



Biology 12

Resource Exam A

Exam Booklet

PART A: MULTIPLE CHOICE

Value: 67 marks

Suggested Time: 60 minutes

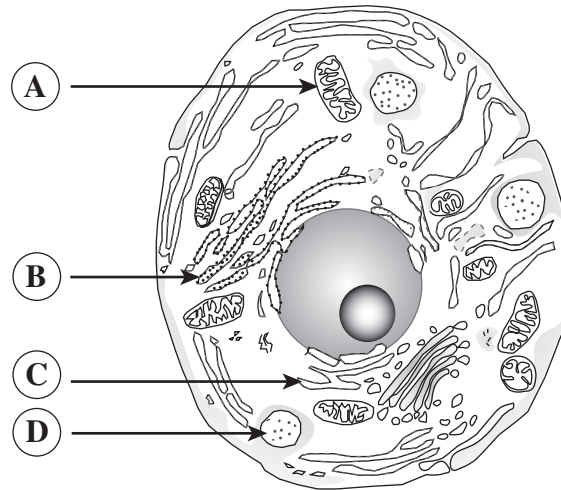


INSTRUCTIONS: For each question select the **best** answer.

1. Which of the following organelles contain enzymes that digest macromolecules?
 - A. vacuoles
 - B. ribosomes
 - C. lysosomes
 - D. Golgi bodies

2. Cellular respiration may be summarized by which of the following?
 - A. $\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water} + \text{ATP}$
 - B. $\text{glucose} + \text{oxygen} + \text{ATP} \rightarrow \text{carbon dioxide} + \text{water}$
 - C. $\text{glucose} + \text{ATP} + \text{carbon dioxide} \rightarrow \text{oxygen and water}$
 - D. $\text{glucose} + \text{carbon dioxide} \rightarrow \text{oxygen} + \text{carbon dioxide} + \text{ATP}$

Use the following diagram of a cell to answer questions 3 and 4.



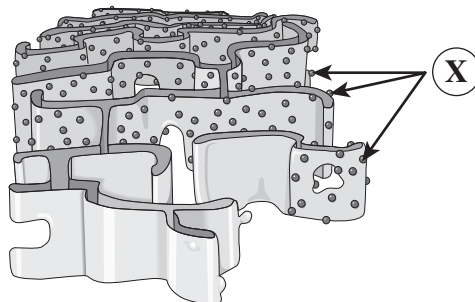
3. Maltase is produced at the structure labelled

- A. **(A)**.
- B. **(B)**.
- C. **(C)**.
- D. **(D)**.

4. Cellular respiration occurs at the structure labelled

- A. **(A)**.
- B. **(B)**.
- C. **(C)**.
- D. **(D)**.

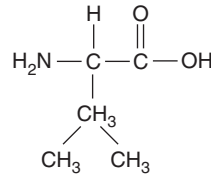
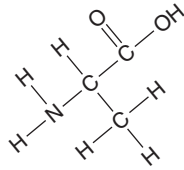
Use the following diagram to answer question 5.



5. Which of the following processes occurs at the structures labelled (X)?
- A. secretion
 - B. translation
 - C. transcription
 - D. cellular respiration
-
6. What is the result when a small amount of hydrochloric acid is added to a solution with a pH of 10?
- A. The pH increases.
 - B. The acid is denatured.
 - C. The concentration of hydrogen ions (H^+) increases.
 - D. The concentration of hydroxide ions (OH^-) increases.
7. The helical shape of a protein molecule is called its
- A. primary structure.
 - B. secondary structure.
 - C. tertiary structure.
 - D. quaternary structure.
8. Glycerol is a monomer of
- A. RNA.
 - B. maltose.
 - C. neutral fats.
 - D. testosterone.

9. Which of the following molecules is classified as a nucleotide?
- urea
 - ATP
 - DNA
 - cholesterol

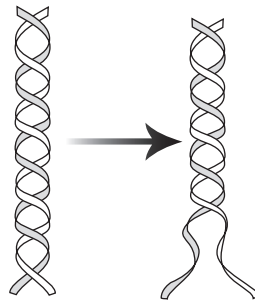
Use the following diagram to answer question 10.



10. Bonding these two molecules produces
- a lipid and energy.
 - a dipeptide and water.
 - a disaccharide and water.
 - a nucleic acid and energy.
-
11. Which of the following correctly pairs a polymer with its monomer?
- cellulose—glucose
 - estrogen—glycerol
 - myelin—amino acid
 - hemoglobin—nucleotide
12. Which of the following may result in changes to the tertiary structure of an enzyme molecule?
- increasing substrate concentration
 - decreasing the energy of activation
 - decreasing coenzyme concentration
 - increasing hydrogen ion (H^+) concentration

13. Which of the following cell structures is the site of DNA replication?
- A. nucleus
 - B. ribosome
 - C. nucleolus
 - D. rough endoplasmic reticulum
14. Which of the following events occurs during DNA replication?
- A. Deoxyribose bonds to phosphate.
 - B. Hydrogen bonds are formed between the original nucleotides.
 - C. Bonds form between the DNA nucleotides and RNA nucleotides.
 - D. Phosphates of the original nucleotides bind to those of the new nucleotides.

Use the following diagram to answer question 15.

