

**BIOL 260 Physiology Spring 2000**  
**Final Exam Cumulative Section**

**MULTIPLE CHOICE & TRUE/FALSE**

- 1) The internal milieu described by early physiologists refers to:
  - a. the intracellular fluid
  - b. plasma
  - c. extracellular fluid
  - d. lactated ringers
  
- 2) Regarding acids and bases
  - a. acids will increase the pH of a solution.
  - b. bases will decrease the pH of a solution.
  - c. acids will accept hydrogen ions in a solution.
  - d. bases will accept hydrogen ions in a solution.
  
- 3) A lack of cellular protein synthesis could result in
  - a. a lack of transport of specific molecules into a cell.
  - b. an increase in the amount of enzymatic reactions occurring within the cell.
  - c. an accelerated immune response by the body.
  - d. an increased responsiveness of the cell to external stimuli.
  
- 4) Which of the following is not a membrane protein function?
  - a. proteins serve as receptors
  - b. proteins may be involved in intercellular junctions
  - c. transport molecules.
  - d. all of the above are functions of membrane proteins
  
- 5) The term used to describe the type of solution in which cells will lose water to their environment is:
  - a. isotonic
  - b. hypotonic
  - c. hypertonic
  - d. catatonic
  
- 6) Which of the following statements about enzymes is not true?
  - a. enzymes increase chemical reaction rates.
  - b. enzymes are consumed during a chemical reaction.
  - c. enzymes decrease activation energy required in specific reactions.
  - d. enzymes have unique pH and temperature optima.
  
- 7) A patient comes in after vomiting all night. Her breathing is slow and shallow. a measure of her blood pH indicates it is 7.7. What is your diagnosis?
  - a. respiratory acidosis
  - b. respiratory alkalosis
  - c. metabolic acidosis
  - d. metabolic alkalosis
  
- 8) A 0.1 osm plasma sample would
  - a. stimulate the action of osmoreceptors.
  - b. be hypertonic to the cells.
  - c. stimulate an increase in blood volume.
  - d. inhibit the release of antidiuretic hormone.

9) Ions primarily diffuse across the membrane by what pathway?

- a. active transport
- b. diffusion through protein channels
- c. diffusion through phospholipid membrane
- d. facilitated diffusion

10) Carrier-mediated transport requires:

- a. phospholipids
- b. carbohydrates
- c. proteins
- d. ATP

11) Which of the following describes the flow of information during protein synthesis?

- a. DNA to RNA to DNA
- b. DNA to RNA to protein
- c. RNA to DNA to protein
- d. protein to DNA to RNA

12) Direct-acting neurotransmitters:

- a. open ion channels to provoke rapid responses.
- b. require cyclic AMP.
- c. mediate very slow responses.
- d. act through second messengers.

13) Mechanisms that help regulate blood pressure include:

- a. renal regulation via the renin-angiotensin system of vasoconstriction.
- b. nervous control that operates via reflex arcs involving baroreceptors, chemoreceptors, and brain stem regions.
- c. chemical controls such as atrial natriuretic factor.
- d. All of the above are correct.

14) Hemorrhage with a large loss of blood causes:

- a. a lowering of blood pressure due to change in cardiac output.
- b. no change in blood pressure but a slower heart rate.
- c. a rise in blood pressure due to change in cardiac output.
- d. no change in blood pressure but a change in respiration.

15) One functional unit of a skeletal muscle is:

- a. a sarcomere.
- b. the myofilaments.
- c. the myofibrils.
- d. the sarcoplasmic reticulum.

16) In order for osmosis to occur between two solutions:

- a. the concentrations have to be absolutely equal on both sides
- b. the two solutions must have different concentrations
- c. both solutions must have and use ATP
- d. both a & c are correct

17) Which of the following is true about EPSP's?

- a. they can be produced by the opening of Na gates
- b. they can be conducted down the axon
- c. they are all or none
- d. they can be produced by the opening of K gates

- 18) Which of the following happens during muscle contraction?
- the myosin slides over the actin
  - the actin slides over the myosin
  - actin & myosin remain fixed, but the H zone gets bigger
  - calcium binds directly to the tropomyosin
- 19) ATP is most directly used for:
- the binding of the myosin head to actin
  - the power stroke
  - the release of Ca from the sarcoplasmic reticulum
  - the release of the crossbridge and recocking of the myosin head
  - the muscle action potential
- 20) The terms “systole” and “diastole” refer, respectively to:
- contraction and relaxation of the atria
  - relaxation and contraction of the ventricles
  - contraction and relaxation of both the atria and the ventricles
  - contraction and relaxation of the ventricles
- 21) In the absence of compensations, the stroke volume will decrease when:
- the blood volume increases
  - venous return increase
  - contractility increases
  - diastolic blood pressure increases
- 22) Both aldosterone and ADH act to:
- increase urine volume
  - increase blood volume
  - increase total peripheral resistance
  - all of the above
- 23) A common buffer found in human blood.
- glucose
  - bicarbonate ion
  - sodium ion
  - triglycerides
- 24) Which of the following does NOT increase arterial blood pressure?
- increased stroke volume
  - more viscous blood
  - vasodilation
  - increased venous return
- 25) Each hemoglobin contains an iron-containing pigment called:
- ferrin
  - globin
  - heme
  - globulin
- 26) Blood flow is:
- proportional to the pressure
  - proportional to the frictional resistance to blood flow along the length of the vessels
  - proportional to the viscosity of the blood
  - equal to the plasma concentration minus the macropoteins
- 27) The heart must contract \_\_\_ \_\_\_ forcefully to maintain cardiac output if the resistance to blood flow in the vessels exiting the heart is increased
- more
  - less
- 28) T F Troponin and tropomyosin work together in the presence of calcium to regulate the attachment of the cross bridges to the actin filament.

