Physiology Past Papers

for MID exam – April / 2024

Introduction to Physiology

Q1: 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 feedbacks
B. 7 negative feedbacks
C. 8 positive feedbacks
D. 7 positive feedbacks

Answer: B

Q2: 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. none of the above
D. more than one of the above

Answer: A

Q3: The body system LEAST concerned with homeostasis?

A. Cardiovascular system
B. Respiratory system
C. Urinary system
D. Reproductive system
E. Nervous system

Answer: D

Q4: When the blood sugar control system is not functioning, and the blood sugar rises from the normal level 90 to 200 mg/100 ml of plasma, if at another time when the blood sugar control system is functioning the blood sugar increases from the normal level 90 mg to 100/100 ml of plasma, calculate the gain of the blood sugar control system:

A. 10; positive feedback
B. 10; negative feedback
C. 2; negative feedback
D. 0; neither negative nor positive feedback
E. 2; positive feedback

Answer: B

Q5: 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,, then hormones stop. This represents:

A. Positive Feedback
B. Negative feedback
C. More than one of the above
D. none of the above

Answer: A

Q6: Which of the following is TRUE about homeostasis?

A. Marinating variables of the body at a fixed level.
B. Essential for the survival of cells.
C. Is the responsibility of the nervous & endocrine systems only.
D. More than one of the above.

Answer: B

Q7: When the body temperature increases, thermoreceptors sends signals to the hypothalamus, then sweating increases. Which of the following is FALSE.

A. Thermoreceptors are the sensors.
B. Hypothalamus is the regulatory center.
C. Sweat glands are the effectors.
D. This is a positive feedback as the increase of temperature caused an increase in sweating.
E. None of the above.

Answer: D

Q8: As you get dehydrated, your blood becomes thicker and harder to pump. Your kidneys will respond by stopping urine production, sending the water from urine into your bloodstream to thin your blood back to normal level is a

A. Positive Feedback Response
B. Negative feedback loop
C. Not a regulatory mechanism
D. Both A & B

Answer: B

Q9: An increase in the concentration of carbon dioxide above it's normal range is detected by a(n):.

A. sensor
B. messenger.
C. afferent
D. integrator
E. effector.

Answer: A

Q10: Which of the following substances has the highest intracellular fluid to extracellular fluid concentration ratio for most mammalian cells?

A. Sodium
B. Potassium
C. Carbon Dioxide
D. Calcium

Answer: B

Cell membrane & Transport

Q1: How does the intracellular Na+ concentration change following inhibition of Na+ -K+ ATPase?

A. Increase
B. decrease
C. Remains the same
D. K+ also inhibited

Answer : A

Why? while Na+ -K+ ATPase are inhibited, there are some channels that get Na+ inside the cell (leaky channels)

Q2: 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

Q3: 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. Decreases and then increases
C. Increase
D. Decrease
E. Increase and then decrease

Answer: A

Q4: 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. Stay unchanged
D. Decrease to the half

Answer: B

(To answer such a question, calculate the concentration difference before “here it’s 10-5=5”, and then calculate it after “20-5=15” so the flux must be TRIPLED; 15 = 5*3)

Q5: The osmolarity of a solution of 50 mmol/L $CaCl_2$ 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

Q6: 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 $CaCl_2$

Answer: C

Q7: The rate at which diffusion takes place is determined by the following conditions EXCEPT:

A. The size of the area of diffusion

B. The direction of the diffusion

C. The temperature

D. The concentration gradient

Answer: B

Q8: 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

Q9: How does the intracellular Na+ concentration change following inhibition of Na+ -K+ ATPase?

A. Increase
B. Decrease
C. Remains the same
D. No enough information

ANSWER: A

Q10: 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

Q11: 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

Q12: 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

Q13: 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

Q14: As osmolarity increases, water concentration _____ and osmotic pressure _____

A. decreases: increases

B. decreases: decreases

C. increases: decreases

D. increases:increases

ANSWER: A

Q15: 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

Q16: 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

Q17: What activates adenylyl cyclase?

A. epinephrine binding to it

B. an activated G protein

C. cAMP

D. a protein kinase

Answer: B

Q18: 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

Q19: 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

Q20: Adenylyl cyclase is used in a G-protein pathway to ;

A. cause ATP to form cAMP

B. add a phosphate to a kinase

C. remove a phosphate from a kinase

D. attract a ligand

ANSWER: A

Q21: Which of the following can activate a protein by transferring a phosphate group to it ?

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

ANSWER: C

Q22: Which of the following transport mechanisms is NOT rate limited by an intrinsic transport maximum (Vmax)?

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

Q23: 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

Q24: 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

Q25: Select the membrane transport protein that is least likely to to exhibit saturation:

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

ANSWER: C

Q26: 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

Q27: 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

Q28: Which one of the following is NOT consistent with secondary active transport?

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

ANSWER: D

Q29: Which of the following transport systems require energy?

A. Osmosis.

B. Phagocytosis.

C. Filtration through aquaporins.

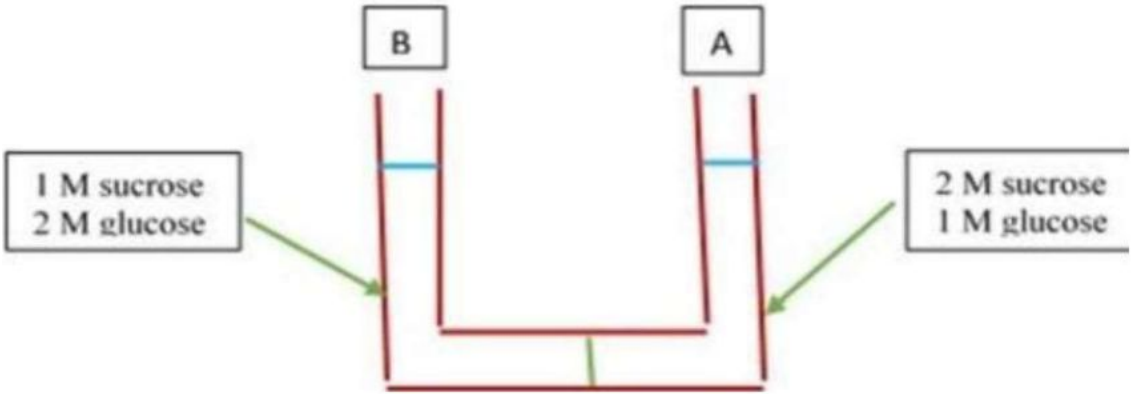
D. Diffusion.

E. Facilitated diffusion

ANSWER: B

Q30: The solutions in the two arms of this U - tube are separated by membrane that is permeable to water and glucose but not to sucrose Side A is filled with a solution of 2 M sucrose and IM glucose. Side B is filled with 1 M sucrose and 2 M glucose. Initially, the liquid levels on both sides are equal. At the beginning, in terms of tonicity, the solution inside A with respect (as compared) to that in B:

A. Hypotonic.
B. Saturated.
C. Hypertonic.
D. Isotonic.
E. Plasmolyzed



ANSWER: D

Q31: Na+ , K,+Ca+2, and Cl- permeation through their respective ion channels represents an example of:

A. Primary active transport.
B. Secondary active transport.
C. Osmosis.
D. Pinocytosis.
E. Passive transport

ANSWER: E

Q32: What is the major difference between simple diffusion and facilitated diffusion?