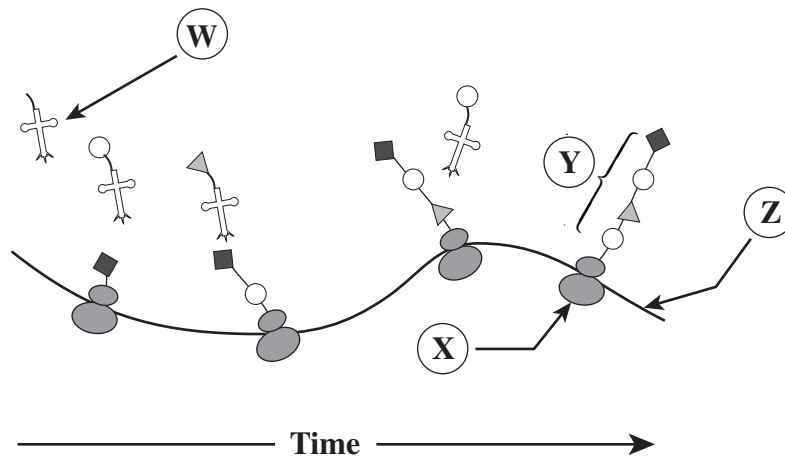


15. What has occurred to this molecule to cause it to change as shown in the diagram?
- A. Ionic bonds have broken between deoxyribose molecules.
 - B. Hydrogen bonds have been broken between nitrogenous bases.
 - C. New bonds have formed causing the molecule to change shape.
 - D. Covalent bonds have been broken between phosphate molecules.
-
16. In an experiment, a molecule known to be a competitive inhibitor to the enzyme helicase is added to a culture of actively dividing cells. Which of the following would likely occur?
- A. The cells would reproduce more rapidly.
 - B. The rate of transcription would increase.
 - C. The rate of DNA production by cells would decrease.
 - D. The amount of free nucleotide molecules in the cells would decrease.

17. Which of the following molecules contains anticodons?

- A. DNA
- B. tRNA
- C. mRNA
- D. amino acid

Use the following diagram of a cellular process to answer question 18.



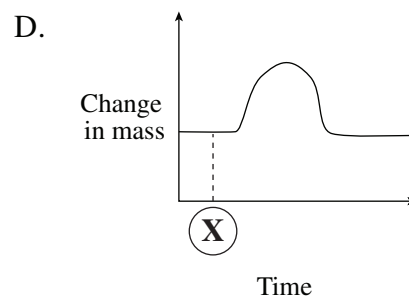
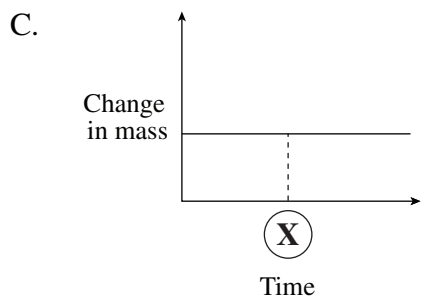
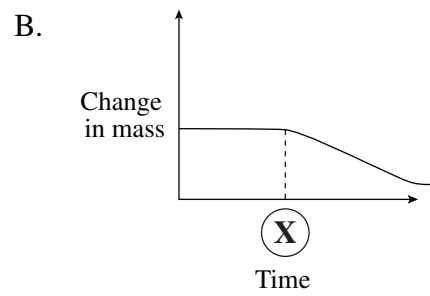
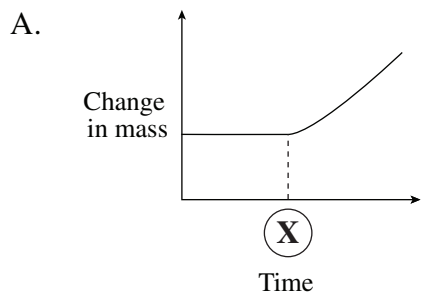
18. Which molecule is **not** composed of nucleotides?

- A. W
- B. X
- C. Y
- D. Z

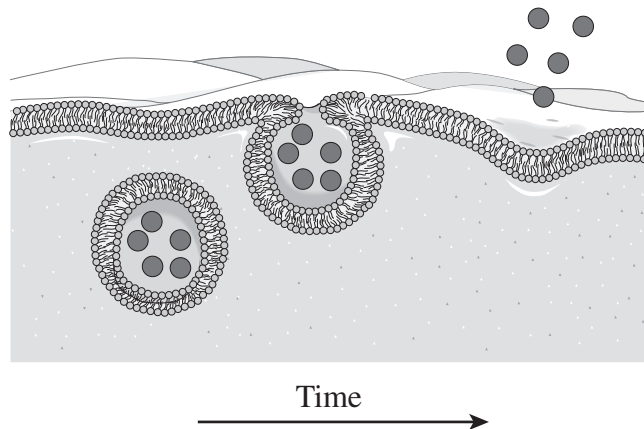
19. Glycolipids in the cell membrane function to

- A. repel water.
- B. act as a carrier molecule.
- C. identify the cell to the immune system.
- D. allow lipids to diffuse by facilitated transport.

20. Which of the following graphs illustrates the change in the mass of potato slices placed in distilled water at time (X)?



Use the following diagram of a cell membrane to answer question 21.

