PHYSIOLOGY 020 MIDTERM TEST BANK

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1.Which of the following transport mechanisms is NOT rate limited by an intrinsic transport maximum (Vmax or Tmax)?

A. Secondary counter-transport (antiport)
B. Primary active transport via carrier proteins
C. Secondary co-transport (symport)
D. Facilitated diffusion via carrier -proteins
E. Simple diffusion through protein channels

Answer: E

2.Which of the following is the approximate extracellular fluid volume of a normal Individual? (male)

A. 5% of body mass
B. 60% of body mass
C. 10% of body mass
D. 20% of body mass
E. 40% of body mass

ANSWER:D

3.Solution A contains 10 mmol/L glucose, and Solution B contains 1 mmol/L glucose. If the glucose concentration in both solutions is doubled, by how much will the flux (flow) of glucose between the two solutions change?

A. remain unchanged
B. double
C. triple
D. quadruple

ANSWER:B

4.A cell is equilibrated in an aqueous solution of 300 mosm/L sodium chloride. Which of the following best describes what will happen to cell volume when the cell is placed in an aqueous solution of 300 mOsm/L Calcium Chloride?

A. No change
B. Decrease and then increase
C. Increase
D. Decrease
E. Increase and then decrease

ANSWER: A

(Both concentrations are 300mosm/L so there is no difference)

*make sure that you really understand the difference between osmolarity and molarity

5.Solutions A and B are separated by a membrane that is permeable to urea. Solution A is 10 mM urea, and solution B is 5 mM urea. If the concentration of urea in solution A is doubled, the flux of urea across the membrane will:

A. double
B. triple
C. be unchanged
D. decrease to one-half

ANSWER:B

(To answer like this question calculate the difference of concentration before “here it’s 10-5=5” and then calculate it after “20-5=15” so the flux must be TRIPPLED)

6.The osmolarity of a solution of 50 mmol/L CaCl2 is closest to the osmolarity of which of the following:

A. 50 mmol/L NaCl,
B. 100 mmol/L urea,
C. 150 mmol/L NaCl,
D. 150 mmol/L urea

ANSWER:D

7.When the blood sugar regulating system is not functioning, the blood sugar rises from normal 100 to 180. When the blood sugar regulating system is normal it rises to 110, what’s the gain?

A. 8 negative feedback
B. 7 negative feedback
C. 8 positive feedbcak
D. 7 positive feedback

ANSWER:B

8.In a hospital error, a 60-year-old woman is infused with large volumes of a solution that causes lysis of her red blood cells (RBCs). The solution was most likely:

A. 150 mM NaCl
B. 350 mM mannitol
C. 100 mM NaCl
D. 150 mM CaCl2

ANSWER:C

9.Omeprazole which is proton pump inhibitor is used to treat gastritis; it blocks H+ secretion in gastric parietal cells. Which of the following transport processes is being inhibited?

A. Simple diffusion
B. Facilitated diffusion
C. Primary active transport
D. Cotransport

ANSWER:C

10.Which one of the following is NOT consistent with secondary active transport:

A. The movement of an ion down its concentration gradient is coupled to the movement of another molecule against its concentration gradient.
B. In secondary active transport ATP is hydrolyzed.
C. Cotransport and exchange are variations of secondary active transport.
D. In secondary active transport, the ion that is moving down its concentration gradient is referred to as the driving ion.
E. All of the above are true about secondary active transport.

ANSWER: B

11. Rapid growth during puberty causes your body to release more and more growth hormones. As you grow, more and more growth hormones are released until puberty is reached, and then the hormones stop. This represents a :

A. Positive Feedback Response
B. Negative Feedback Loop
C. non of the above
D. more than one of the above

ANSWER:A

12.How does the intracellular Na+ concentration change following inhibition of Na+ -K+ ATPase?