A.Simple diffusion does not require energy but facilitated diffusion requires energy.

B.Simple diffusion only operates across a cell membrane.

C.Simple diffusion only moves substances inside a cell.

D.Simple diffusion requires energy but facilitated diffusion does not requires energy.

E. Facilitated transport requires a specific carrier.

ANSWER:E

Q33: The solutions in the two arms of this U- tube are separated by a membrane that is permeable to water and glucose but not to sucrose. Side A is filled with a solution of 2 M sucrose and IM glucose. Side B is filled with 1 M sucrose and 2 M glucose. Initially, the liquid levels on both sides are equal. After the system reaches equilibrium, what changes are observed?

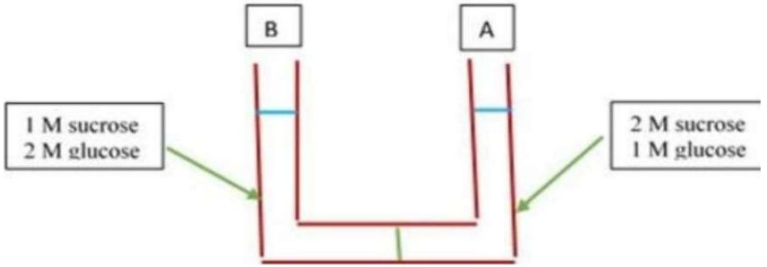
A.The water level is higher inside A than inside B.

B. The molarity of glucose is higher inside A than inside B.

C. The water level is higher inside B than inside A.

D.The water level is unchanged.

E. The molarity of sucrose and glucose are equal on both sides



ANSWER: A

Q34: At the resting membrane potential of an excitable cell, the electrical driving force for Cl- , Na+ and K+ ions is:

A. Equal for all mentioned ions.
B. High for Cl-
C. Low for K+ and high for Na+
D. Low for Na+
E. High for K+and low for Cl-

ANSWER: C

Q35: What is a hypotonic solution?

A. An external solution with a higher concentration than inside a cell.
B. An external solution of 0.9% NaCl (molecular weight of NaCl 58.5).
C. An internal solution with 0.9% NaCl (molecular weight of NaCl= 58.5).
D. An external solution with the same concentration as inside the cell.
E. An external solution with a lower concentration than inside a Cell.

ANSWER: E

Q36: An experiment is done to measure the uptake of an amino acid into a cell. The above data are obtained. If Na+ is removed from the extracellular bathing solution, or a drug is added that prevents the cell from making ATP, the uptake of amino acid into the cell is markedly reduced. Based on this information which of the following mechanisms is likely responsible for the transport of the amino acid into the cell?

A. Uniporter (one molecule unidirectional)
B. Transport ATPase (pump)
C. Na+ symporters (co-transport)
D. Passive diffusion through the lipid bilayer
E. Na+ antiporter (counter transport)

ANSWER: C

Q37: The type of membrane protein enables cells to respond to specific hydrophilic ligand by changes in the level of intracellular cyclic-AMP?

A. Ligand
B. Cholesterol
C. Phospholipid
D. Enzymes
E. Receptors.

ANSWER: E

Q38: The cell membrane is most permeable to which of the following substances?

A. Sodium fluoride
B. Oxygen
C. Potassium Chloride
D. Albumin protein

ANSWER: B

Q39: A blood sample is taken from an individual whose blood osmolality is 300 mOsm/kg H_2O, Red blood cells from this sample are then replaced in the following solution, in which solution cells will shrink?

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

	Molar concentration (mM/liter)
1. Na Cl	150
2. Fructose	300
3. $Na HCO_3$	150
4. $Ca Cl_2$	150
5. K Cl	100

ANSWER: D

Q40: Which of the following substances has the highest intracellular fluid to extracellular fluid concentration ratio for most mammalian cells?

A. Carbon dioxide
B. Proteins
C. Calcium
D. Sodium
E. Potassium

ANSWER: E

Q41: Phagocytosis involves the transportation of a phagosome to which of the following organelles?

A. Lysosome

B. Endoplasmic reticulum

C. Golgi apparatus

D. Mitochondria

ANSWER: A

Q42: 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. 160 mM NaCl

B. 350 mM mannitol

C. 100 mM NaCl

D. 150 mM $CaCl_2$

ANSWER: C; *(Normal saline ~ 300 mOsm/L= 0.9% NaCl [by mass])*

Q43: The forces governing the diffusion of a gas through a biological membrane are listed below. Which of the following changes DECREASE the diffusion of gas through a biological membrane?

A. A
B. B
C. C
D. D
E. E

	ΔC	A	S	T	MW
A.	↓	↓	↓	↓	↓
B.	↓	↓	↓	↑	↑
C.	↓	↑	↑	↓	↓
D.	↓	↓	↑	↓	↓
E.	↑	↑	↑	↑	↑

Abbreviations: (ΔC): concentration difference across the membrane; (A): the cross sectional area of the membrane; (S) the solubility of the gas; (T) thickness of the membrane and (MW) the molecular weight of the gas. ↓=decrease, and ↑=increase

ANSWER: B

Q44: An increase in the concentration of carbon dioxide above it's normal range is detected by a

A. Messenger.
B. Sensor.
C. Afferent.
D. Effector.
E. Integrator.

ANSWER: B

Q45: Which of the following solutions will cause shrinkage of cells (cell osmolarity = 300 mOSM/L) ?

A. 150 mM NaCl.
B. 100 mM CaCl2.
C. 290 mM Glucose.
D. 200 mM NaCl.
E. None will cause shrinkage.

ANSWER: D

Q46: Which of the following best describes the changes in the changes in the cell volume that will occur when red blood cells (previously equilibrated in a (280-) milliosmolar solution of NaCl) are placed in a solution of a 140-millimolar NaCl containing 20-millimolar urea , a relatively large but permanent molecule ?

A. Shrink, then swell and lyse.
B. Shrink, then return to the original volume.
C. Swell and lyse.
D. Swell, then return to original volume.
E. No change in cell volume.

ANSWER: B

Q47: What is the major difference between simple diffusion and facilitated diffusion?

A. facilitated transport requires a specific carrier.
B. simple diffusion only moves substances inside a cell.
C. simple diffusion does not require energy but facilitated diffusion requires energy.
D. simple diffusion requires energy but facilitated diffusion does not requires energy.
E. simple diffusion only operates across a cell membrane.

ANSWER: A

Q48: Which of the following transort processes of glucose is affected if Na+ usual gradient across the membrane is abolished?

A. vesicular transport.
B. simple diffusion.
C. facilitated diffusion.
D. co-transporter.

ANSWER: D

Q49: Which of the following characteristics is shared by simple and facilitated diffusion of glucose?