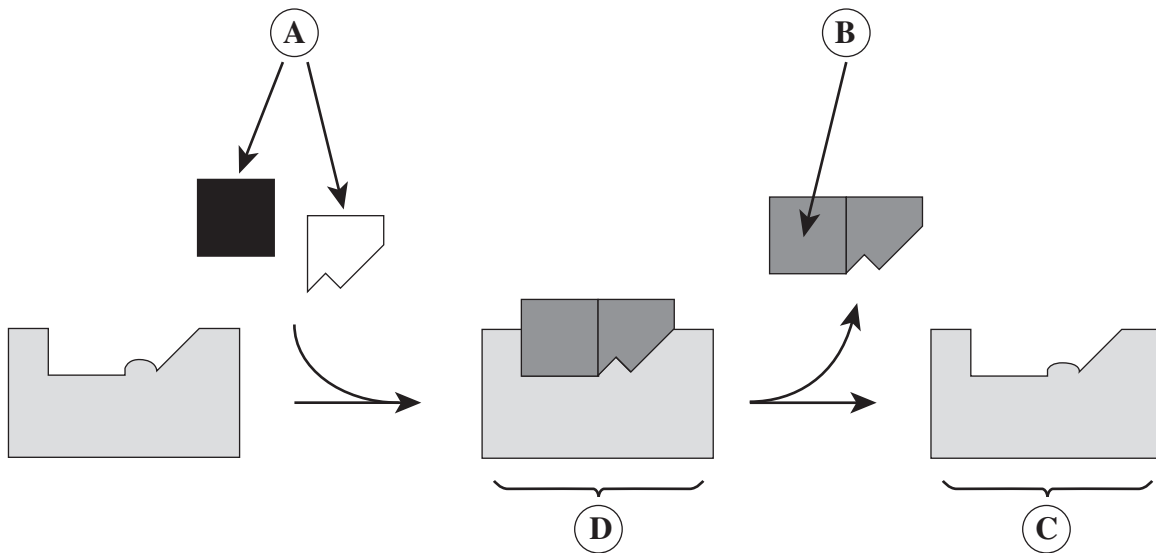


21. Which of the following processes is illustrated above?

- A. osmosis
- B. diffusion
- C. active transport
- D. facilitated transport

22. Which of the following descriptions is a function of cholesterol in the cell membrane?
- A. to attract water
 - B. to act as a carrier molecule
 - C. to maintain the fluidity of the membrane
 - D. to identify the cell to the immune system

Use the following diagram to answer question 23.



23. Which of the following letters indicates the enzyme–substrate complex?

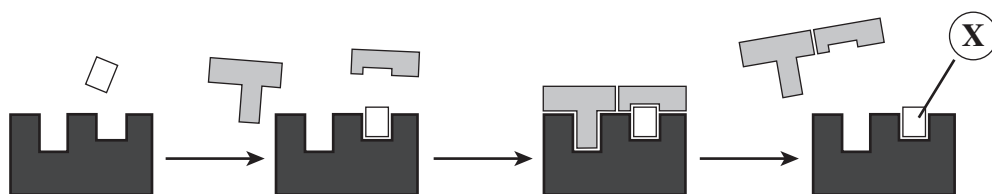
- A. **(A)**
- B. **(B)**
- C. **(C)**
- D. **(D)**

24. If a cell crenates, its surface area-to-volume ratio

- A. increases.
- B. decreases.
- C. remains unchanged.

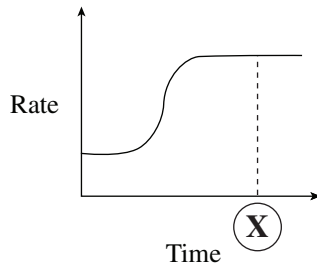
25. Which of the following substances, when added to an enzyme-catalyzed reaction, will cause the rate of a reaction to slow down?
- A. acids
 - B. enzymes
 - C. substrates
 - D. coenzymes
26. Feedback inhibition can occur when
- A. the substrate of a reaction is decreased.
 - B. a coenzyme binds to an enzyme's active site.
 - C. the amount of an enzyme in a reaction is increased.
 - D. the product of a reaction binds to an enzyme's active site.

Use the following diagram to answer question 27.



27. The structure indicated by the letter (X) is a
- A. product.
 - B. coenzyme.
 - C. competitive inhibitor.
 - D. non-competitive inhibitor.

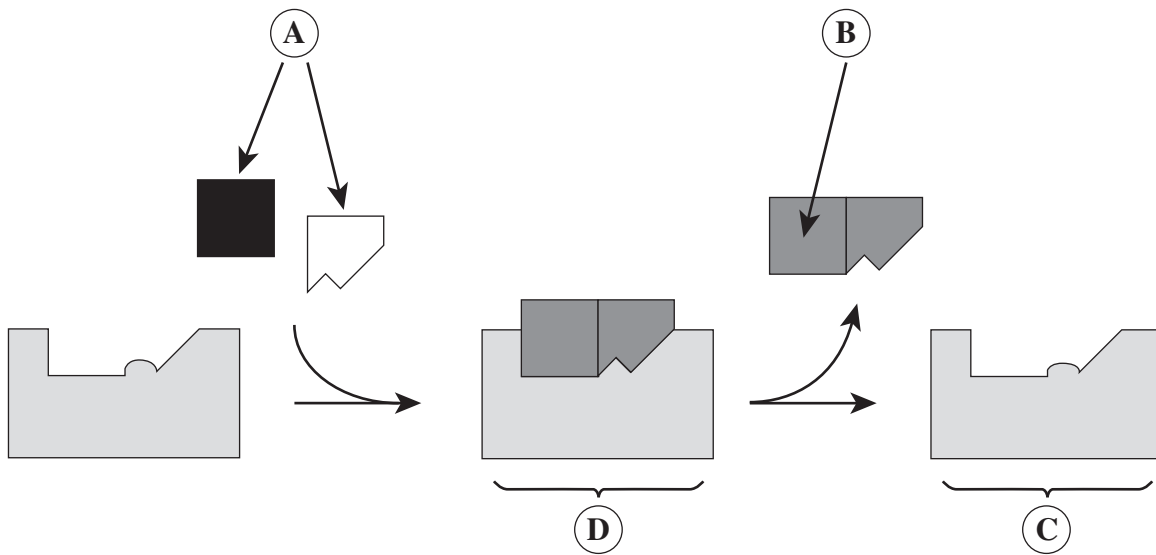
Use the following graph to answer question 28.



