Physiology Past Papers

for Final exam - June 2024

Q3: Which of the following would not be possible occurrences when signal build up occurs?

A. They can reach AP as a result of EPSP
B. IPSP can hyperpolarize the membrane
C. They can reach AP as a result of IPSP
D. An AP will reach if a number of EPSP>IPSP

Answer: C

Q5: Where would we find Voltage Regulated Channels?

A. On The dendrites
B. On the Axons

Answer: B

Q7: What happens when an IPSP is generated after EPSP?

A. Membrane is more depolarized
B. Effect of subthreshold is enhanced
C. Action potential is reached
D. A threshold event takes place
E. Membrane is hyperpolarized

Answer: E

Q8: What is the term used to describe an AP that jumps of one node of Ranvier to another?

A. IPSP conduction
B. EPSP conduction
C. Myelinated conduction
D. Saltatory conduction

Answer: D

Q21: Which of the following types of neuronal circuits is self-stimulating once activated?

A. Diverging
B. One that incorporates lateral inhibition.
C. Converging
D. Reverberating
E. Negative feedback circuit (corticofugal)

Answer: D

Q22: Which statement concerning sensory neurons or their functional properties is true?

A. All sensory fibers are unmyelinated
B. In spatial summation, increasing signal strength is transmitted by using progressively greater numbers of sensory fibers.
C. Increased stimulus intensity is signaled by a progressive decrease in the receptor potential
D. Continuous subthreshold stimulation of a pool of sensory neurons results in disfacilitation of those neurons
E. Temporal summation involves signaling of increased stimulus strength by decreasing the frequency of action potentials in the sensory fibers

Answer: B

Q25: One of the following is TRUE:?

A. In Convergence, the input signal spreads to an increasing number of neurons
B. Divergence can act only on the same track
C. Divergence means that multiple inputs are gathered together in a single neuron
D. In convergence, the excitation will be on a single neuron
E. Both C & D

Answer: D

L15-16
Body Fluids

(26) Questions

Q1: A decrease in which one of the following would tend to increase lymph flow:

A. Hydraulic conductivity of the capillary wall
B. Capillary hydrostatic pressure
C. Albumin concentration of the **interstitium**
D. Interstitial colloid osmotic pressure
E. Plasma colloid osmotic pressure

Answer: E

Q3: Which of the following changes favor(s) the movement of surrounding interstitial fluid into the capillary lumen (i.e., fluid reabsorption into the capillary)?

A. An increase in the colloid osmotic pressure of the interstitial fluid surrounding the capillary
B. An increase in the hydrostatic blood pressure in the capillary
C. An increase in the colloid osmotic (oncotic) pressure of plasma
D. An decrease in the hydrostatic pressure of the interstitial fluid surrounding the capillary
E. An increase in the capillary permeability

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اياك ان يؤتى الاسلام من قبلك، فاتقن عملك..

Answer: C

Q5 :Listed below are the hydrostatic and oncotic pressure across a muscle capillary wall.

Mean capillary hydrostatic pressure=30 mmHg
Plasma colloid osmotic pressure= 25 mmHg
Interstitial colloid osmotic pressure=10 mmHg
Interstitial hydrostatic pressure=5 mmHg

What is the net filtration pressure (in mmHg) for fluid movement across the capillary wall?

A. 25 mmHg
B. 0 mmHg
C. 5 mmHg
D. 15 mmHg
E. 10 mmHg

Answer: E

Q6: Edema at interstitial fluids can be generated by all the followings EXCEPT:

A. Increased oncotic pressure in interstitial fluids
B. Increased albumin concentration in plasma
C. Increased hydrostatic pressure in capillaries
D. Decreased lymph flow from interstitial fluids
E. Increased capillary permeability

Answer: B

Q21 :Edema at interstitial fluids can be generated by all the following EXCEPT

A. Increased hydrostatic pressure in capillaries
B. Decreased lymph flow from interstitial fluids.
C. Decreased albumin concentration in plasma.
D. Increased wash down of protein from interstitial fluid
E. Increased venous pressure.

كلما دعتك نفسك إلى معصية
تذكر أن أمتك جريحة تنتظر من يحمل همها و
يلتمس طريق عزتها
معصيتك و غفلتك تجعلك عبئا جديدا على الأمة..
فاتق الله فالحمل كاد يكسر ظهرها

Answer: D

L17-18
Conduction System of the Heart

(30) Questions

Q1: Which of the following is the pacemaker of the heart?

A. AV node
B. Bundle of His
C. Bundle branches
D. SA node
E. Purkinje fibers

Answer: D

Q2: In resting conditions, which of the following channels are most likely open in cardiac myocytes (muscle cells).

