

1. A plasma membrane with.....will generate the most negative potential.

- A) 1, 4, 5
- B) 1, 4
- C) 2, 3, 5
- D) 1, 2, 5

Answer: A) 1, 4, 5

2. Which of the following sensory neurons is the slowest?

- • Type IA
- • Type IB
- • Type 2
- • Type C
- • Type A gamma

Answer: Type C

3. Which of the following statements about the relative refractory period is incorrect?

- A) We can call the membrane in a falling state
- B) The membrane potential can be closer to zero than the resting membrane potential
- C) The K⁺ voltage-gated channels have the highest activity
- D) Na⁺ voltage-gated channels are closed and capable of opening

Answer: D) Na⁺ voltage-gated channels are closed and capable of opening

4. Which of the following is the smallest neurotransmitter that isn't an amine?

- • Norepinephrine
- • Glutamine
- • Serotonin
- • Histamine
- • Acetylcholine

Answer: Glutamine

5. If the membrane potential was permeable to Na^+ and Ca^{++} , and permeability to K^+ and Cl^- was zero, what would be the membrane potential?

- **Answer:** This question requires calculation. Given the equilibrium potentials:
 - $\text{Na}^+ = +63 \text{ mV}$
 - $\text{K}^+ = -94 \text{ mV}$ (irrelevant here)
 - $\text{Cl}^- = -65 \text{ mV}$ (irrelevant here)
 - $\text{Ca}^{++} = +134 \text{ mV}$

Since K^+ and Cl^- permeability is zero, the membrane potential will be a weighted average of the Na^+ and Ca^{++} equilibrium potentials. Given the complexity, the exact potential would be calculated based on the relative permeabilities if they were known.

6. Which of the following doesn't match?

- • Secondary active transport / direct use of ATP to phosphorylate a carrier
- • Facilitated diffusion / transport of oxygen across the membrane
- • Low concentration of Na⁺ inside / counter transport
- • Facilitated diffusion / from low concentration to high concentration
- • Counter transport / channels

Answer: Facilitated diffusion / from low concentration to high concentration

7. Which of the following is caused by the inhibition of adrenergic β receptors?

- A) Bronchoconstriction
- B) General vasoconstriction
- C) Increase in heart rate

Answer: A) Bronchoconstriction

8. Which of the following happens in neuropeptides but not in neurotransmitters?

- **Answer:** Their vesicle is not recycled back to the presynaptic membrane

9. Which of the following can generate an action potential?

- • Decreasing Na⁺ in the extracellular fluid
- • Increasing K⁺ in the extracellular fluid

Answer: Neither option directly generates an action potential; rather, action potentials are generated by changes in membrane permeability and ion fluxes. This question may require clarification.

10. Which of the following is true about the cell membrane?

- • It has carriers to transport ions
- • It has oxidative bound enzymes for ATP synthesis

Answer: It has carriers to transport ions

11. Which one of the following best describes homeostasis?

- • More glucose in the blood → more insulin → less glucose in the blood
- • Less glucose in the blood → more glucagon release → more glucose in the blood
- • Low blood pressure → more sympathetic activity → higher pressure
- • All of the above
- • A&C

Answer: All of the above

12. All of the following describe homeostasis except:

- • It is regulated by hormones control only

13. Norepinephrine is released in:

- • Sympathetic preganglionic neurons
- • Sympathetic postganglionic neurons in sweat glands
- • Sympathetic postganglionic neurons in vessels
- • Sympathetic adrenal gland innervated neurons

Answer: Sympathetic postganglionic neurons in sweat glands (Norepinephrine is generally released by sympathetic postganglionic neurons, but sweat glands specifically use acetylcholine.)

14. Which of the following is false?

- • EPSPs last less time than action potentials

15. Regarding the following conditions:

- • High surface area
- • High permeability to the ion
- • Low concentration
- • High membrane thickness

Which of them will result in the lowest diffusion rate?

- • High membrane thickness

16. Which of the following is true about the autonomic nervous system?

- • When stimulated, there are more diffuse receptors in the sympathetic system than in the parasympathetic system
- • The sympathetic division has roots in cranial nerves

Answer: When stimulated, there are more diffuse receptors in the sympathetic system than in the parasympathetic system

17. Which event takes place first in the transmission of an action potential in the postsynaptic membrane?

- • Opening of chemical Na⁺ gated channels
- • Summation of EPSPs to generate an action potential
- • Opening of voltage-gated Na⁺ channels

Answer: Opening of chemical Na⁺ gated channels

18. **At resting potential:**

- • It has high electrical driving force to Na⁺
- • It has electrical driving force to K⁺
- • It has the highest conductivity to K⁺

Answer: It has high electrical driving force to Na⁺

19. **At overshoot:**

- • It is positive inside the cell relative to the outside

20. **All of the following are true about the Na⁺/K⁺ pump except:**

- • It has an important role in the firing phase of an action potential
- • It can hyperpolarize the cell when active only

Answer: It has an important role in the firing phase of an action potential

21. **Poisoning with muscarine will result in all of the following except:**

- • Vomiting and diarrhea
- • More salivation
- • More sweating
- • Pupil dilation

Answer: Pupil dilation

22. **Which of the following can generate an action potential?**

- • Decreasing IPSPs to the postsynaptic neuron
- • Opening of Cl⁻ channels

Answer: Decreasing IPSPs to the postsynaptic neuron

23. Which of the following is false about synaptic transmission?

- • Neurotransmitters are released by diffusion

24. What determines if the signal is excitatory or inhibitory to the postsynaptic neuron?

- • The type of neurotransmitter
- • The type of receptor

Answer: The type of receptor

25. To transport Ca^{++} by secondary active transport it needs:

- • A special transporter to exchange
- • Ca^{++} pump
- • High Na^+ concentration outside the cell
- • All of them

Answer: All of them

26. When all voltage-gated sodium channels are open:

- • At absolute refractory period
- • At depolarization and immediately before reaching the threshold

Answer: At depolarization and immediately before reaching the threshold