A. Increase
B. decrease
C. Remains the same

ANSWER:A

13.Select the molecule that should have the greatest permeability through a cell membrane:

A. ATP
B. amino acid
C. cholesterol
D. glucose
E. potassium

ANSWER:C

14.Aquaporins are _____ that permit the _____ transport of water:

A. channels: active
B. carriers: passive
C. channels: passive
D. carriers: active
E. none of the above

ANSWER:C

15.Red blood cells are placed into an unknown solution. The cells swell and some burst. This indicates that the solution is _____ :

A. isotonic
B. hypotonic
C. hypertonic
D. cannot be determined

ANSWER:B

16. A 23-year-old man is brought to the emergency department after collapsing during basketball practice. On admission, he is lethargic and appears confused. His coach reports that it was hot in the gym and he was drinking a lot of water during practice. An increase in which of the following is the most likely cause of his symptoms? (صعب)

A. Intracellular tonicity
B. Extracellular tonicity
C. Intracellular volume
D. Extracellular volume
E. Plasma volume

ANSWER:C

17.An example of primary active transport is the:

A. calcium pump
B. glucose carrier
C. sodium-linked glucose transport
D. sodium-proton counter transport
E. cholesterol throw plasma membrane

ANSWER:A

18.Select the membrane transport protein that is least likely to exhibit saturation :

A. carrier
B. channel with binding sites
C. channel with an open pore
D. Na+/k+ pump

ANSWER:C

19.Secondary active transport occurs when:

A. an energy source directly transports a molecule across a membrane
B. a concentration or electrochemical gradient is created by primary active transport
C. a membrane potential moves ions up their concentration gradient
D. a molecule passes through a second membrane after a first membrane

ANSWER:B

20.As osmolarity increases, water concentration _____ and osmotic pressure _____

A. decreases: increases
B. decreases: decreases
C. increases: decreases
D. increases:increases

ANSWER:A

21.The chemical driving force across a membrane is a reflection of the:

A. membrane potential
B. concentration gradient
C. equilibrium potential
D. osmotic pressure

ANSWER:B

21.Which of the following would cause an immediate reduction in the amount of potassium leaking out of a cell?

A. Decreasing the extracellular potassium concentration
B. Decreasing the extracellular sodium concentration
C. Hyperpolarizing the membrane potential
D. Increasing the permeability of the membrane to potassium
E. Reducing the activity of the sodium–potassium pump

ANSWER:C

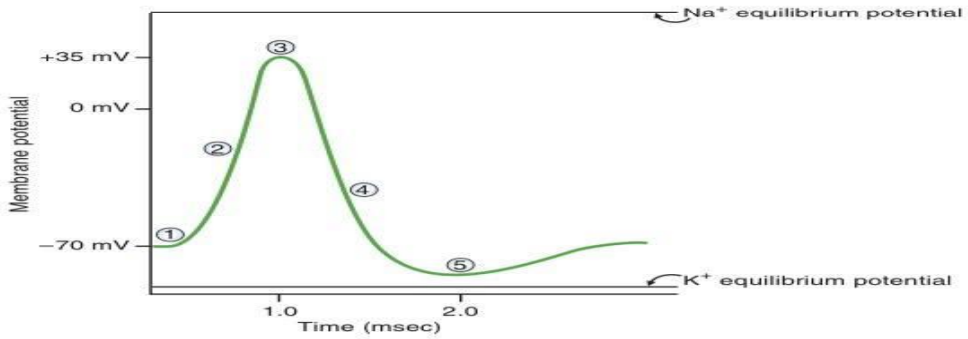
22.Choose the correct statement ;

A. The greater the ratio of the ion concentrations on the two sides of the membrane the greater the tendency for ions to diffuse in one direction
B. the greater the tendency for ions to diffuse in two directions the greater the Nernst potential
C. The greater the ratio of the ion concentrations on the two sides of the membrane the lower the tendency for ions to diffuse in one direction
D. None of the above

ANSWER:A

23.At which labeled point on the action potential is the K+ closest to electrochemical equilibrium?

