



قائمة الاسئلة

مقدمة في تقنيات الطبية الحيوية- كلية الهندسة - قسم الميكاترونكس - المستوى الرابع- 3ساعات - درجة هذا الاختبار (60)

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1) Which natural mechanism is responsible for generating bioelectric potential in living organisms?

- 1) - Electric
- 2) + Ionic
- 3) - Electronic
- 4) - Mechanical

2) Which signals are generated by muscle cells and nerve cells?

- 1) - Biomechanical Signals
- 2) - Bio- optical signals
- 3) - Biochemical Signals
- 4) + Bioelectric Signals

3) What is primary function of a biomedical sensor?

- 1) + To measure biological signals
- 2) - To regulate body temperature
- 3) - To transmit electrical impulses
- 4) - To analyze chemical reaction

4) These signals are generated as result of optical functions of the biological system.

- 1) - Biomechanical signals
- 2) - Bioacoustics signals
- 3) + Bio-optical signals
- 4) - Bio-Magnetic signals

5) What is the role of biological recognition element in a biosensor?

- 1) - Convert biochemical reactions in electrical signals
- 2) - Stores the data collected from the sensor
- 3) - Controls the temperature of the sensor
- 4) + Provide selectivity needed to sense the analyte

6) What does accuracy refer to in sensor specifications?

- 1) - The ability to produce the same measurement multiple times
- 2) + The difference between the true value and the actual value
- 3) - The sensitivity of the sensor
- 4) - The ability to detect small changes in input

7) Which device converts energy from one form to another?

- 1) - Sensor
- 2) + Transducer
- 3) - Electrode
- 4) - All of above

8) What does linearity measure in a sensor?

- 1) - The sensitivity of the sensor
- 2) - The response time of the sensor
- 3) + The maximum deviation of any reading from a straight calibration line
- 4) - The noise level in sensor readings

9) Which of the following is the most common type of biopotential electrode used for ECG?

- 1) - Copper – cooper sulfate electrode
- 2) - Platinum electrode
- 3) - Iron – chromium electrode
- 4) + Silver / silver chloride electrode





- 10) How is the pressure drop in a Fleish pneumotachometer measured ?
- 1) - Using a potentiometer transducer
 - 2) ☒ Using a differential pressure transducer
 - 3) - Using an accelerometer
 - 4) - Using an optical sensor
- 11) The Linear variable differential transformer (LVDT) works based on which principle ?
- 1) ☒ Electromagnetic induction
 - 2) - Resistance variation
 - 3) - Capacitance change
 - 4) - Piezoelectric effect
- 12) What is the function of living tissues in generating biomedical signals ?
- 1) - They store and release chemicals
 - 2) - They create physical force for movement
 - 3) - They provide insulation for electrical signals
 - 4) ☒ They act as power station producing bioelectric potentials
- 13) Which imaging technique is used to study soft tissues and organs, especially the heart (echocardiograms) and during pregnancy?
- 1) ☒ Ultrasound
 - 2) - X ray
 - 3) - Fluoroscopy
 - 4) - CT Scan
- 14) Which technique uses strong magnets and radio waves to interact with the hydrogen atoms in the body?
- 1) - Ultrasound
 - 2) ☒ Magnetic Resonance Imaging (MRI)
 - 3) - Computed tomography (CT)
 - 4) - Gamma Camera
- 15) Which field applies engineering principles to understand, modify, or control human biological systems?
- 1) - Biomechanics
 - 2) - Biotechnology
 - 3) ☒ Biomedical Engineering
 - 4) - Biology
- 16) What is the term used to describe the charge on the membrane of every living cell?
- 1) ☒ Resting membrane (RMP)
 - 2) - Active membrane charge
 - 3) - Bioelectric gradient
 - 4) - Cellular electrostatic charge
- 17) Which state are cells in when their resting potential is typically between -70 to -90mV relative to the external conductive ionic medium?
- 1) ☒ a polarized state.
 - 2) - a repolarized state.
 - 3) - a depolarized state.
 - 4) - a hyperpolarized state.
- 18) Which type of temperature transducer is formed by joining two dissimilar metals?
- 1) - Thermistor
 - 2) - Thermostat
 - 3) - Thermometer
 - 4) ☒ Thermocouples
- 19) What happens to the inside of the cell during depolarization?
- 1) - It becomes more negative



- 2) ☒ It becomes more positive
3) ☐ It remains unchanged
4) ☐ It releases neurotransmitters
- 20) What is the main function of an action potential in neurons?
1) ☐ To store energy
2) ☐ To transport oxygen
3) ☒ To carry electrical signals along the neuron
4) ☐ To produce neurotransmitters
- 21) What is normal frequency range of EEG signals?
1) ☐ 0.1 HZ TO 10 HZ
2) ☒ 0.5 HZ TO 50 HZ
3) ☐ 1 HZ TO 100 HZ
4) ☐ 5 HZ TO 500 HZ
- 22) What does electromyogram (EMG) detect?
1) ☐ Heart rate fluctuations
2) ☐ Electrical potential generated by brain
3) ☐ The reaction of a living system to the presence of a material.
4) ☒ Electrical potential generated by muscle cells
- 23) What does the QRS complex in an ECG represent?
1) ☐ Ventricular relaxation
2) ☐ Atrial contraction
3) ☒ Ventricular depolarization
4) ☐ Atrial repolarization
- 24) What process involves acquiring and preprocessing physiological signals to extract meaningful information and identify patterns and trends?
1) ☐ Biomedical imaging
2) ☒ Biomedical signal processing
3) ☐ Biomedical signal
4) ☐ Biomedical image processing
- 25) Which of the following is an example of an active bio signal acquisition procedure?
1) ☐ Measuring ECG with skin electrodes
2) ☐ Monitoring heart with a pulse oximeter
3) ☒ Recoding EMG signals
4) ☐ Measuring EEG with skin electrodes
- 26) Which imaging technique combines x ray images taken from different angles to produce cross section views?
1) ☐ MRI
2) ☐ Ultrasound
3) ☒ CT scan
4) ☐ PET scan
- 27) A CT image is composed of matrix of tiny squares known as:
1) ☐ Voxels
2) ☐ Frames
3) ☒ Pixels
4) ☐ Nodes
- 28) Which of the following imaging modalities uses ionizing radiation?
1) ☐ MRI
2) ☐ Ultrasound
3) ☒ X ray
4) ☐ Infrared



29) Which imaging technique is commonly used to detect cancer by tracking metabolic activity?

- 1) - X ray
- 2) - MRI
- 3) + PET scan
- 4) - CT scan

30) Which imaging modality is based on Doppler effect?

- 1) - MRI
- 2) - Fluoroscopy
- 3) + Ultrasound
- 4) - CT scan