation, while a defibrillator does not.
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39. In what scenario might nerve and muscle stimulators be particularly useful?

- A. To enhance cognitive function
 - B. **To treat muscle atrophy in immobilized patients**
 - C. To improve cardiac function
 - D. To stabilize body temperature
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40. **What is the main therapeutic mechanism of diathermy?**

- A. Cooling the surface tissue
 - B. Inducing muscle contractions
 - C. **Heating deeper tissues**
 - D. Reducing electrical activity in the brain
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41. **During which procedure is a heart-lung machine most likely used?**

- A. During kidney dialysis
 - B. During non-invasive heart monitoring
 - C. **During open-heart surgery**
 - D. During a standard physical examination
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42. **What is a key feature of audiometers in audiology?**

- A. They can directly measure ear drum resistance.
 - B. **They provide a quantitative measure of hearing loss.**
 - C. They visualize the inner ear structure.
 - D. They stimulate the auditory nerve directly.
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43. **What distinguishes a dialyzer in its function from other renal support devices?**

- A. **It filters blood through a semi-permeable membrane.**
 - B. It injects antibiotics directly into the bloodstream.
 - C. It measures the electrical activity of the kidneys.
 - D. It increases blood flow to the kidneys.
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44. **What is the primary function of lithotripsy in urology?**

- A. To diagnose urinary tract infections
 - B. To visualize the urinary tract
 - C. **To break up kidney stones**
 - D. To enhance bladder control
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45. **What is an essential feature of nano robots in targeted drug delivery?**

- A. They can store large volumes of drugs.
 - B. **They can navigate to specific cells or tissues.**
 - C. They replace traditional surgical methods.
 - D. They function independently of medical supervision.
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2.1 UNIT-5 2 mark MCQ

46. What is a synchronous (demand) pacemaker and how does it differ from an asynchronous (fixed-rate) pacemaker?

- A. A synchronous pacemaker adjusts the pacing rate based on respiratory rate, whereas an asynchronous does not.
 - B. **A synchronous pacemaker stimulates the heart only if it detects no natural heartbeats, whereas an asynchronous continuously stimulates the heart.**
 - C. A synchronous pacemaker uses ultrasound, whereas an asynchronous uses electrical impulses.
 - D. A synchronous pacemaker is implantable, whereas an asynchronous is external.
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47. How does an implantable cardioverter-defibrillator (ICD) differ functionally from a standard defibrillator?

- A. An ICD is used only during surgeries as a life-support measure.
 - B. **An ICD can automatically detect and treat arrhythmias, while a standard defibrillator requires manual operation.**
 - C. An ICD is less powerful and only used for minor corrections.
 - D. An ICD monitors blood pressure, while a standard defibrillator does not.
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48. In what way does a modern ventilator manage different ventilation modes, such as volume-controlled and pressure-controlled?

- A. By changing the chemical composition of the supplied air
 - B. By adjusting the speed of the fan in the ventilator
 - C. **By altering the pressure or volume of air delivered per breath**
 - D. By varying the oxygen concentration only
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49. Explain the principle of operation of a dialyzer in the context of counter-current flow.

- A. Blood and dialysate flow in the same direction to maximize waste removal.
 - B. Blood flows through a semipermeable membrane that selectively prevents large molecules from passing.
 - C. **Blood and dialysate flow in opposite directions to increase the gradient for diffusion.**
 - D. The dialyzer recycles dialysate by filtering it through a secondary system.
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50. What technological advancements enable nano robots to specifically target cancerous cells without affecting surrounding healthy tissue?

- A. Use of magnetic fields to guide them to specific locations
 - B. **Programming with AI to identify cancer cells based on their genetic markers**
 - C. Coating with materials that are only absorbed by cancerous cells
 - D. Utilizing gamma radiation to selectively destroy target cells
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