A. occurs down an electrochemical gradient
B. is saturable
C. is inhibited by the presence of galactose
D. requires a Na+ gradient

ANSWER: A

Q50: Which of the following molecules crosses through a semipermeable membrane during the process of osmosis?

A. sodium
B. potassium
C. osmotically active molecules
D. water

ANSWER: D

Q51: an animal cell has a %2 salt concentration. It is placed into a solution with a 0.05% salt concentration. what will happen to the animal cell?

A. water will move out of the animal cell, causing it to shivel

B. water will move into the animal cell , causing it to swell and burst

C. water will move into the animal cell, causing it to shivel

D. water will move out of the animal cell, causing it to swell and burst

ANSWER: B

Q52: An experiment is done to measure the uptake of an amino acid into a cell. The above data are obtained. If Na+ is removed from the extracellular bathing solution, or a drug is added that prevents the cell from making ATP, the uptake of amino acid into the cell is markedly reduced. Based on this information which of the following mechanisms is likely responsible for the transport of the amino acid into the cell?

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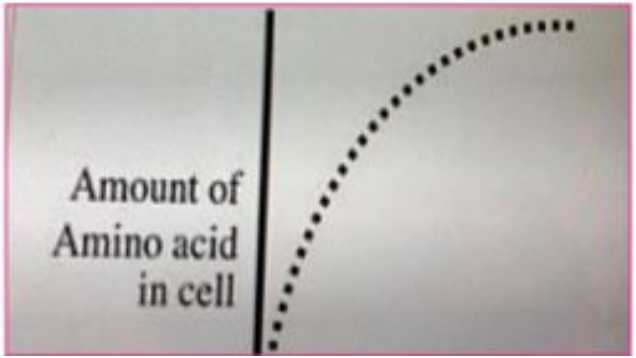
B. Transport ATPase (pump)
C. Na+ symporters (co-transport)
D. Passive diffusion through the lipid bilayer
E. Na+ antiporter (counter transport)



ANSWER: C

Membrane Potential

Q1: 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

Q2: 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

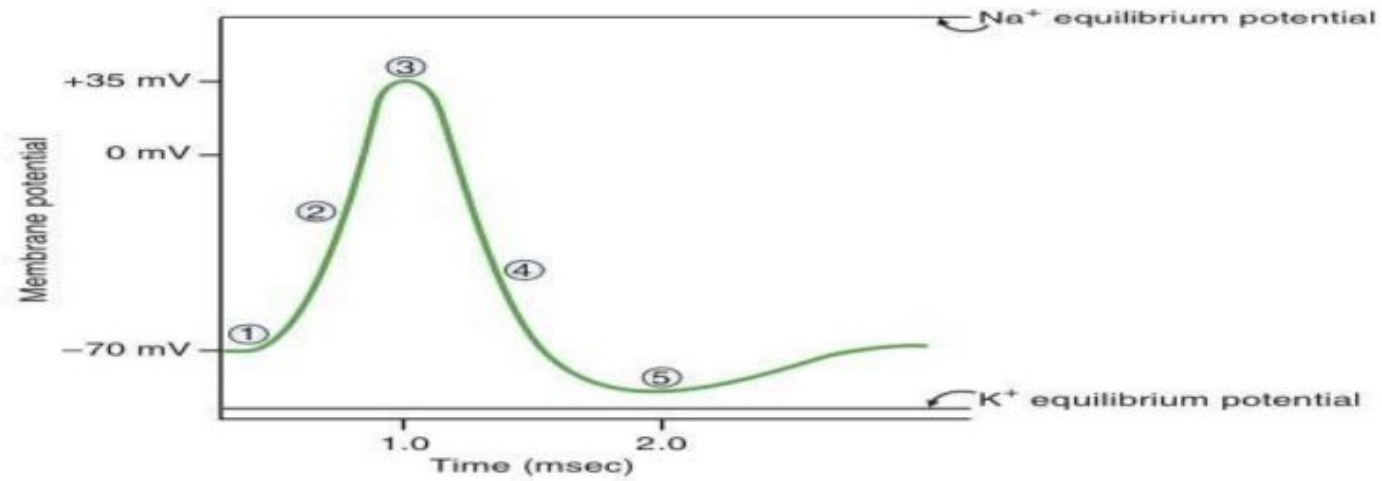
Q3: Choose the correct statement:

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

Q4: At which labeled point on the action potential is the K+ closest to its electrochemical equilibrium?

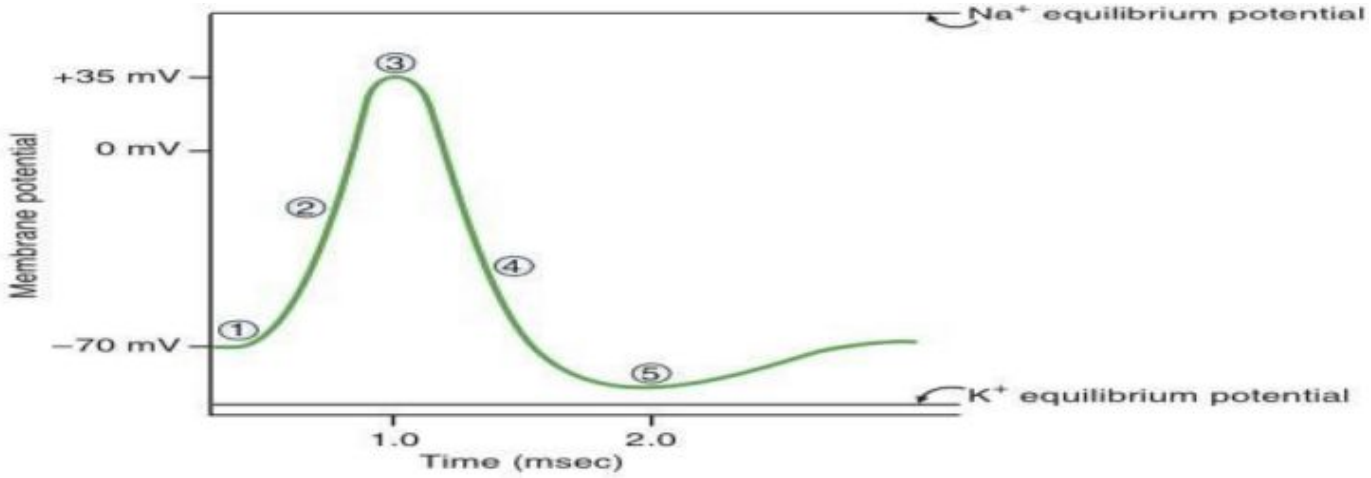
A. 1
B. 2
C. 3
D. 4
E. 5



ANSWER: E

Q5: 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

Q6: 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

Q7: 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

Q8: 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

Q9: 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

Q10: 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

Q11: 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

Q12: 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; *(inside the cell becomes less negative)*

Q13: 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; *(because of the slight permeability for other ions “goldman equation“)*