28. Which of the following statements explains what is happening at Time (X)?

- A. the active sites are saturated
- B. coenzymes have been added
- C. the enzyme has been denatured
- D. the activation energy has been lowered

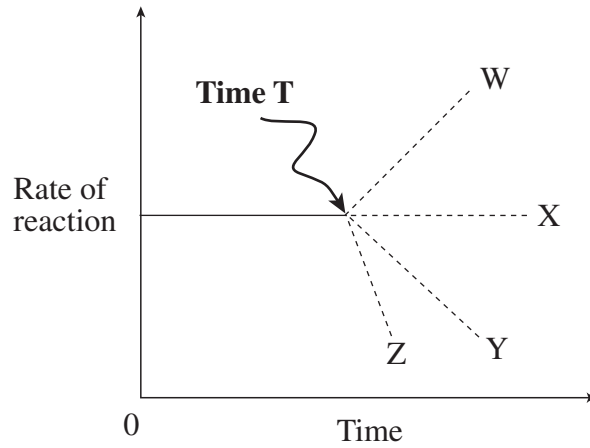
Use the following diagram to answer question 29.



29. Which of the following structures represents the substrate of an enzyme-catalyzed reaction?

- A. (A)
- B. (B)
- C. (C)
- D. (D)

Use the following graph to answer question 30.



30. What graph illustrates the rate of an enzyme-catalyzed reaction occurring in the stomach if the pH is decreased from pH 6 to pH 2 at Time T?

- A. W
- B. X
- C. Y
- D. Z

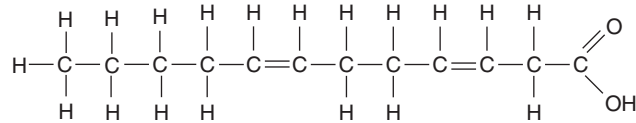
31. In which of the following structures are vitamins stored?

- A. liver
- B. gall bladder
- C. large intestine
- D. small intestine

32. What structure prevents the movement of chyme from the stomach to the esophagus?

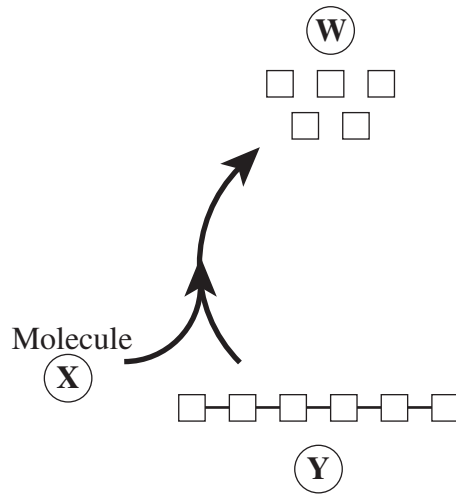
- A. the larynx
- B. the epiglottis
- C. the pyloric sphincter
- D. the cardiac sphincter

Use the following molecular diagram to answer question 33.



33. Which of the following catalyzes the reaction that produces this molecule?
- A. bile
 - B. lipase
 - C. amylase
 - D. peptidase

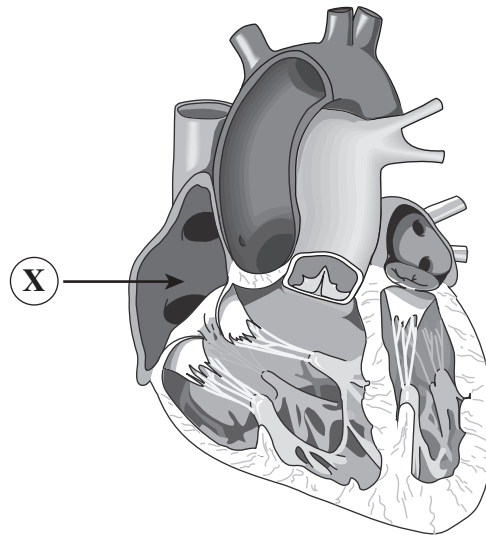
Use the following diagram of a reaction to answer question 34.



34. The reaction illustrated above takes place in the mouth. Which of the following choices correctly identifies the labelled molecules?

	(W)	(X)	(Y)
A.	glucose	oxygen	starch
B.	maltose	water	starch
C.	peptide	pepsin	protein
D.	fat	water	fat droplet

Use the following cross section of the heart to answer question 35.



35. (X) indicates the

- A. left atrium.
- B. right atrium.
- C. pulmonary trunk.
- D. superior vena cava.

36. The chordae tendinae are connected to the

- A. Purkinje fibres.
- B. semi-lunar valves.
- C. atrio-ventricular (AV) node.
- D. atrio-ventricular (AV) valves.

