

OPTION I: BIOMEDICAL

Instructions:

Exam Format: NDDC overseas scholarship test was conducted by Cinfores-Ltd, between 2010 and 2015. Since 2016, the tests are now conducted by MEIL (MARG Educational International Limited).

The test usually comprises of 2 sections –

1. General questions which everyone will have to sit, and
2. Discipline-based questions.

For example, candidates in Engineering and Science related disciplines could take a mix of science-based questions like maths, English, physics and chemistry for part 1, then discipline-specific questions for part 2, 2016 and 2017 tests contained more discipline-specific tests and English language test as general paper. The test usually lasts between 30 to 60 minutes.

Read Carefully: Read each question carefully before selecting your answer. Pay attention to any specific details or numerical data provided in the question.

1. Source of Bioelectric potential is _____ in nature.

- a) electronic
- b) electric
- c) ionic
- d) mechanical

Answer: c

Explanation: Bioelectric potentials are generated at cellular level and the source of these potentials is ionic in nature. The prominent ions are K^+ , Na^+ , and Cl^- . Electronic potential is seen in commonly used

cells for example the Galvanic cell. Mechanical potential is found nowhere. Electrical potential is found in electricity.

2. Palsied muscles mean _____

- a) paralyzed muscles
- b) active muscles
- c) voluntary muscles
- d) involuntary muscles

Answer: a

Explanation: Palsied is an adjective that means paralyzed. It is used to describe a muscle on which an individual has lost all control (cannot move). Voluntary muscles are the muscles on which the individual has complete control. Involuntary muscles are the ones on which the individual has no control for example heart wall muscles.

3. The principal ion that is not involved with the phenomena of producing cell potentials is _____

- a) sodium
- b) potassium
- c) chlorine
- d) hydrogen

Answer: d

Explanation: Sodium (Na^+), Potassium (K^+), and Chlorine (Cl^-) are the principal ions involved with the phenomena of producing cell potentials. Na^+ is present outside the cell membrane and creates a positively charged environment outside the cell membrane. Cl^- is present inside the cell membrane and is responsible for the negative environment inside the cell membrane

4. What is the relatively static membrane potential of quiescent cells called?

- a) half-cell potential
- b) action potential
- c) resting membrane potential
- d) cell potential

Answer: c

Explanation: Resting membrane potential or the resting potential is the relative static membrane potential of quiescent cell. That is if the resting membrane potential of a neuron is about -70 mV (mV=millivolt) it means that the inside of the neuron is 70 mV less than the outside of the neuron. An action potential occurs when the potential of the membrane of a given axonal position increases and decreases rapidly. This depolarization causes depolarization of adjacent positions in a similar way.

5. The variation of the electrical potential associated with the passage of a pulse along the membrane of a muscle cell or a nerve cell is called _____

- a) muscle potential
- b) action potential
- c) resting potential
- d) half cell potential

Answer: b

Explanation: An action potential occurs when the potential of the membrane of a given axonal position increases and decreases rapidly. This depolarization causes depolarization of adjacent

positions in a similar way. Resting membrane potential or the resting potential is the relative static membrane potential of a quiescent cell.

6. Cells depolarize and action potential is generated as soon as a stimulus is applied.

- a) True
- b) False

Answer: b

Explanation: This statement is False. This is because unless a stimulus above a certain minimum value is applied, the cell will not be depolarized and no action potential will be generated. This value of potential above which the cell depolarizes and an action potential is generated is known as the stimulus threshold.

7. After a cell is stimulated, a finite period of time is required for the cell to return to its pre-stimulus state. This period is known as

-
- a) restoration period
 - b) refractory period
 - c) regain period
 - d) regenerative period

Answer: b

Explanation: After a cell is stimulated, a finite period of time is required for the cell to return to its pre-stimulus state. This is because the energy associated with the action potential is developed from metabolic processes within the cell which takes time for completion. This time period is called refractory period.

8. Electrooculography (EOG/E.O.G.) is a technique for measuring what?

- a) abnormal function of the retina
- b) heart rate
- c) respiration rate
- d) cornea-retinal standing potential

Answer: d

Explanation: Electrooculography (EOG / E.O.G) is a technique for measuring the potential of the corneal retinal standing potential that exists between the front and back of the human eye. The resulting signal is called electrooculogram. The main applications are in the diagnosis of ophthalmology and the recording of eye movements.

9. EKG stands for _____

- a) Electrocardiography
- b) Electroencephalography
- c) Electromyography
- d) Electrtokinetcography

Answer: a

Explanation: Electrocardiography (ECG or EKG) is the way toward recording the electrical action of the heart over some stretch of time utilizing anodes put on the skin. It could simply be understood as the electrical representation of heart beat. Electroencephalography is the electrical recording of brain.

10. Phonocardiography is listening to _____

- a) arm muscle sound

- b) lungs sound
- c) heart sound
- d) respiratory tract sound

Answer: c

Explanation: A phonocardiogram (or PCG) is a record high-constancy recording of sounds and mumble made by the heart with the assistance of the machine called phonocardiography.

Consequently, phonocardiography is the chronicle of the considerable number of sounds made by the heart amid a heart cycle. Mostly stethoscope is used phonocardiography.

11. Electrodes make a transfer from the _____ in the tissue to the electronic conduction which is necessary to make measurements.

- a) electronic conduction
- b) ionic conduction
- c) electric conduction
- d) impulsive conduction

Answer: b

Explanation: Electrodes make an exchange from the ionic conduction in the tissue to the electronic conduction which is important to make measurements. An electrolytic paste is applied between the electrodes and the skin to reduce skin contact impedance. The electrolyte also facilitates ionic conduction from the skin to the electrodes.

12. Surface electrodes damage the living tissues.

- a) True
- b) False

Answer: b

Explanation: The surface electrodes pick up the potential difference from the tissue surface when placed over it without damaging the living tissues. They are placed above the skin and cause no harm to the living tissues. They capture the electrical activities of bunch of tissues together.

13. Deep-seated electrodes indicates the electric potential difference arising _____ the living tissues or cells.

- a) inside
- b) outside
- c) around
- d) adjacent

Answer: a

Explanation: Deep-seated electrodes indicate the electric potential difference arising inside the living tissues or cells. Surface electrodes indicates the electric potentials arising outside the living tissues that is on the surface of the skin. Needle electrodes are example of deep seated electrodes.

14. Impedance pneumography is a commonly-used technique to monitor a person's _____

- a) respiration rate
- b) heart rate

- c) pulse rate
- d) skin impedance

Answer: a

Explanation: Impedance pneumography is a commonly-used technique to monitor a person's respiration rate, or breathing rate. It is implemented by using two electrodes or four electrodes. Skin impedance is the resistance between the skin and the electrode. Heart rate measurement is called ECG.

15. Electrode paste _____

- a) increases contact impedance
- b) equates contact impedance
- c) reduces contact impedance
- d) absorbs contact impedance

Answer: c

Explanation: In order to obtain a clearly established contact (low contact impedance) an electrolyte or electrode paste is usually employed as an interface between the electrode and the surface of the source of the event. It is placed between the skin and the electrode. It helps to get better signal acquisition.

16. All electrode potentials are measured with respect to which reference electrode?

- a) hydrogen electrode
- b) platinum electrode
- c) calomel electrode
- d) hydrogen absorbed on platinum electrode