A. 1
B. 2
C. 3
D. 4
E. 5



ANSWER:E

24.(look at the same figure) What process is responsible for the change in membrane potential that occurs between point 1 and point 3?

A. Movement of Na+ into the cell
B. Movement of Na+ out of the cell
C. Movement of K+ into the cell
D. movements of K+ out of the cell
E. activation of Na+-K+ pump
F. inhibition of Na+-K+ pump

ANSWER:A

25. A 56-year-old woman with severe muscle weakness is hospitalized. The only abnormality in her laboratory values is an elevated serum K+ concentration. The elevated serum K+ causes muscle weakness because:(صعب)

A. the resting membrane potential is hyperpolarized
B. the K+ equilibrium potential is hyperpolarized
C. the Na+ equilibrium potential is hyperpolarized
D. K+ channels are closed by depolarization
E. K+ channels are opened by depolarization
F. Na+ channels are closed by depolarization

ANSWER:F

26.If the membrane is impermeable for both K+ and Cl- the Nernst potential will equal :

A. the Nernst potential for K+ and Cl- together
B. K+ only because Cl- is a negative ion
C. Na+
D. k+ only because chlorine concentration is low
E. Will equal ZERO

ANSWER:C

27.Which of the following factors will increase the diffusive clearance of solutes across the semipermeable membrane?

A. Area of the membrane increases
B. Concentration gradient for the solutes decreases
C. Lipid solubility of the solutes decreases
D. Size of the solute molecules increases
E. Thickness of the membrane increases

ANSWER: A

28.Which of the following is NOT true about the refractory period?

A. It is thought that the relative refractory period is caused by the hyperpolarization phase of the action potential.
B. The absolute refractory period refers to that time during which a stronger stimulus will lead to the generation of a new action potential.
C. The relative refractory period refers to that time during which a stronger stimulus will lead to the generation of a new action potential.
D. The relative refractory period coincides with the hyperpolarization phase of the action potential
E. The absolute refractory period sets the upper limit for the maximum frequency of action potentials generated.

ANSWER:B

29.Which of the followings is taking place last during transmission of action potentials at the synapse:

A. Release of neurotransmitters
B. Activation of voltage gated Ca++ channels at the terminals of presynaptic neurons
C. Generation of postsynaptic potentials
D. Generation of action potentials at the post synaptic neurons
E. Summation of postsynaptic membrane potentials

ANSWER:D

30.Which statement is incorrect :

A. It's possible for the sodium channels to become closed and capable of opening with repolarization
B. The inactivation gate for the sodium channel will not reopen until repolarization occurs
C. The same increase in voltage that opens the activation gate also close the inactivation gate
D. None of the above
E. More than one of the above.

ANSWER:D

31.When reaching a point at which diffusion of K+ is COMPLETELY OPPOSED by the potential difference_____

A. NET DIFFUSION for K+ is ZERO
B. concentration gradient = zero
C. equilibrium potential for K+ is achieved
D. all above except B

Answer: D

32.A graded hyperpolarization of a membrane can be induced by_____

A. increasing its membrane's permeability to Na.+
B. decreasing its membrane's permeability to H+
C. decreasing its membrane's permeability to Cl-
D. increasing its membrane's permeability to Ca+
E. increasing its membrane's permeability to K+

Answer: E

33.Match the ion channel with its resulting change in membrane potential_____

A. entry of a negative ion; hyperpolarization
B. entry of a positive ion; hyperpolarization
C. exit of a positive ion; depolarization
D. exit of a negative ion; hyperpolarization
E. inactivation of sodium-potassium transporters; depolarization

Answer: A

34.For a neuron with an initial membrane potential at -70 mV, an increase in the movement of potassium ions out of that neuron's cytoplasm would result in _____

A. the depolarization of the neuron.
B. the hyperpolarization of the neuron.
C. the replacement of potassium ions with sodium ions.
D. the replacement of potassium ions with calcium ions.
E. the neuron switching on its sodium-potassium pump to restore the initial conditions.