Q14: 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

(**NOTE : first opened are sodium ligand gated and then voltage gated**)

Q15: The region from where neurotransmitters cross from one neuron to another is called _____

A. dendrite
B. axon
C. synapse (cleft)
D. neurotransmitter

Answer: C

Q16: 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

Q17: 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

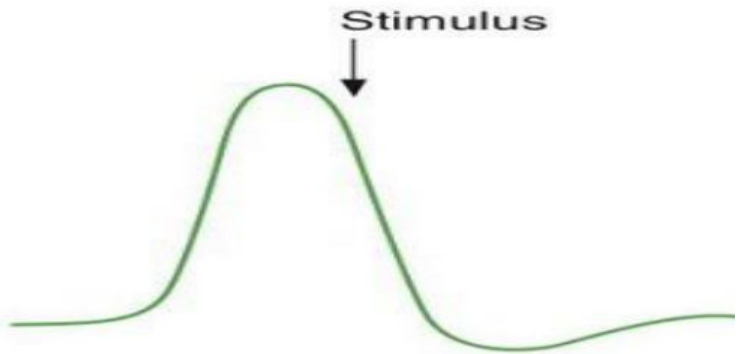
Q18: An input neuron to a diverging circuit causes the membrane potential of a target neuron to change from −65 millivolts to −55 millivolts. Which of the following best describes this change in membrane potential (in millivolts)?

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

Answer: A

Q19: 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.

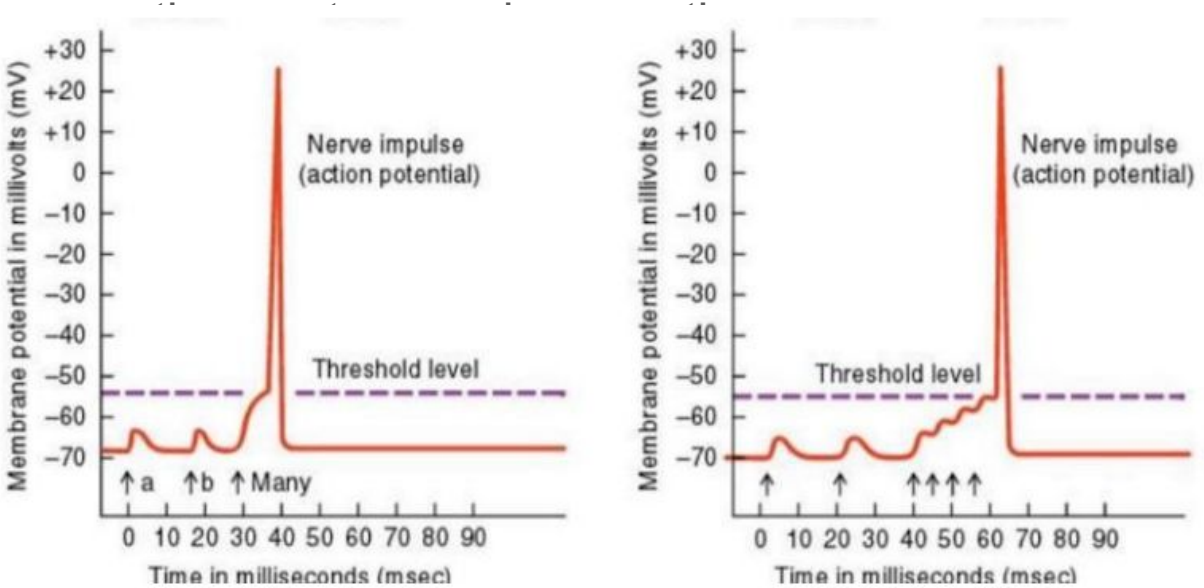
A. of smaller magnitude will occur
B. of normal magnitude will occur
C. of normal magnitude will occur, but will be delayed
D. will occur, but will not have an overshoot
E. will not occur



ANSWER: E

Q20: 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



ANSWER: A

But what is the right graph?

Q21: 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

Can you think of other consequences caused by this action?

Q22: 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

Q23: At the synaptic cleft, increased neurotransmitter concentration is resulted by:

A. Activation of adenylate cyclase.
B. Activation of chemical gated Ca++ channels.
C. Activation of phospholipase C.
D. Increased Ca++ concentration in terminals.
E. Inhibition of adenylate cyclase.

ANSWER: D

Think more: **why B is incorrect ?**

Q24: If more K+ channels have been activated the membrane was at resting potential, which of the following statements is CORRECT:

A. The membrane potential becomes closer to threshold.
B. The membrane is in refractory period.
C. More Na+ channels become in the state of closed and capable for opening
D. More Cl- can move inward.
E. The membrane potential can exceed (more negative) the -95mv.

Answer: C

Sodium driving force becomes greater

Q25: Which channel membrane protein is specifically important in the process of neurotransmitter release?

A. Neurotransmitter receptor sodium channels.
B. Voltage - dependent (gated) calcium channels.
C. Voltage - dependent (gated) chloride channels.
D. Voltage - dependent (gated) potassium channels.
E. Chemical gated calcium channels

ANSWER: B

Q26: Assuming that we have a membrane that is NOT permeable to Cl - , K+ and Na+, and permeability for Ca++ is the highest . Which of the following potentials is expected to develop at that membrane?

A. More positive than +160 mV.
B. Between +100 and +130 mV.
C. Between 0 and + 60 mV.
D. More negative than -30mV.
E. Between -30 and 0 mv.

ANSWER: B

Q27: One of the following statements is NOT true with regard to Na+ channels:

A. Almost all voltage dependent channels become active at threshold potential.
B. They transform into the state of closed and capable for opening during the positive after potential.
C. Chemical gated channels can be activated by excitatory transmitter.
D. The voltage dependent channels are activating at a slower rate than K+ channels during action potential.
E. Voltage dependent channels are closed and not capable for opening during falling phase of action potential.

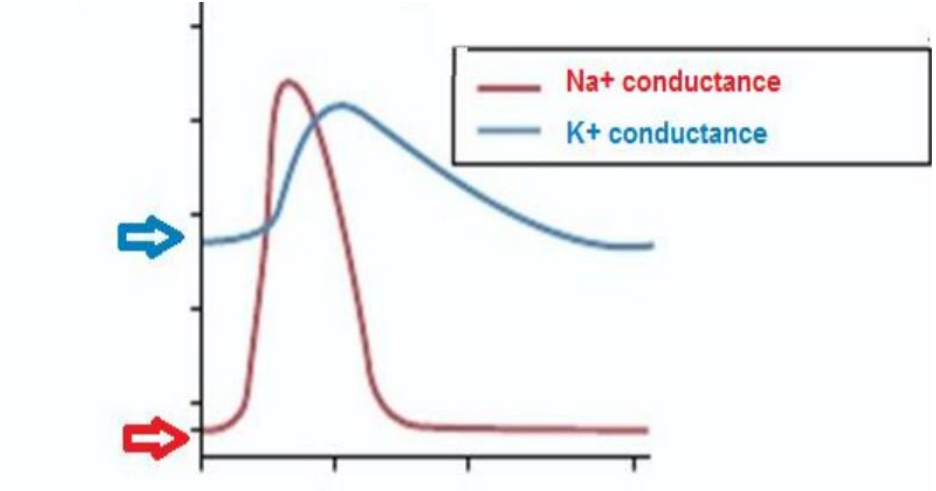
ANSWER: D

Q28: Regarding action potentials, which of the following pairs are NOT related to each other?