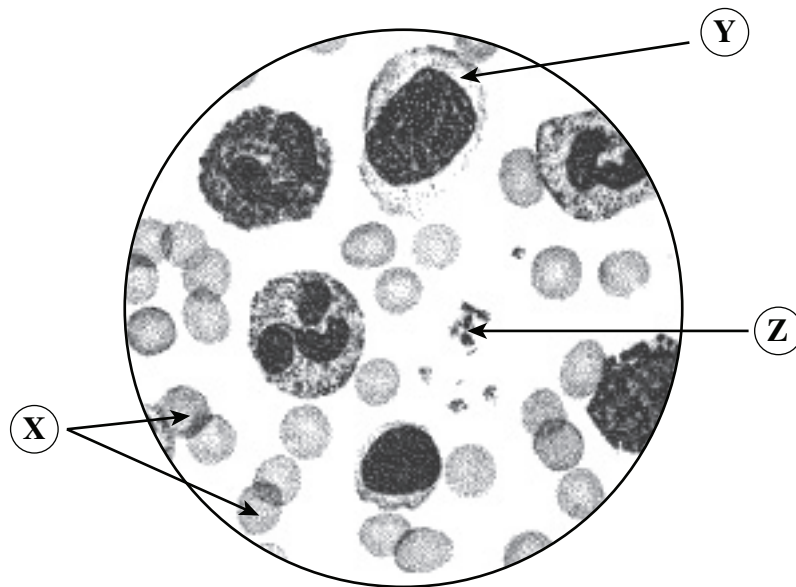
37. In which of the following vessels is blood pressure the greatest?

- A. aorta
- B. iliac artery
- C. pulmonary vein
- D. anterior vena cava

38. What vessel carries blood to the liver?

- A. the iliac artery
- B. the hepatic vein
- C. the mesenteric artery
- D. the hepatic portal vein

Use the following micrograph to answer question 39.



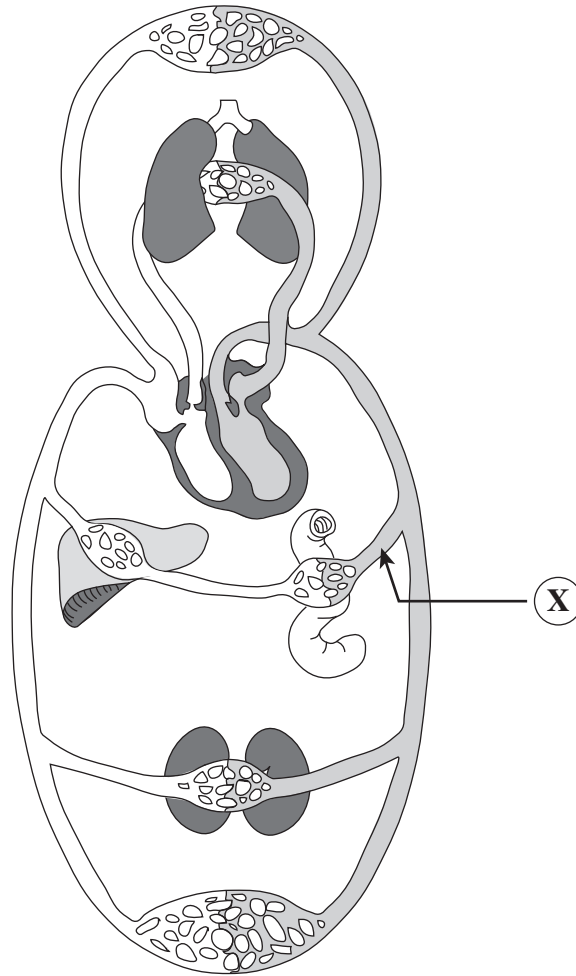
39. Antibodies are synthesized by

- A. (X) only.
- B. (Y) only.
- C. (Z) only.
- D. (X) and (Z) only.

40. Which of the following occurs at the arterial end of a capillary bed in a muscle?

- A. Plasma proteins enter the tissues.
- B. Blood pressure forces fluid to enter the tissues.
- C. Carbon dioxide and glucose enter the bloodstream.
- D. Osmotic pressure causes water to move into the blood.

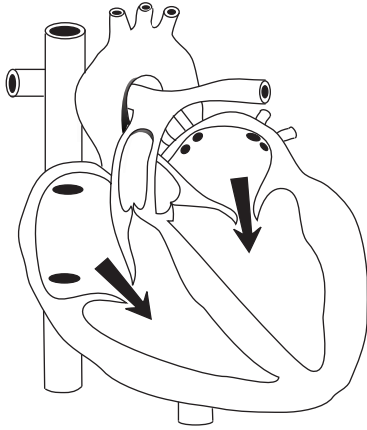
Use the following diagram to answer question 41.