Answer: B

35.Although the membrane of a "resting" neuron is highly permeable to potassium ions, its membrane potential does not exactly match the equilibrium potential for potassium because the Neuronal membrane is also _____ :

A. fully permeable to sodium ions.
B. slightly permeable to sodium ions.
C. fully permeable to calcium ions.
D. impermeable to sodium ions.
E. highly permeable to chloride ions.

Answer: B

36.The operation of the sodium-potassium "pump" moves_____

A. sodium and potassium ions into the cell.
B. sodium and potassium ions out of the cell.
C. sodium ions into the cell and potassium ions out of the cell.
D. sodium ions out of the cell and potassium ions into the cell.
E. sodium and potassium ions into the mitochondria.

Answer: D

37.The "undershoot" phase of after-hyperpolarization is due to_____

A. slow opening of voltage-gated sodium channels.
B. sustained opening of voltage-gated potassium channels.
C. rapid opening of voltage-gated calcium channels.
D. slow restorative actions of the sodium-potassium ATPase.
E. ions that move away from their open ion channels.

Answer: B

38.Which of the following is characteristic of the events occurring at an excitatory synapse?

A. There is a massive efflux of calcium from the presynaptic terminal
B. Synaptic vesicles bind to the postsynaptic membrane
C. Voltage-gated potassium channels are closed
D. Ligand-gated channels are opened to allow sodium entry into the postsynaptic neuron

Answer: D

39.Which electrical event is characteristic of inhibitory synaptic interactions?

A. A neurotransmitter agent that selectively opens ligand-gated chloride channels is the basis for an inhibitory postsynaptic potential
B. Because the Nernst potential for chloride is about –70 mV, chloride ions tend to move out of the cell
C. along its electrochemical gradient
D. A neurotransmitter that selectively opens potassium channels will allow potassium to move into the cell
E. An increase in the extracellular sodium concentration usually leads directly to an inhibitory postsynaptic potential

Answer: A

40.When an action potential moves down a neuron, the action potential is said to be_____

A. transmitted
B. activated
C. propagated
D. motivated

Answer: C

41.The region from where neurotransmitters cross from one neuron to another is called_____

A. dendrite
B. axon
C. synapse
D. neurotransmitter

Answer: C

42.Which of the following sets of terms do NOT belong together_____

A. saltatory conduction; faster conduction speeds in smaller neurons
B. open sodium channels; membrane depolarization
C. saltatory conduction; slower conduction speeds in smaller neurons
D. open potassium channels; membrane repolarization
E. sodium-potassium pump; restoration of the normal concentrations of these ions

Answer: C

43.The correct relation is_____

A. more current, more conductance, less resistance
B. more current, more conductance, more resistance
C. less current, less conductance, more resistance
D. A+C

Answer: D

44.In the nervous system, the strength of the stimulus is coded into:

A. The frequency of action potential generated
B. The amplitude of action potentials generated
C. Both of them 1+2.

ANSWER: A

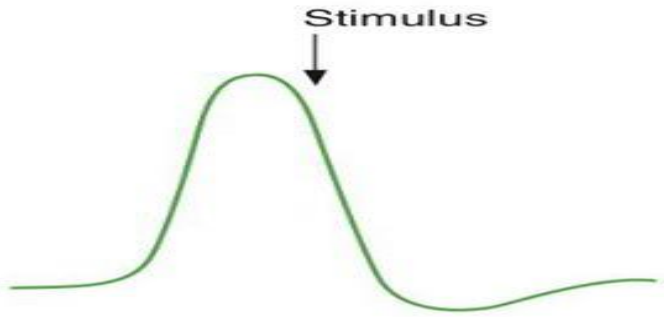
(The amplitude of the action potential doesn't affect how strong is that stimulus….once the action potential reaches the threshold, all Na+ channels open)

45.An input neuron to a diverging circuit causes the membrane potential of a target neuron to change from −65 millivolts to −55 millivolts. Which of the following best describes this change in membrane potential (in millivolts)?