A. Resting potential: High conductance for K+.
B. Relative refractory period: Highest conductance of K+.
C. Threshold potential: Activation of voltage gated Na+ channels.
D. Overshoot: Highest electrical driving force for Na+.
E. Hyperpolarization: More diffusion for K+.

(LOOK AT FIGURE BESIDE FOR BETTER COMPREHENSION)

ANSWER: D



Q29: Generation of action potentials by post synaptic neurons can be reduced by all the followings EXCEPT:

A. Inhibition of Ca++ channels at presynaptic terminals releasing excitatory neurotransmitters.
B. Activation of chemical gated Cl- channels at the postsynaptic membranes.
C. inhibition of Na+ channels at the postsynaptic membranes.
D. Generation of more IPSPs (Inhibitory postsynaptic potentials)
E. Inhibition of K+ channels at the postsynaptic membranes.

ANSWER: E

Q30: Assuming that we have a membrane is highly permeable to Na+ and Ca++ and permeability for Cl- and K+ is zero. Which of the following membrane potentials is expected?

A. More positive than +160 mV
B. Between +61 mv and +130 mv
C. Between 0 and +30 mv
D. Between 0 and -80 mv
E. More negative than -94 mv

ANSWER: B

(NOTE: Remember how did we calculate it)

Q31: One of the followings with regard to electrical activity along nerve fibers (axons) is true:

A. Nodes of Ranvier refer to the parts of neurons that are covered with myelin sheath
B. Conduction is continuous in myelinated fibers
C. Saltatory conduction refers to jumping of impulse from Schwann cell to the next Schwann
D. Local currents are depolarizing axonal membrane to reach the threshold potentials
E. Activation of Ca++ at the axon hillock is important for generation of action potentials at motor neurons

ANSWER: D

Q32: Generation of an action potential at the axon hillock of a motor neuron can take place by:

A. Development of more EPSPs at the postsynaptic neurons
B. Activation of more chemical gated Cl- channels at the postsynaptic membrane
C. Activation of more chemical gated k+ channels at the postsynaptic membrane
D. Increasing concentration of neurotransmitter in synaptic cleft that can generate IPSPs
E. None of the above

ANSWER: A

Q33: An excitable membrane at a resting membrane potential of -80 mv can depolarize by:

A. More diffusion of K+
B. Activation of CL- channels
C. Decreasing Na+ concentration in extracellular fluids
D. Increasing K+ concentration in extracellular fluids
E. Activation of Na+/K+ pump

ANSWER: D; *see explanation below*

A is false ⇔ Diffusion of K+ (outside) causes hyperpolarization.
B is false ⇔ Diffusion of Cl- (inside) causes hyperpolarization.
C is false ⇔ Driving force for sodium decreases causing less influx – less depolarization – more negative potential (hyperpolarization).
D is True ⇔ Driving force for K+ decreases causing less efflux – less hyperpolarization – less negative potential ***(depolarization)****.*
E is false ⇔ 3+ exits & 2+ enters ⇒ net positive outside (hyperpolarization).

Q34: One of the followings is NOT true with regard to summation:

A. Summation can have place between IPSPs and EPSPs
B. Temporal summation refers to summation of potentials from the same presynaptic neurons
C. Spatial summation refers to summation of potentials from different presynaptic neurons
D. The duration of postsynaptic potentials is less than the duration of action potentials at the presynaptic axons
E. High frequency of action potentials by inhibitory presynaptic neurons can reduce generation of action potentials at the postsynaptic neurons

ANSWER: D

Q35: One of the followings with regards to synaptic function is NOT true:

A. Neurotransmitters from presynaptic terminals are released by endocytosis
B. Upon release of neurotransmitters, chemical gated channels over postsynaptic membranes are activated
C. Transmission from presynaptic to postsynaptic neurons is chemical
D. Destruction of neurotransmitter by enzymes at the postsynaptic membrane is reducing concentration of neurotransmitter at the synaptic cleft
E. Postsynaptic membranes are bearing specific receptors for released neurotransmitters

ANSWER: A

Q36: Which of the following is NOT true with regard to conduction along nerve fibers:

A. Higher velocity of conduction is in myelinated than unmyelinated fibers
B. The velocity of conduction is increased by increasing diameter of nerve fibers
C. Refractory periods are important for ensuring propagation of action potentials in one direction only from the site where they have been generated
D. Higher velocity of conduction is achieved by saltatory than by continuous conduction
E. Higher resistance for internal currents is in large nerve fibers

ANSWER: E

Q37: Resting membrane potential at excitable cells is:

A. Positive inside with regard to outside
B. Established by high permeability of membrane to CL- ion
C. Determined mainly by the activity of adenylate cyclase
D. Generated by high protein content inside cells
E. Established just across the membrane

ANSWER: E

Q38: Which of the followings is NOT true with regard to an action potential at neurons:

A. Depolarization can appear by activation of Na+ channels
B. Positive after potential is more negative than the resting potential
C. At threshold, there will be activation of voltage gated channels
D. Action potentials appear by activation of Na+/k+ pumps
E. At the overshoot, the membrane potential is positive inside with regard to outside

ANSWER: D

(CAN YOU DETERMINE ON FIGURES WHERE EXACTLY IS OVERSHOOT ?)

Q39: Which of the following is NOT characterizing a membrane during absolute refractory period?

A. The membrane potential is closer to zero mv than the resting potential
B. The membrane is having higher conductance for K+ than for Na+
C. Voltage gated Na+ channels are opened
D. Voltage gated k+ channels are activating
E. High conductance is for Na+

ANSWER: B

Q40: Which of the followings pairs are NOT related to each other:

A. Activation of chemical gated Na+ channels :Excitatory post synaptic potentials (EPSPs)
B. Activation of chemical gated K+ channels :Inhibitory post synaptic potentials (IPSPs)
C. Activation of adenylate cyclase at the terminals of axons : release of neurotransmitters from terminals
D. Action potentials at presynaptic axons : Activation of voltage gated Ca++ channels at the terminals
E. Summation of postsynaptic membrane potentials : Action potentials at the postsynaptic neurons

ANSWER: C

Q41: After hyperpolarization wave recorded with an action potential refers to:

A. The membrane potential before reaching threshold
B. The membrane potential when becoming positive inside with regard to outside
C. The resting membrane potential before starting action potential
D. The membrane potential during absolute refractory period
E. The more negative potential than the resting potential after repolarization phase

ANSWER: E

(WHAT IS THE DIFFERENCE BETWEEN HYPERPOLARIZATION AND AFTER HYPERPOLARIZATION)

Q42: Regarding action potentials, which of the following pairs are NOT related to each other?