41. (X) indicates the

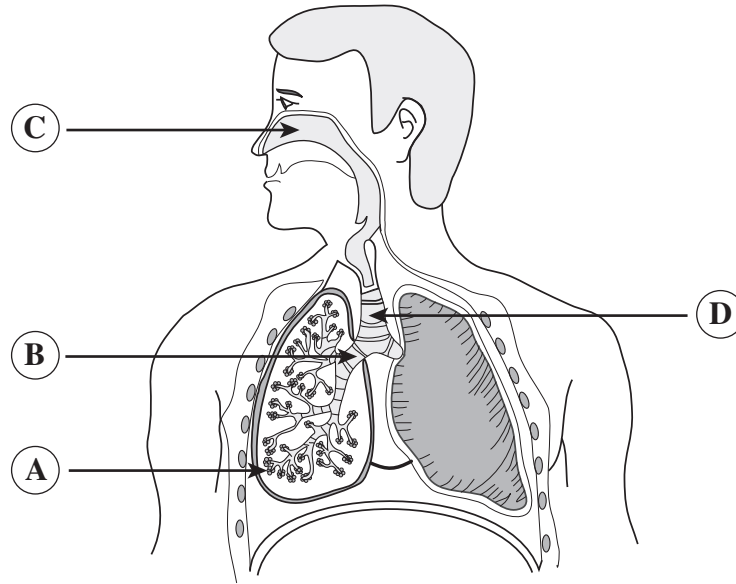
- A. renal vein.
- B. iliac artery.
- C. mesenteric artery.
- D. hepatic portal vein.

Use the following cross section of the heart to answer question 42.



42. After blood is forced in the direction shown by the arrows, what is the next event in the cardiac cycle?
- A. closing of the semilunar valves
 - B. generation of a nerve impulse by the sinoatrial (SA) node
 - C. generation of a nerve impulse by the atrioventricular (AV) node
 - D. opening of the atrioventricular (AV) valves by the chordae tendinae

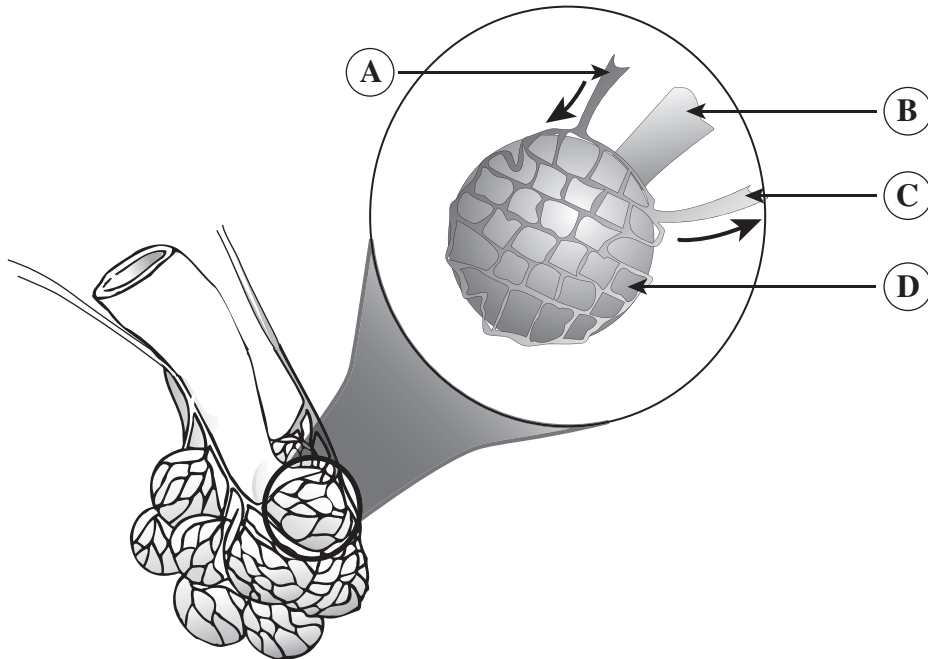
Use the following diagram to answer question 43.



43. Cilia are **not** found in

- A. **(A)**.
- B. **(B)**.
- C. **(C)**.
- D. **(D)**.

Use the following diagram to answer question 44.



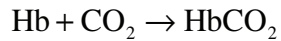
44. Which letter indicates the area having the greatest concentration of oxyhemoglobin?

- A. A
- B. B
- C. C
- D. D

45. Internal respiration is defined as the

- A. production of ATP in cells.
- B. movement of air into and out of the lungs.
- C. exchange of gases between blood and the air.
- D. exchange of gases between blood and the tissues.

46. Consider this biochemical reaction:



This reaction occurs in the

- A. alveoli.
- B. pharynx.
- C. capillaries of the tissues.
- D. capillaries of the alveoli.

47. Which of the following is **not** produced as a result of external respiration?

- A. water
- B. carbon dioxide
- C. oxyhemoglobin
- D. bicarbonate ions

48. Which of the following substances assists in the maintenance of normal blood pH?

- A. pepsin
- B. amylase
- C. oxyhemoglobin
- D. carbonic anhydrase

49. Carbon dioxide in the blood is transported in three forms:

I	a dissolved gas
II	bicarbonate ions
III	carbaminohemoglobin

Which of the following shows the correct order of their concentration, from highest to lowest, in the blood of the vena cava?

- A. I, II, III
- B. II, I, III
- C. II, III, I
- D. III, II, I

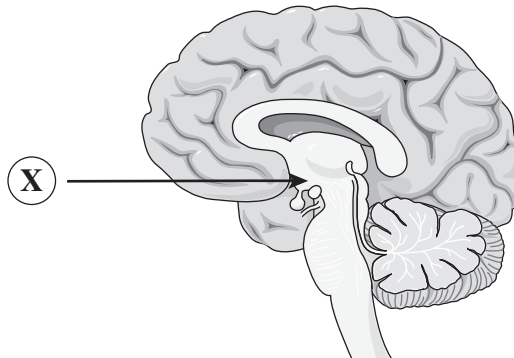
50. Which of the following processes is a function of the myelin sheath?