A. Na^+
B. K^+
C. Ca^{++}
D. Cl^-

Answer: B

Q3: If the ventricular Purkinje fibers become the pacemaker of the heart, what is the expected heart rate?

A. 30 bpm
B. 65 bpm
C. 75 bpm
D. 50 bpm
E. 85 bpm

Answer: A

Q4: Parasympathetic stimulation of the heart leads to:

A. Negative chronotropic but almost no inotropic action
B. Negative chronotropic and negative inotropic effect
C. Negative chronotropic and positive inotropic effect
D. Positive chronotropic but negative inotropic effect
E. Positive chronotropic and positive inotropic effect

Answer: A

Q5: The sinoatrial node and atrioventricular are autorhythmic because:

A. Their cells are rounded instead of rectangular
B. Their cells are more permeable to Na+ at rest
C. Their cells have a lot of voltage-gated slow Ca++ channels
D. Their cells are non-contractile
E. Their cells are leaky to anions

Answer: B

Q6: In which phase of the ventricular muscle AP is the potassium permeability the highest?

A. 0
B. 1
C. 2
D. 3
E. 4

Answer: D

Q7: Which of the following is the mechanism by which the sympathetic nervous system increases the heart rate?

A. Lower or more negative shift in RMP
B. Changing the threshold potential to a less negative value
C. Greater absolute amount of repolarization
D. Increasing rate of phase 4 depolarization

Answer: D

Q8: Which of the following is the depolarization phase of the AP in pacemaker cells?

A. 0
B. 1
C. 2
D. 3
E. 4

Answer: A

Q9: Which condition at the AV node will cause a decrease in heart rate?

A. Increased sodium permeability
B. Decreased acetylcholine levels
C. Increased norepinephrine levels
D. Increased potassium permeability
E. Increased calcium permeability

Answer: D

Q10: A drug that increases the permeability of cardiac cells to Na+ and Ca++ but decreases its permeability to K+ and Cl- would cause:

A. Negative chronotropic and negative inotropic effect on the heart
B. No effect since the effect of Ca++ and Na+ would be counterbalanced by the effect of Cl- and K+
C. Positive chronotropic and negative inotropic effect on the heart
D. Positive inotropic and Positive chronotropic effect on the heart
E. Positive inotropic and negative chronotropic effect on the heart

Answer: D

Q11: In the case of SSS, the pacemaker becomes:

A. Bundle of His
B. SA node
C. AV node
D. Purkinje fibers

Answer: C

Q12: The correct order of AP transmission steps is:

A. SA node, Bundle of His, AV node, Purkinje fibers
B. AV node, SA node, AV bundle, Purkinje fibers
C. SA node, AV node, Purkinje fibers, Bundle of His
D. SA node, AV node, Bundle of His, Purkinje fibers

Answer: D

Q14: About the refractory period in the heart, all the following are true EXCEPT:

A. It is longer than the refractory period in neurons
B. It lasts approximately as long as the cardiac contraction
C. It is due mainly to phase 2 (plateau) of the contractile cardiac muscle action potential
D. During it, the heart cannot be stimulated
E. It corresponds in time with the whole duration of the action potential

Answer: E

Q15: Sympathetic stimulation causes all of the following in the heart EXCEPT:

A. It has a positive inotropic action on the heart
B. It decreases the conduction time in the atrioventricular (AV) node
C. It decreases the permeability of sinoatrial (SA) node to K+
D. It decreases the slope of phase 4 of the slow response potential of the SA node
E. It increases the heart rate

Answer: D

Q16: Myocardial contractility is best correlated with the intracellular concentration of:

A. HCO_3^-
B. Na^+
C. Ca^{++}
D. K^+
E. Cl^-

Answer: C

Q17: Slow response action potential (pacemaker potential) is characterized by:

A. During phase 4 the transmembrane potential is closer to Ca++ equilibrium potential rather than to Na+ equilibrium potential
B. It has longer plateau phase than fast response potential of ventricular cells
C. dV/dt (change in voltage per unit change in time) of phase 0 is much lower than ventricular cell phase 0
D. Ca++ ions is responsible for phase 2
E. It has more negative resting membrane potential than ventricular cell potential

Answer: C

Q18: At phase (2) of an action potential in a ventricular muscle cell, which of the following is true?