A. Firing stage: High conductance of Na+
B. Depolarization: More diffusion for Na+
C. Overshoot: Highest driving force for Na+
D. Threshold potential: Activation of voltage gated Na+ channels
E. Resting potentials: High permeability for K+

ANSWER: C

Q43: At the resting membrane potential of an excitable cell the driving force for ions is:

A. The highest for K+
B. The highest for Na+
C. The highest for CL-
D. Equal for all ions
E. None of the above

ANSWER: B

Q44: Na+ channels are in the state of closed and NOT capable for opening during:

A. Resting membrane potential
B. Depolarization and before reaching threshold
C. Firing stage of an action potential and part of the falling stage
D. During all the Falling phase of an action potential
E. Positive after potentials

ANSWER: C

Q45: One of the followings with regard to electrical properties of excitable membrane is true:

A. All are establishing the same value for resting membrane potentials
B. All are having the same value for threshold potential
C. In all excitable tissues, only Na+ and K+ are involved in generation of action potentials
D. Neurons can develop more negative potentials than the equilibrium potential for K+
E. Equilibrium potential for Na+ is never reached during action potentials

ANSWER: E

Q46: During depolarization, which of the following statements about voltage gated ion channels is TRUE?

A. K+ gates open before Na+ gates.
B. Na+ gates open after K+ gates.
C. Na+ and K+ gates get activated at the same time in different rates.
D. Na+ gates open while K+ gates remain closed.
E. K+ gates open while Na+ gates remain closed.

ANSWER: D

Q47: Choose the most accurate statement regarding the relative refractory period:

A. It coincides (occurs at the same time) with the period of lowest K+ channel activity.
B. It mostly takes place when Na+ channels are closed but not capable of opening.
C. It precedes the absolute refractory period
D. It occurs during the firing stage
E. The sodium channels during this period do not respond even to stronger stimuli

ANSWER: B

Q48: Which of following statements about transmission of action potentials along the axon of the nerve fiber is NOT TRUE:

A. Continuous conduction is slower than saltatory conduction.
B. As the diameter of the nerve fiber decreases, speed of conduction increases.
C. In saltatory conduction, the action potential travels from one node of Ranvier to another.
D. Saltatory conduction involves opening voltage-gated sodium channels at the nodes of Ranvier
E. Speed of transmission is fastest in myelinated nerve fibers.

ANSWER: B

Q49: Events during synaptic transmission are:

1) Activation of voltage gated Ca++ channels at terminals.
2) Generation of EPSPS (Excitatory postsynaptic potentials).
3) Exocytosis of neurotransmitter.
4) Generation of action potentials at postsynaptic neurons.

The correct sequence of the events above according to their appearance during synaptic transmission

A. 1, 3, 2, 4.
B. 2, 1, 3, 4.
C. 1, 2, 3, 4.
D. 3, 1, 2, 4.

ANSWER: A

Q50: 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 along its electrochemical gradient
C. A neurotransmitter that selectively opens potassium channels will allow potassium to move into the cell
D. An increase in the extracellular sodium concentration usually leads directly to an inhibitory postsynaptic potential

Answer: A

ANS

Q1: Cells of the adrenal medulla receive synaptic input from which type of neuron?

A. Preganglionic sympathetic
B. Postganglionic sympathetic
C. Preganglionic parasympathetic
D. Postsynaptic parasympathetic

ANSWER: A

Q2: Are the neurons carrying impulses away from the central nervous system to the muscles or glands

A. Extensors
B. Flexors
C. Afferent nerves
D. Efferent nerves
E. Sensory nerves

Answer: D

Q3: All the following structures have muscarinic receptors EXCEPT:

A. Postganglionic neurons
B. Sweat glands
C. Intestine
D. Salivary glands
E. Heart conductive tissue

Answer: A

Q4: All the followings may describe the parasympathetic system EXCEPT:

A. When stimulated it causes an increase in intestinal movements
B. Second neurons release a neurotransmitter that binds to muscarinic receptors
C. It dominates in quiet and relaxed situation
D. Its postganglionic neurons can also be stimulated by nicotine
E. When stimulated it is increasing sweating

Answer: E

Q5: One of the followings does NOT characterize the sympathetic nervous system:

A. Has acetylcholine as transmitter in preganglionic neuron
B. Is always giving excitatory responses
C. Is a part of the autonomic nervous system
D. Has short preganglionic and long postganglionic fibers
E. Promotes responses for fight or flight reaction

Answer: B

Q6: Which type of receptor is found at synapses between preganglionic and postganglionic neurons of the sympathetic system?

A. Muscarinic
B. Nicotinic
C. Alpha
D. Beta-1
E. Beta-2

Answer: B

Q7: All the following with regard to beta adrenergic receptors are true EXCEPT:

A. Their stimulation increases heart rate
B. They are present in the heart
C. They are stimulated by a neurotransmitter released by sympathetic nervous system
D. They are blocked by atropine
E. Their stimulation increases the air flow to the lung

Answer: D

Q8: All the following may describe the sympathetic system EXCEPT:

A. When stimulated, it has less diffuse receptors than parasympathetic stimulation.
B. When stimulated, it reduces blood flow to gastrointestinal tract.
C. The transmission at the level of prevertebral ganglia appears by the secretion of acetylcholine.
D. It has short preganglionic and long postganglionic fibers.
E. It is stimulated during fear or stress.

Answer: A

Q9: Which substance activates muscarinic receptors?

A. Acetylcholine (ACh)
B. Atropine
C. Norepinephrine (NEpi)
D. Epinephrine (Epi)
E. More than one of the above

Answer: A; atropine blocks them instead

Q10: Which of the following actions is/are mediated by β2 receptors?

A. increased heart rate
B. contraction of gastrointestinal sphincters
C. contraction of vascular smooth muscle
D. dilation of airways
E. relaxation of bladder wall

Answer: D & E

Q11: Which of the following reactions can be developed by giving atropine to a healthy person:

A. Increased heart rate (tachycardia)
B. Increased intestinal movements
C. High sweating
D. Miosis (constriction of pupil)
E. Increased salivation

ANSWER: A

Q12: By muscarinic intoxication (~injection or intake of muscarine) , all the followings are taking place EXCEPT:

A. Vomiting and diarrhea
B. Dilation of pupil(mydriasis)
C. Hyper salivation
D. High sweating
E. Decrease heart rate.

ANSWER: B

Q13: Which of the following statements concerning the autonomic nervous system is TRUE?

A. In the synaptic organization, more divergence and convergence are found in parasympathetic system than in sympathetic.
B. Norepinephrine is secreted by preganglionic neurons of sympathetic.
C. Smooth muscle cells of blood vessels are controlled directly only by Sympathetic.
D. Parasympathetic fibres that originate in the brain are under the voluntary control.
E. Sympathetic fibres that innervate suprarenal glands are releasing Norepinephrine.

Answer: C

Q14: Which of the following is a feature of the sympathetic, but not the parasympathetic nervous system?

