

1. A simple reflex requires the nervous system to perform three functions. Two of these functions are to collect and distribute information. What is the third function? Choose the correct option.

- A) Disintegrate information
- B) Integrate information
- C) Process information
- D) Translate information

Ans: B

Difficulty: Easy

2. What is resting membrane potential? Choose the correct option.

- A) Difference in electrical charge across the membrane at rest
- B) Generation and conduction of action potential at rest
- C) Positive charge inside the membrane with respect to outside at rest
- D) Isolation of the cytosol from extracellular fluid

Ans: A

Difficulty: Moderate

3. What is capacitance? Choose the correct option.

- A) Electrical potential difference
- B) Storage of electric charge
- C) Voltage across neuronal membrane
- D) Migration of electric charge

Ans: B

Difficulty: Difficult

4. Which of the following is the major charge carriers involved in the conduction of electricity in neurons? Choose the correct option.

- A) Anions
- B) Cations
- C) Ions
- D) Ionic bonds

Ans: C

Difficulty: Easy

5. How do the lipids of the neuronal membrane contribute to the neuronal membrane potential? Choose the correct option.

- A) Encourages chemical interactions with water
- B) Catalyzes chemical reactions
- C) Integrates cytosol of neuron with extracellular fluid
- D) Forms a barrier to water-soluble ions and water

Ans: D

Difficulty: Moderate

6. Which force other than the ionic concentration gradient determines the equilibrium potential for an ion? Choose the correct option.

- A) Selective ionic permeability
- B) Sodium potassium pump
- C) Electrical resistance
- D) Electrical conductance

Ans: A

Difficulty: Easy

7. How do action potentials differ from passively conducted electrical signals? Choose the correct option.
- A) Action potentials diminish over distance; passively conducted signals do not diminish over distance
  - B) Action potentials occur only in nerve cells; passively conducted signals occur only in muscle cells
  - C) Action potentials are transmitted over short distances; passively conducted signals are conducted over long distances
  - D) Action potentials are signals of fixed size and duration; passively conducted signals are not signals of fixed size and duration

Ans: D

Difficulty: Easy

8. How does the sodium potassium pump help maintain the resting membrane potential? Choose the correct option.
- A) Pumps potassium in and sodium out
  - B) Pumps sodium in and potassium out
  - C) Exchanges a sodium and a potassium for a calcium
  - D) Uses calcium to pump sodium and potassium against their concentration gradients

Ans: A

Difficulty: Easy

9. Which of the following mechanisms decrease intracellular  $[Ca^{2+}]$ ? Choose the correct option.
- A) The calcium pump
  - B) Intracellular calcium-binding proteins
  - C) Organelles such as mitochondria and endoplasmic reticulum
  - D) All of the above

Ans: D

Difficulty: Easy

10. What is the meaning of an ion's equilibrium potential? Choose the correct option.
- A) Net movement of ions from a region of high concentration to a region of low concentration
  - B) Electrical potential difference that exactly balances an ionic concentration gradient
  - C) Difference between the real membrane potential and equilibrium potential for a particular ion
  - D) Difference in concentration between region with high ionic concentration and region with low ionic concentration

Ans: B

Difficulty: Moderate

11. What is the term used to describe the mechanism for the regulation of  $[K^+]_o$  by astrocytes? Choose the correct option.
- A) Depolarization  
B) Potassium spatial buffering  
C) Blood-brain barrier  
D) Goldman equation
- Ans: B  
Difficulty: Moderate
12. Distinguish between the “head” and “tail” of phospholipids. Choose the correct option.
- A) The phospholipids have a nonpolar “head” and polar “tail.”  
B) The phospholipids “head” contains hydrophilic phosphate and “tail” contains a hydrophobic hydrocarbon.  
C) The phospholipid “head” is hydrophobic and the hydrocarbon “tail” is hydrophilic.  
D) The phospholipid “heads” face each other and “tails” face the watery extracellular and intracellular environments.
- Ans: B  
Difficulty: Easy
13. In which condition do astrocytes take up extracellular  $K^+$ ? Choose the correct option.
- A) Rise in extracellular potassium concentrations  
B) Fall in extracellular potassium concentrations  
C) Potassium equilibrium potential  
D) All of the above
- Ans: A  
Difficulty: Difficult
14. Which of the following factors determines the ion selectivity of specific ion channels? Choose the correct option.
- A) Number of protein molecules assembling to form a pore  
B) Number of ion channels in the membrane  
C) Nature of the R groups lining the ion channel  
D) Gating properties
- Ans: C  
Difficulty: Easy
15. Two types of cells have excitable membranes, neurons and muscle cells.
- Ans: True  
Difficulty: Easy
16. Protein shape influences protein function.
- Ans: True  
Difficulty: Easy

17. Peptide bonds are a single chain of amino acids.  
Ans: False  
Difficulty: Easy
18. The differences between amino acids result from the differences in the size and nature of the R groups.  
Ans: True  
Difficulty: Easy
19. The subunits of different potassium channels have common structural features that bestow selectivity for  $K^+$  ions. \_\_\_\_\_ is one such structural feature.  
Ans: Pore loop  
Difficulty: Easy
20. All amino acids have a central \_\_\_\_\_ atom.  
Ans: Alpha carbon  
Difficulty: Easy