A. Excitatory postsynaptic potential = +10
B. Excitatory postsynaptic potential = −10
C. Inhibitory postsynaptic potential = +10
D. Inhibitory postsynaptic potential = −10

Answer: A

46.During a nerve action potential, a stimulus is delivered as indicated by the arrow shown in the following figure.In response to the stimulus, a second action potential

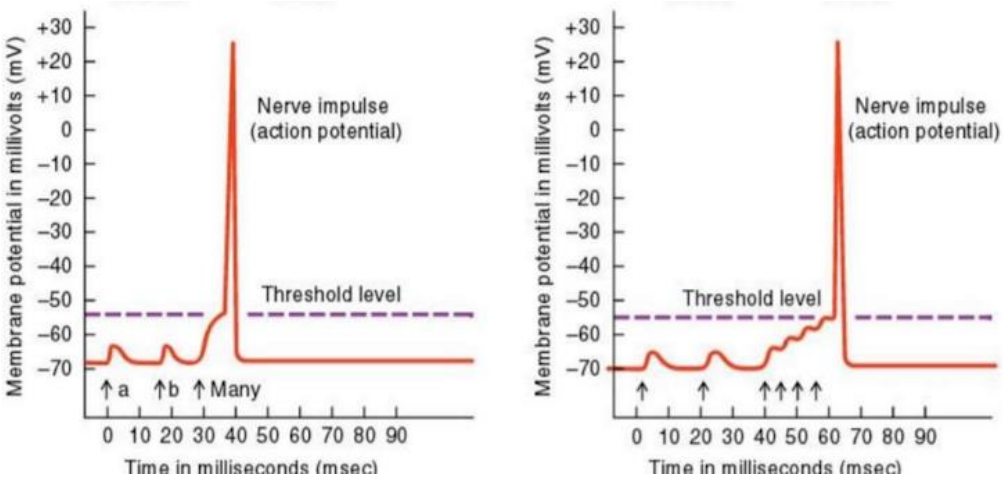


A. of smaller magnitude will occur
B. of normal magnitude will occur
C. of normal magnitude will occur, but will be delayed
D. will occur, but will not have an overshoot
E. will not occur

ANSWER: E

47.The correct statement regarding this graph below :

A. The left graph caused by a spatial summation
B. The right graph caused by a spatial summation
C. Cannot be determined
D. This is not a spatial summation nor temporal summation.



ANSWER: A

48.Placing neurons and their synaptic contacts into a medium containing no calcium ions would be expected to_____

A. decrease the time required to move sodium ions out of the axon terminal.
B. enhance the voltage changes associated with the action potential.
C. increase the number of transmitter molecules released from the axon terminal.
D. prolong the refractory period of the action potential.
E. prevent the release of neurotransmitter into the synapse.

Answer: E

49.An input neuron to a diverging circuit causes the membrane potential of a target neuron to change from –65 millivolts to –55 millivolts. Which of the following best describes this change in membrane potential (in millivolts)?

E. Excitatory postsynaptic potential = +10
F. Excitatory postsynaptic potential = –10
G. Inhibitory postsynaptic potential = +10
H. Inhibitory postsynaptic potential = –10

Answer: A

50.Which statement concerning the generation of an action potential is correct?

A. When the membrane potential in the soma/axon hillock dips below "threshold," an action potential is initiated
B. The action potential is initiated in synaptic boutons
C. The least number of voltage-gated sodium channels in an axon is found near the node of Ranvier
D. Once an action potential is initiated, it will always run its course to completion

Answer: D

51.What determines whether a cell is a target cell for a particular signal molecule?

A. phosphorylation cascade
B. cAMP
C. signal receptors
D. phosphatase

Answer: C

52.What activates adenylyl cyclase?

A. epinephrine binding to it
B. an activated G protein
C. cAMP
D. a protein kinase

Answer: B

53.The most significant difference between a paracrine and an autocrine is

A. the cell that releases it.
B. the cell that responds to it.
C. the method of transport.
D. the route of transport.
E. There are no differences-they are the same.