(A) Ganglia located in the effector organs

(B) Long preganglionic neurons

(C) Preganglionic neurons release norepinephrine

(D) Preganglionic neurons release acetylcholine (ACh)

(E) Preganglionic neurons originate in the thoraco-lumbar spinal cord

(F) Postganglionic neurons synapse on effector organs

(G) Postganglionic neurons release epinephrine directly

(H) Postganglionic neurons release ACh

Answer: E

Q15: Which spinal cord level contains the entire population of preganglionic sympathetic neurons?

A. C5-T1
B. C3-C5
C. S2-S4
D. T1-L2
E. T6-L1

Answer: D

Q16: Preganglionic sympathetic axons pass through which of the following structures?

A. Dorsal root
B. Dorsal primary rami
C. White rami
D. Gray rami
E. Ventral root

ANSWER: C & E

Q17: Regarding the autonomic nervous system, which of the following pairs are NOT related to each other?

A. Acetylcholine and Stimulation of muscarinic receptors
B. Sympathetic division and Release of norepinephrine
C. Atropine and Blocking of nicotinic receptors
D. Medication with beta adrenergic blockers and Decreasing heart rate
E. Sweating and Sympathetic stimulation

Answer: C

Q18: Muscarinic receptors are blocked by:

A. Nicotine
B. Epinephrine
C. Acetylcholine
D. Muscarine
E. Atropine

Answer: E

Q19: Activation of adrenergic receptors will result in all the following EXCEPT:

A. Decreased salivation
B. Bronchodilation
C. Sweating
D. Increased heart rate (Tachycardia)
E. Constriction of blood vessels

Answer: C; *although sympathetic, sweating is cholinergic and not adrenergic*

Q20: Which of the following responses is mediated by parasympathetic muscarinic receptors?

A. Dilation of bronchiolar smooth muscle
B. Miosis
C. Ejaculation
D. Constriction of gastrointestinal (GI) sphincters
E. Increased cardiac contractility

ANSWER: B

Q21: Which autonomic receptor mediates an increase in heart rate?

A. Adrenergic α1 receptors
B. Adrenergic β1 receptors
C. Adrenergic β2 receptors
D. Cholinergic muscarinic receptors
E. Cholinergic nicotinic receptors

ANSWER: B

Q22: Which adrenergic receptor produces its stimulatory effects by the formation of inositol 1,4,5-triphosphate (IP3) and an increase in intracellular [Ca2+]?

A. α1 Receptors
B. α2 Receptors
C. β1 Receptors
D. β2 Receptors
E. Muscarinic receptors
F. Nicotinic receptors

Answer: A, *muscarinic receptors use this mechanism as well but they are <u>not</u> adrenergic and are thus excluded from the answer*

Q23: Which autonomic receptor mediates secretion of epinephrine by the adrenal medulla?

A. Adrenergic α1 receptors
B. Adrenergic β1 receptors
C. Adrenergic β2 receptors
D. Cholinergic muscarinic receptors
E. Cholinergic nicotinic receptors

ANSWER: E

Q24: Preganglionic parasympathetic axons pass through which of the following structures?

A. Dorsal root
B. Dorsal primary rami
C. White rami
D. Gray rami
E. None of the above

Answer: E; *parasympathetic nerves pass from cranial nerves (or spinous S2-S4) to the effector organs and do no pass through any of the aforementioned structures*

Q25: The sweat glands are innervated by which type of fibers?

A. Cholinergic postganglionic parasympathetic
B. Cholinergic postganglionic sympathetic
C. Adrenergic preganglionic parasympathetic
D. Adrenergic postganglionic sympathetic
E. Adrenergic preganglionic sympathetic

Answer: B

Q26: Which type of cholinergic receptor is found at synapses
between preganglionic and postganglionic neurons of the sympathetic system?

A. Muscarinic
B. Nicotinic
C. Alpha
D. Beta-1
E. Beta-2

Answer: B

Q27: The excitatory or inhibitory effect of a postganglionic sympathetic fiber is determined by which feature or structure?

A. Function of the postsynaptic receptor to which it binds
B. Specific organ innervated
C. Ganglion where the postganglionic fiber originates
D. Ganglion containing the preganglionic fiber
E. Emotional state of the individual

Answer: A

Q28: Which substance activates adrenergic alpha and beta receptors equally well?

A. Acetylcholine
B. Norepinephrine
C. Epinephrine
D. Serotonin
E. Dopamine

Answer: C

Q29: Nasal, lacrimal, salivary, and gastrointestinal glands are
stimulated by which substance?

A. Acetylcholine
B. Norepinephrine
C. Epinephrine
D. Serotonin
E. Dopamine

Answer: A

Q30: The function of which organ or system is dominated by the sympathetic nervous system?

A. Systemic blood vessels
B. Heart
C. Gastrointestinal gland secretion
D. Salivary glands
E. Gastrointestinal motility

Answer: A

Q31: Regarding to autonomic nervous system which of the following are Not related to each other?

A. ACh (acetylcholine) >>> stimulation of muscarinic receptor
B. Atropine >>> blocker of nicotinic receptors
C. Medication with beta adrenergic blocker >>> decreasing heart rate
D. Sweating >>> sympathetic stimulation

Answer: B

Q32: Which neurotransmitter is released by both the sympathetic and parasympathetic nervous systems?

A. Acetylcholine
B. Norepinephrine
C. Dopamine
D. Serotonin
E. Epinephrine

Answer: A

Q33: Which type of receptor is activated by acetylcholine?

A. Alpha-adrenergic receptor
B. Beta-adrenergic receptor
C. Nicotinic receptor
D. Muscarinic receptor

Answer: C & D

Q34: Which type of receptor is activated by norepinephrine?

A. Alpha-adrenergic receptor
B. Beta-adrenergic receptor
C. Nicotinic receptor
D. Muscarinic receptor

Answer: A & B

Q35: Which type of receptor is found on the sweat glands, and is activated by acetylcholine released by the sympathetic nervous system?

A. Alpha-adrenergic receptor
B. Beta-adrenergic receptor
C. Nicotinic receptor
D. Muscarinic receptor

Answer: D

Q36: Which hormone is released by the adrenal medulla in response to sympathetic nervous system stimulation?

A. Epinephrine
B. Insulin
C. Growth hormone
D. Cortisol
E. Norepinephrine

Answer: A & E; *primarily epinephrine and smaller amounts of norepinephrine*

Q37: Which of the following muscarinic receptors are expected to increase the permeability to potassium ions?

A. M1
B. M2
C. M3
D. M5

Answer: B; *inhibitory action, while M(1,3,5) are excitatory*

Q38: Which of the following responses is not controlled by the sympathetic system?

A. Tachycardia
B. Near sight accommodation
C. Relaxation of smooth muscles in the GI tract (slow peristalsis)
D. Increased metabolism
E. Fight-or-flight response

Answer: B

Q39: What is the function of the enzyme acetylcholinesterase?