A. The chemical gradient for Ca++ tends to move this ion inside
B. The electrochemical gradient for K+ tends to move this ion inside
C. Na+ permeability greatly increases
D. This phase is responsible for the short refractory period of cardiac action potential
E. The chemical gradient for K+ tends to move this ion inside

Answer: A

Q19: Which of the following is NOT caused by Sympathetic stimulation:

A. Increase in the heart rate
B. Decrease of the permeability of the sinoatrial node to K+
C. Positive inotropic effect
D. Decrease of the slope of the slow depolarization phase of the pacemaker potential
E. Increase of the conduction of the atrioventricular phase

Answer: D

Q20: The cardiac tissue with the slowest autorhythmicity is the:

A. AV bundle cells (myocytes)
B. SA node
C. Purkinje fibers
D. Bundle branches cells (myocytes)
E. AV node

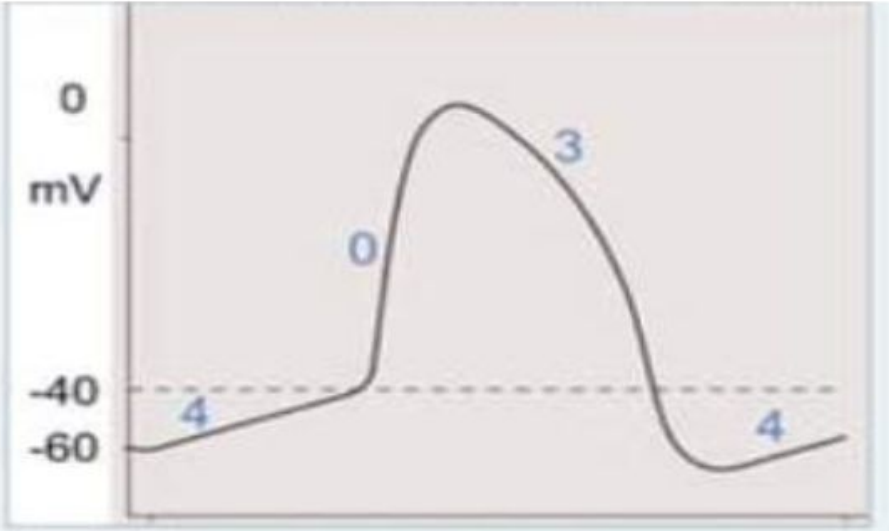
Answer: C

Q21: Sinoatrial node cells are characterized by one of the following:

A. Able to generate intrinsic and rhythmic impulses because their membrane potential is unstable.
B. Unable to generate impulses when completely denervated.
C. Innervated by the vagus (parasympathetic) only.
D. Connected to the AV node by fine bundles of Purkinje tissue.
E. Found in both atria.

Answer: A

Q22: The curve below represents the slow response action potential of the sinoatrial node of the conduction system. Which of the following phases is due to leakage of Na+ ions?



A. 4
B. 0
C. 3
D. 4 & 0
E. None of the above

Answer: A

Q23: Sympathetic stimulation of the heart normally causes which of the following conditions?

A. Decreased force of contraction (negative inotropic) of the atria.
B. Decreased rate of conduction (negative dromotropic effect) of the cardiac impulse.
C. Acetylcholine release at the sympathetic endings.
D. Negative chronotropic effect on the heart rate.
E. Increased force of contraction (positive inotropic) of the ventricles.

Answer: E

Q24: The SA node is the pacemaker of the heart because:

A. Leakier to K+ than other cells.
B. It is the only cells leaky to Na+ in the heart.
C. Its membrane property (reach threshold faster than any other cell).
D. Its location in the right atrium between the venae cava.
E. It is connected to autonomic nervous system.

Answer: C

Q25: Which of the following is true about the heart?

A. All parts contract simultaneously.
B. Purkinje fibers are located in the atria.
C. The AV node is also called the bundle of His.
D. The heart has not one but two syncytia.
E. The pacemaker is the AV node.

Answer: D

Q26: All of the following are true about cardiac muscles EXCEPT:

A. They have a plateau (phase 2).
B. Their depolarization (phase 0) is very fast.
C. They have stable RMP.
D. Transient potassium current is responsible for phase 3.
E. They are FRAP cells.

Answer: D

Q27: Which of the following cases is responsible for the relative refractory period (closed and inactive)?

A. The m gate open
B. The h gate open
C. Both gates closed
D. m gate closed
E. h gate closed

Answer: E

Q28: The ratio of intracellular concentration of Ca++ to its extracellular concentration is:

A. 0.01
B. 0.001
C. 0.0001
D. 1000
E. 10000

Answer: C

Q29: The sodium funny channels in SRAP cells:

A. Opens at -60 and closes at -50
B. Opens at -60 and closes at -45
C. Opens at -90 and closes at -45
D. Opens at -90 and closes at +10
E. Opens at -60 and closes at +10

Answer: A

Q30: Which of the following is true?