- 29) Which of the following comparing 0.5 m NaCl solution and a 1.0 m glucose solution is true?
- they have the same osmolality
  - the glucose is hypoosmotic to the NaCl
  - the NaCl is hypotonic to the glucose
  - all of the above are true
- 30) In a resting neuron:
- $\text{Na}^+$  freely enters the cell
  - $\text{Na}^+$  is extruded from the cell by an active transport carrier
  - the  $\text{Na}^+$  concentration is greater inside the cell than outside
  - the cell membrane is completely impermeable to  $\text{Na}^+$
- 31) Which of the following is true about action potentials in the SA node?
- they are produced automatically
  - they result from a spontaneous depolarization that occurs during diastole
  - they are accompanied by diffusion of  $\text{Ca}^{++}$  into the cell
  - all of the above
- 32) The striations of a skeletal muscle cell are produced, for the most part, by:
- a difference in the thickness of the sarcolemma.
  - arrangement of myofilaments.
  - the sarcoplasmic reticulum.
  - the T tubules.
- 33) During muscle contraction, myosin cross bridges attach to which active sites?
- myosin filaments
  - actin filaments
  - Z disc
  - thick filaments
- 34) The role of calcium ions in muscle contraction is to:
- act as a third messenger.
  - reestablish glycogen stores.
  - bind to regulatory sites on troponin changing the configuration.
  - initiate the conversion of carbon dioxide to oxygen for storage.
- 35) All of the following are true of graded potentials except that they:
- can be called postsynaptic potentials.
  - are short-lived.
  - can form on receptor endings.
  - increase amplitude as they move away from the stimulus point.
- 36) The period after an initial stimulus when a neuron is not sensitive to another stimulus is the:
- refractory period.
  - repolarization.
  - depolarization.
  - resting period.
- 37) The part of a neuron that conducts impulses away from its cell body is called a(n):
- Schwann cell.
  - neurolemma.
  - axon.
  - dendrite.

38) Permitting the exchange of nutrients and gases between the blood and tissue cells is the primary function of:

- a. arteries.
- b. veins.
- c. capillaries.
- d. arterioles.

39) The role of acetylcholinesterase is:

- a. destroy ACh a brief period after its release by the axonal endings.
- b. act as a transmitting agent.
- c. stimulate the production of serotonin.
- d. amplify or enhance the effect of ACh.

40) Saltatory conduction is made possible by:

- a. diphasic impulses.
- b. large nerve fibers.
- c. the myelin sheath.
- d. erratic transmission of nerve impulses.

41) How does the interior of a resting neuron differ from the external environment? The interior is:

- a. positively charged and contains less sodium.
- b. negatively charged and contains more sodium.
- c. negatively charged and contains less sodium.
- d. positively charged and contains more sodium.

42) Preparing the body for the "fight or flight" response is the role of the:

- a. cerebrum.
- b. parasympathetic nervous system.
- c. sympathetic nervous system.
- d. None of the above are correct.

43) Cardiovascular effects of the sympathetic division include all but:

- a. increase of heart rate and force.
- b. dilation of the blood vessels serving the skin and digestive viscera.
- c. constriction of most blood vessels.
- d. dilation of the vessels serving the skeletal muscles.

44) The influence of blood vessel diameter on resistance to blood flow is:

- a. the only factor that influences resistance.
- b. very small because vessel diameter does not vary.
- c. very large because resistance is inversely proportional to the fourth power of vessel radius.
- d. very large because resistance is directly proportional to the blood vessel diameter.

45) What is the main function of the rods in the eye?

- a. accommodation for near vision
- b. vision in dim light
- c. color vision
- d. depth perception

46) Glycolysis is best defined as the:

- a. formation of sugar.
- b. conversion of glucose into two molecules of pyruvic acid.
- c. conversion of pyruvic acid into carbon dioxide and water.
- d. conversion of glucose into carbon dioxide and water.

47) The left ventricular wall of the heart is thicker than the right wall in order to:

- a. expand the thoracic cage during diastole.
- b. pump blood with greater pressure.
- c. accommodate a greater volume of blood.
- d. pump blood through a smaller valve.

48) Factors that aid venous return include all except the following?

- a. activity of skeletal muscles
- b. pressure changes in the thoracic cavity
- c. urinary output
- d. venous valves

49) Which of the following is likely during vigorous exercise?

- a. capillaries of the skin will be vasoconstricted
- b. capillaries of the active muscles will be vasodilated
- c. blood will be diverted to the digestive organs
- d. all of the above are correct

### SHORT ANSWER/ESSAY

50) The gap between Schwann cells in the peripheral system is called a(n) \_\_\_\_\_.

51)  $CO = \text{_____} \times SV$

52) A woman who is blood type O has two children. One is type O and the other has type B blood. What is the genotype of the mother? \_\_\_\_\_ What are the genotype and phenotype of the father? \_\_\_\_\_ What is the genotype of each child?

\_\_\_\_\_

53) Explain the sequence of gated channels opening and closing at rest and during an action potential along an axon.(3)