- A. insulating the cell body of the neuron
- B. slowing the speed of a nervous impulse
- C. aiding in the regeneration of a damaged nerve
- D. passing a nervous impulse from one nerve to another

51. What is an effect of the secretion of epinephrine (adrenaline)?

- A. decreased breathing rate
- B. slowing of the heartbeat
- C. slower rate of peristalsis
- D. constriction of the pupils

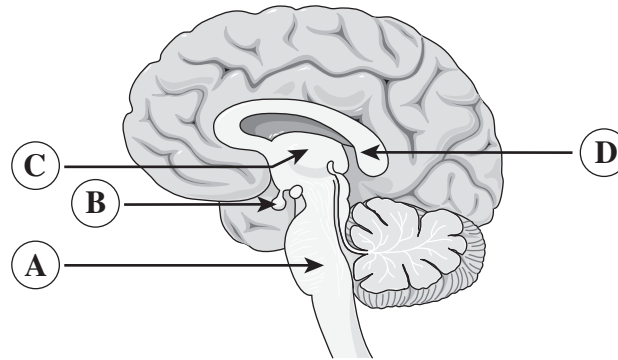
Use the following diagram of the brain to answer question 52.



52. Secretions produced by structure (X) cause which of the following to be released?

- A. insulin
- B. follicle-stimulating hormone (FSH)
- C. human chorionic gonadotropin (HCG)
- D. gonadotropin-releasing hormone (GnRH)

Use the following diagram of the brain to answer question 53.



53. Which structure receives and integrates sensory information from the body?

- A. (A)
 - B. (B)
 - C. (C)
 - D. (D)
-

54. Pressure filtration occurs at the

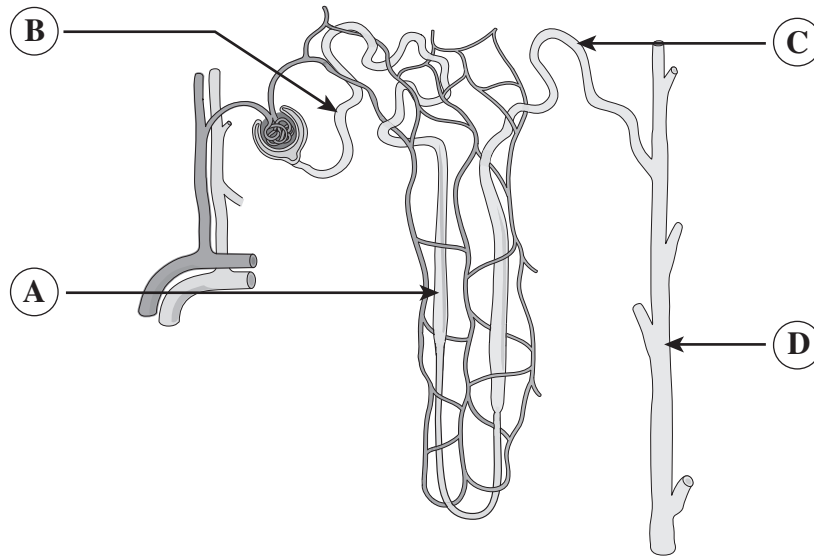
- A. collecting duct.
- B. Bowman's capsule.
- C. distal convoluted tubule.
- D. proximal convoluted tubule.

55. The tissues of which of the following structures contains the greatest concentration of salt?

- A. the ureters
- B. the urethra
- C. the renal cortex
- D. the renal medulla

56. Increased secretion of aldosterone leads to
- A. increased urea concentration in the blood.
 - B. increased glucose concentration in the urine.
 - C. decreased potassium ion concentration in the blood.
 - D. decreased hydrogen ion concentration in the filtrate.
57. Which of the following molecules are not present in the filtrate at the proximal convoluted tubule?
- A. salt
 - B. urea
 - C. ADH
 - D. glucose