A. Cardiac output always increases with heart rate
B. Stroke volume depends on calcium ions
C. The vagal stimulation causes negative inotropic effect
D. Sympathetic nerves innervate SA & AV nodes as well as the ventricles
E. The cardiac output is about 5000 L/min

Answer: B + D

L19-20
Microcirculation and Edema

(30) Questions

Q1: Listed below are the hydrostatic and oncotic pressures across a muscle capillary wall.
Mean capillary hydrostatic pressure = 25 mmHg.
Plasma colloid osmotic pressure = 28 mmHg.
Interstitial colloid osmotic pressure = 5 mmHg.
Interstitial hydrostatic pressure = 5 mmHg.

What is the net filtration pressure (in mmHg) for fluid movement across the capillary wall?

A. No enough information
B. +7
C. -7
D. +3
E. -3

Answer: -3

Q2: The net loss of fluid from capillaries to the interstitial fluid in the legs is decreased by:

A. Decrease plasma albumin.
B. Lymphatic obstruction and increased interstitial hydrostatic pressure.
C. Arteriolar dilation to increase capillary pressure.
D. Change from the recumbent to the standing position.
E. Leg exercise and capillary hydrostatic pressure.

Answer: B

Q3: Which of the following pairs are NOT related to each other?

A. Increased capillary permeability and Generation of edema.
B. Increased colloid pressure in capillaries and Development of edema.
C. Increased lymph drainage and Wash down of proteins in interstitial fluid.
D. Hydrostatic pressure in arterial end of capillaries and Filtration.

Answer: B

Q4: Which of the following will cause an increase in the plasma oncotic pressure inside the capillaries?

A. Decrease in plasma protein concentration
B. Increase in plasma protein concentration
C. Increased lymphatic activity
D. Decreased lymphatic activity

Answer: B

Q5: In the equation of NFP, what does negative net pressure indicate?

A. Fluid filtration
B. Fluid reabsorption
C. Outflow of proteins from the capillaries
D. Inflow of proteins into the capillaries

Answer: B

Q6: Which of the following changes favor(s) the movement of surrounding interstitial fluid into the capillary lumen (i.e., fluid reabsorption into the capillary):

A. An increase in the colloid osmotic pressure of the interstitial fluid surrounding the capillary
B. An increase in the hydrostatic blood pressure in the capillary
C. An increase in the colloid osmotic (oncotic) pressure of plasma
D. An decrease in the hydrostatic pressure of the interstitial fluid surrounding the capillary
E. An increase in the capillary permeability

Answer: C

Q7: Edema at interstitial fluids can be generated by all the followings EXCEPT:

A. Increased oncotic pressure in interstitial fluids
B. Increased albumin concentration in plasma
C. Increased hydrostatic pressure in capillaries
D. Decreased lymph flow from interstitial fluids
E. Increased capillary permeability

Answer: B

Q8: A 65-year-old man has a 20-year history of nephrotic syndrome (kidney disease). He visits his physician complaining of swelling of his extremities. A decrease in which of the following is one of the most likely cause of his lower limb edema?

A. Arteriole conductance
B. Interstitial hydrostatic pressure
C. Plasma colloid osmotic pressure
D. Capillary hydrostatic pressure
E. Interstitial colloid osmotic pressure

Answer: C

Q9: Edema at interstitial fluids can be generated by all the following EXCEPT :

A. Increased hydrostatic pressure in capillaries.
B. Decreased lymph flow from interstitial fluids.
C. Decreased albumin concentration in plasma.
D. Increased wash down of protein from interstitial fluid.
E. Increased venous pressure.

Answer: D

Q10: The net loss of fluid from capillaries to the interstitial fluid in the legs is decreased by:

A. Decrease plasma albumin.
B. Lymphatic obstruction and increased interstitial hydrostatic pressure.
C. Arteriolar dilation to increase capillary pressure.
D. Change from the recumbent to the standing position.
E. Leg exercise and capillary hydrostatic pressure

Answer: B

Q11: Which of the following is the largest contributor to the plasma oncotic pressure?

A. Small molecules (e.g., glucose, amino acids, vitamins, etc).
B. Red blood cells and white blood cells.
C. Large proteins found in plasma (e.g., albumin and globulins).
D. Cations and anions in plasma.
E. Fibrinogen

Answer: C

Q12: Which of the following pairs are NOT related to each other?