A. Reuptake of Acetylcholine
B. Formation of Acetylcholine
C. Breakdown of Acetylcholine
D. Inactivation of Cholinergic receptors
E. None of the above

Answer: C

D can be tricky, but the enzyme listed does not act on receptors rather on the neurotransmitter itself

Q40: What is the best-acting neurotransmitter regarding adrenergic beta receptors?

A. Epinephrine
B. Norepinephrine
C. Acetylcholine
D. Nicotine
E. Muscarine

Answer: A

B has little effect, C,D & E have no effect as they are cholinergic neurotransmitters

Neurotransmitters

(up to slide 40 of Dr. Faisal's)

Q1: What activates adenylyl cyclase?

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

Answer: B

Q2: 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

Q3: Adenylyl (adenylate) cyclase is used in a G-protein pathway to

A. form cyclic-AMP from ATP
B. add a phosphate to a kinase
C. remove a phosphate from a kinase
D. attract a ligand

ANSWER: A

Q4: Which of the following can activate a protein by transferring a phosphate group to it ?

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

ANSWER: C

Q5: 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

Q6: 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

Q7: Small molecules neurotransmitters in contrast to neuropeptides 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 terminals.
E. Made in soma, and transported down by axonal transport.

ANSWER:D

Q8: 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

Q9: 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

Q10: What is Wrong about receptor antagonist?

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

ANSWER: B

Q11: 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

Q12: Which of the following classical neurotransmitter molecules is an amino acid molecule?

A. Epinephrine
B. Acetylcholine
C. Carbon Monoxide
D. Glycine
E. Dopamine.

Answer: D

Q13: Small rapidly acting transmitter molecules are

A. Packaged in small synaptic vesicles and synthesized in synaptic terminals
B. Soluble gases packaged in small vesicles that freely cross lipid membranes
C. Packaged in large synaptic vesicles derived from Golgi body
D. Made in the soma, packaged in small synaptic vesicles and transported down axons
E. Neuropeptides that are synthesized in synaptic terminals.

Answer: A

Q14: Nitric oxide (NO) is a gas neurotransmitter that

A. Freely cross lipid membranes
B. Is stored in synaptic vesicles
C. Is transported to the synaptic terminals via microtubules
D. Is synthesized in the nucleus by nissl granules
E. Does not cross lipid membranes.

Answer: A

Q15: Which statement is CORRECT about small molecules rapidly acting neurotransmitters?

A. Depending on the frequency of the incoming signal, a neuron will always synthesise and release more than one neurotransmitter
B. Depending if the incoming signal is inhibitory or stimulatory a neuron will synthesise and release one or another neurotransmitter
C. Depending on the integrated signal derived from both inhibitory and excitatory signals, a neuron will synthesise and release one or another neurotransmitter
D. Both A and C choices are correct
E. Each neuron will usually synthesize, store and release one neurotransmitter

Answer: E

Q16: What determines the effect of neurotransmitter released on the postsynaptic neurons?

A. The neurotransmitter contained in the synaptic vesicles
B. The post-synaptic receptors
C. The size of the synaptic vesicles
D. The concentration of calcium ions reached in presynaptic terminals
E. The size of the action potential.

Answer: B

Q17: Regulation of gene expression is associated with which membrane protein in a neuron?

A. Voltage-dependent (sensitive) sodium channels.
B. Voltage-gated calcium channels.
C. Metabotropic receptors.
D. Ionotropic receptors.
E. The second-messenger cyclic AMP (cAMP).

Answer: C, *specifically G-proteins (dissociated alpha subunit)*

Q18: Binding to gamma-aminobutyric acid (GABA) an inhibitory neurotransmitter to GABA receptors may lead to an increase in membrane permeability to:

A. Proteins
B. Proton (H+)
C. Calcium (Ca++)
D. Sodium (Na+)
E. Potassium (K+)

Answer: E; *Chloride (Cl-) is also a suitable answer*

Q19: Serotonin – specific re-uptake inhibitors (SSRIs) are widely prescribed to treat clinical depression. Which of the following procedures do you think would most likely make symptoms worse in untreated depressed patients?

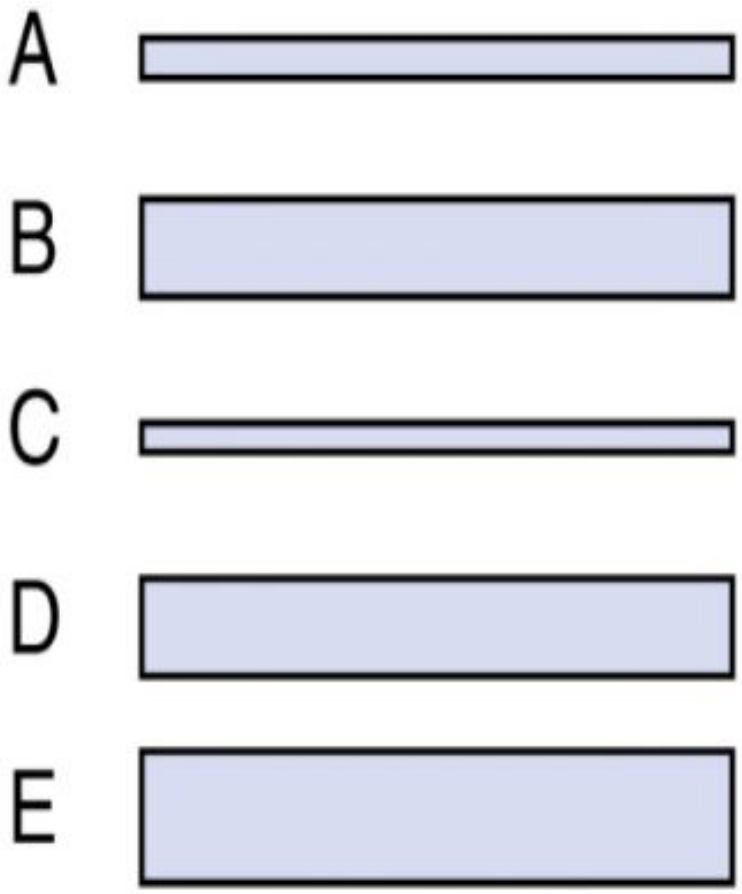
A. Decrease the concentration of serotonin in the brain.
B. Give serotonin presynaptic receptor antagonist (inhibit receptor function) or reduce presynaptic.
C. Give a dopamine receptor antagonist (reduce the function of dopamine receptors)
D. Give a drug that increases the vesicular release (in the synapse) or serotonin
E. Increase the concentration of serotonin in the brain.

Answer: A

Q20: Which of the following types of sensory nerve fibers has the slowest transmission rate for action potentials?

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

Answer: D



Q21: Five hypothetical nerve axons are shown in the above figure. Axons A and B are myelinated, whereas axons C, D, and E are nonmyelinated. Which axon is most likely to have the fastest conduction velocity for an action potential?

A) A
B) B
C) C
D) D
E) E

Figure is on the left and not above :)

Answer: B

Q22: Which of the following is true about neuropeptides?

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

بالتوفيق