ANSWER: B

54.Receptor molecules on the surface of a cell do what of the following:

A. determine that cells response.
B. may allow a particular ligand to bind.
C. bind to all ligands.
D. determine that cell's response and may allow a particular ligand to bind.
E. determine that cell's response and bind to all ligands.

ANSWER:D

55.Receptor molecules are located :

A. only in the outer cell membrane.
B. only in the cytosol.
C. only in the nucleus.
D. only on the cell surface.
E. in all of these places.

ANSWER: E

56.In chemical communication between cells, a _____ cell secretes a chemical messenger that binds to _____ on the _____ cell.

A. gap : connexons : secretory
B. secretory : connexons : gap
C. secretory : connexons : target
D. target : receptors : secretory
E. secretory : receptors : target

ANSWER: E

57.Which type of chemical messenger, when released, binds to receptors on the cell that released the same chemical messenger?

A. neurohormone
B. autocrine
C. hormone
D. cytokine
E. neurotransmitter

ANSWER: B

58.Inositol triphosphate

A. is a water-insoluble messenger molecule.
B. binds to the calcium channel of the endoplasmic reticulum.
C. is involved in the release of calcium into the cytosol.
D. is a second messenger that is involved in the release of calcium into the cytosol.
E. uses all of the mechanisms.

ANSWER: E

59.Which ion has the greatest electrochemical driving force in a typical neuron with a resting membrane potential of −65 millivolts?

A. Chloride
B. Potassium
C. Sodium
D. Calcium

ANSWER:C

(IF the question was “the lowest driving force” …. the answer would be A)

60.Adenylyl cyclase is used in a G-protein pathway to ;

A. cause ATP to form cAMP
B. add a phosphate to a kinase
C. C.remove a phosphate from a kinase
D. attract a ligand

ANSWER: A

61.Which of the following can activate a protein by transferring a phosphate group to it?

A. A.cAMP
B. B.G Protein
C. protein kinase
D. protein phosphatase

ANSWER:C

62.Which of the following mechanisms would you associate with agonist drug action?

A. A drug that binds and blocks normal presynaptic function
B. A drug that binds postsynaptic receptors and has the same effect of the endogenous neurotransmitter
C. A drug that blocks the enzymatic synthesis of neurotransmitter
D. A drug that binds postsynaptic receptors and blocks the normal action of the endogenous neurotransmitter
E. A drug that speeds the normal reuptake of neurotransmitters inside presynaptic terminals

ANSWER:B

63.Small molecules neurotransmitter in contrast to neuropeptide are?

A. Packaged in large synaptic vesicles.
B. Their action can be terminated by peptidase enzymes.
C. They act through binding to presynaptic receptors.
D. Synthesized in the presynaptic receptors.
E. Made in soma, and transported down by axonal transport.

ANSWER:D

64.Which of the following types of sensory nerve fibers has the fastest transmission rate for action potentials?

A. Type III
B. Type A gamma.
C. Type A beta.
D. Type IV.
E. Type A delta.

ANSWER:C

65.What is True about neuro-peptides:

A. They are usually released individually
B. They're synthesized in the synaptic terminals
C. They require a low Ca+ infusion in order to be released
D. They are important in memory and learning

ANSWER:D

66.What is Wrong about receptor antagonist :

A. It's a receptor ligand that blocks or dampens a biological response by binding to and blocking a receptor
B. It's a receptor ligand that causes inhibitory post-synaptic potetnials in the post-synaptic membrane
C. its binding will disrupt the interaction and inhibit the function of an agonist or inverse agonist at their receptors
D. all statements are correct

ANSWER:D

67.Which of the following is NOT a way neurotransmitter inactivation?

A. Re-uptake by surrounding glial cells
B. Re-uptake into the postsynaptic terminal
C. Enzymatic degradation
D. Diffusion
E.Re-uptake into presynaptic terminals

Answer: B

BEST OF LUCK ^^