A. High albumin concentration in plasma and Reabsorption.
B. Increased capillary permeability and Generation of edema.
C. Increased colloid pressure in capillaries and Development of edema.
D. Increased lymph drainage and Wash down of proteins in interstitial fluid.
E. Hydrostatic pressure in arterial end of capillaries and Filtration

Answer: C

Q13: The structure that is considered the blood reservoir:

A. Systemic capillaries
B. Systemic arteries
C. Systemic veins
D. Pulmonary vessels
E. The heart atria

Answer: C

Q14: All of the following are causes of edema EXCEPT:

A. High filtration
B. High hydrostatic pressure in the capillaries
C. High lymphatic activity
D. Low protein concentration in the plasma
E. High permeability of the capillary walls

Answer: C

Q15: The pressure of capillaries does not change unless the force on the walls changes because:

A. The arterial end has higher pressure than the venous end
B. The high protein concentration in the plasma
C. Sympathetic activity on the AV node
D. Pulsatility of the capillary flow
E. The absence of smooth muscles in the capillary walls

Answer: E

Q16: Regarding the pulsatile flow of the systemic cycle, which of the following is TRUE?

A. It depends on the precapillary sphincter activity
B. It ranges from a minimum of 0% to a maximum of 100%
C. The systolic phase is longer than the diastolic phase
D. It goes from the right ventricle to the left atrium
E. It carries most of the blood in the human body

Answer: E

Q17: If the capillary pressure was 40 mmHg, if the venous-end pressure increases by 12 mmHg, what is the final pressure in the capillary (in mmHg)?

A. 42
B. 45
C. 48
D. 50
E. 52

Answer: D

Q18: What would happen if the pressure gradient across the capillary collapses (P at venous = P at arterial)?

A. Flow is halved
B. Flow stops
C. No effect
D. Positive dromotropic effect
E. None of the above

Answer: B

Q19: If the radius of a capillary is reduced to half its original value, the required driving force to maintain the same flow is (times relative to the original):

A. 1/16
B. 16
C. 1/4
D. 4
E. Same DF as before

Answer: B

Q20: If Pv increases by X mmHg and Pa decreases by X mmHg, what would happen to Pc?

A. Increases by 2/3 of X
B. Decreases by 1/5 of X
C. No change
D. Increases by 5/6 of X
E. It depends on the value of X

Answer: A

Q21: Which of the following has the highest Pc?

A. Lungs
B. Skeletal muscles
C. Smooth muscles
D. Glomerular capillaries
E. All have the same Pc

Answer: D

Q22: In the case of a bee sting, what is the correct order?

1. Edema forms
2. High filtration
3. Release of histamine
4. Increased permeability of the capillary walls

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

Answer: D

Q23: All of the following are causes of edema EXCEPT:

A. Malnutrition
B. Malabsorption in intestines
C. High loss of proteins in kidneys
D. Hyperalbuminemia
E. Insufficient production of albumin in the liver

Answer: D

Q24: Which of the following is FALSE regarding lymphatics?

A. Help reduce edema
B. Introduce a negative hydrostatic pressure in the ISF
C. Return fluids and proteins via systemic arteries
D. Activity increases 20 to 30 times while exercising
E. All of the above are true

Answer: C

Q25: What percentage of the filtered fluids is usually reabsorbed into the capillaries?

A. 100
B. 85
C. 50
D. 15
E. 0

Answer: B

Q26: Something special to encapsulated organs is:

A. Positive Pc values
B. Positive interstitial hydrostatic pressure values
C. Negative interstitial hydrostatic pressure values
D. A + B
E. A + C

Answer: B

Q27: Which of the following forces (pressures) has changing values across the capillary?

A. Pc
B. Pif
C. Πc
D. Πif
E. All except Pc

Answer: A

Q28: If we assumed that the relation between albumin concentration and Π is linear, the real value for Π is:

A. Less than expected linearly
B. More than expected linearly
C. Equal to the value expected linearly
D. Twice the expected linearly
E. No enough information to decide

Answer: E; because Π behaves linearly below the critical conc. and nonlinearly after that.

Q29: If we have 1 mmol/L of NaCl, what is the expected osmotic pressure approximately (in mmHg)?

A. 0
B. 10
C. 20
D. 30
E. 40

Answer: E, exact calculations will give 19.3*2 = 38.6 mmHg → 40 mmHg

Q30: The most important capillary exchange mechanism for solute exchange is:

A. Diffusion
B. Transcytosis
C. Bulk flow
D. B + C
E. None of the above

Answer: A

Q31: Which of the following will increase blood flow through an artery?

A. Increased resistance along the artery
B. Decrease in diameter of the artery
C. Increased pressure at the end of the artery
D. Increased pressure at the beginning of the artery
E. Increased length of the artery

Answer: D