Use the following diagram of the nephron to answer questions 58 and



58. At which of the indicated areas does the regulation of blood pH occur?

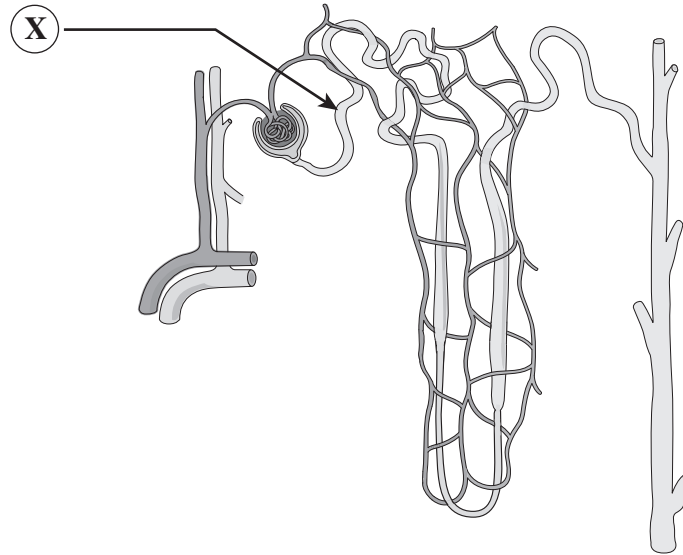
- A. A
- B. B
- C. C
- D. D

59. The majority of cells equipped with receptor sites for the hormone ADH are located in which indicated area?

- A. A
- B. B
- C. C
- D. D

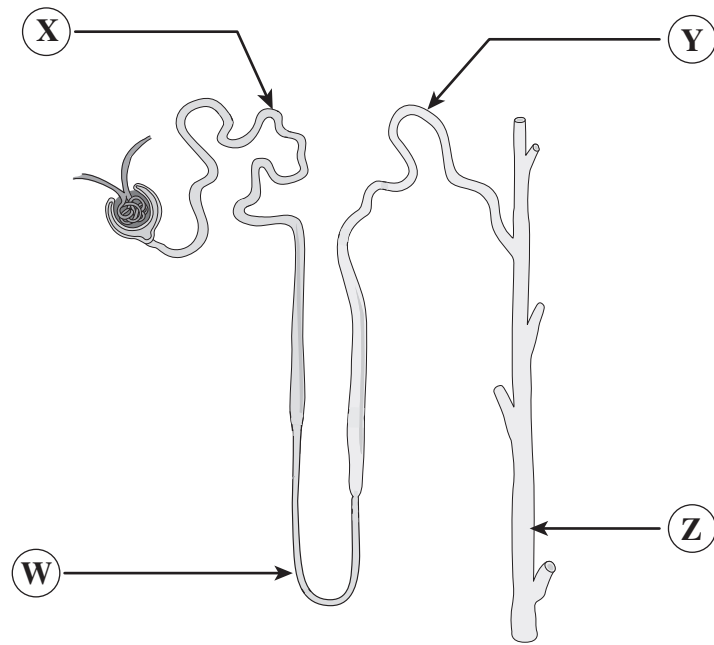
60. Which of the following choices correctly matches a substance with its method of transport in the kidney?
- A. urea—exocytosis
 - B. glucose—osmosis
 - C. water—phagocytosis
 - D. hydrogen ions (H^+)—active transport

Use the following diagram of the nephron to answer question 61.



61. Which of the following statements best describes the cells located in the area indicated by (X)?
- A. a large number of food vacuoles and lysosomes
 - B. a high proportion of smooth ER and many vesicles
 - C. a relatively large amount of rough ER and many vesicles
 - D. a brush border for increased surface area and many mitochondria

Use the following diagram of a nephron to answer question 62.



62. Which of the following correctly matches a hormone that increases active transport of sodium ions with the site of its activity?

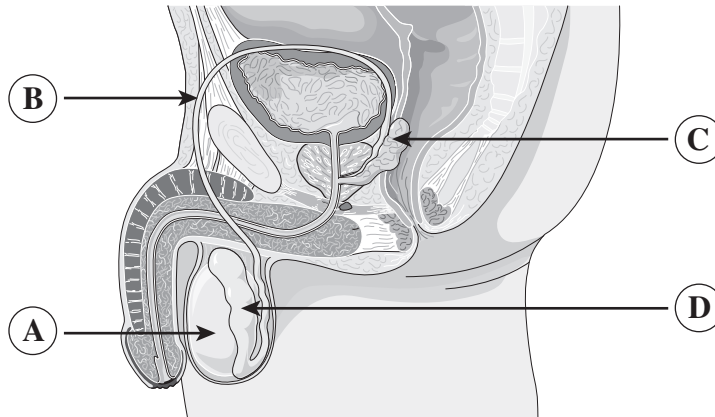
	Hormone	Site of Activity
A.	aldosterone	X
B.	aldosterone	Y
C.	antidiuretic hormone (ADH)	W
D.	antidiuretic hormone (ADH)	Z

63. The hormone that controls the production of sperm cells is

- A. testosterone.
- B. luteinizing hormone (LH).
- C. follicle stimulating hormone (FSH).
- D. human chorionic gonadotropin (HCG).

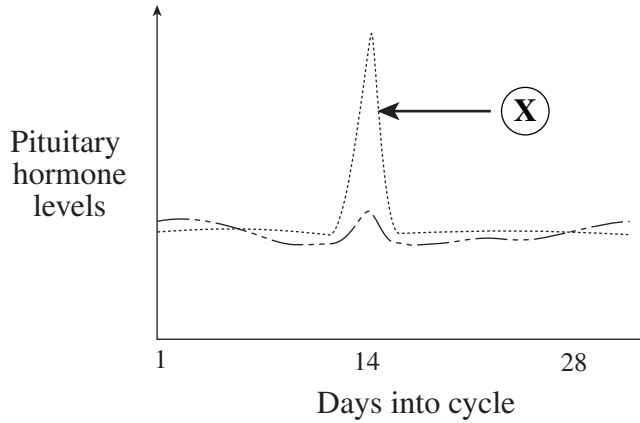
64. Increased levels of testosterone in the blood results in
- A. decreased sperm production.
 - B. increased secretions by the hypothalamus.
 - C. decreased secretion by the anterior pituitary.
 - D. increased secretions by the anterior pituitary.

Use the following diagram to answer question 65.



65. Which indicated structure responds to increased blood concentration of luteinizing hormone (LH)?
- A. (A)
 - B. (B)
 - C. (C)
 - D. (D)

Use the following graph to answer question 66.



66. What hormone is represented by (X)?
- A. estrogen
 - B. progesterone
 - C. luteinizing hormone (LH)
 - D. follicle-stimulating hormone (FSH)

-
67. After ovulation, the follicle develops into the
- A. ovum.
 - B. placenta.
 - C. endometrium.
 - D. corpus luteum.

**This is the end of the multiple-choice section.
Answer the written-response questions in the Response Booklet.**

