



Biology 12

Resource Exam B

Exam Booklet

PART A: MULTIPLE CHOICE

Value: 67 marks

Suggested Time: 60 minutes



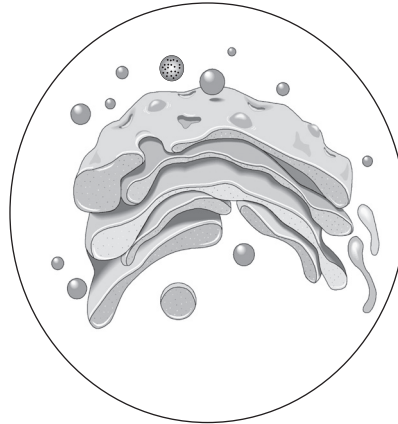
INSTRUCTIONS: For each question select the **best** answer.

1. The cytoskeleton
 - A. surrounds the entire cell.
 - B. moves vesicles throughout the cell.
 - C. allows proteins to enter the nucleus.
 - D. processes and packages lipids for export out of the cell.

2. The energy from the breakdown of carbohydrates is used to synthesize ATP.
The process requires
 - A. chloroplasts and oxygen.
 - B. mitochondria and oxygen.
 - C. chloroplasts, carbon dioxide and water.
 - D. mitochondria, carbon dioxide and water.

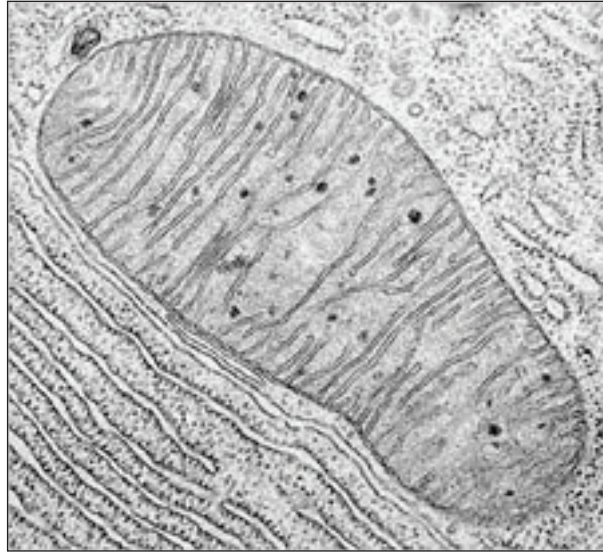
3. Which of the following pathways describes the synthesis and secretion of pepsin by a cell?
- A. vacuole → Golgi body → vacuole → plasma membrane
 - B. rough endoplasmic reticulum → vesicle → Golgi body → vesicle
 - C. rough endoplasmic reticulum → Golgi body → lysosome → vesicle
 - D. smooth endoplasmic reticulum → Golgi body → vesicle → plasma membrane

Use the following diagram to answer question 4.



4. Which of the following is **not** processed and packaged by the organelle illustrated above?
- A. lipids
 - B. nucleic acids
 - C. glycoproteins
 - D. hydrolytic enzymes

Use the following micrograph to answer question 5.



5. This structure requires which of the following to synthesize its primary product?

- A. light
 - B. water
 - C. oxygen
 - D. carbon dioxide
-

6. When a base is added to a solution,

- A. its pH increases and its concentration of hydroxide ions increases.
- B. its pH increases and its concentration of hydroxide ions decreases.
- C. its pH decreases and its concentration of hydroxide ions increases.
- D. its pH decreases and its concentration of hydroxide ions decreases.

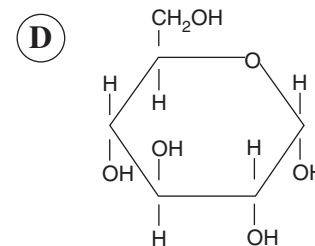
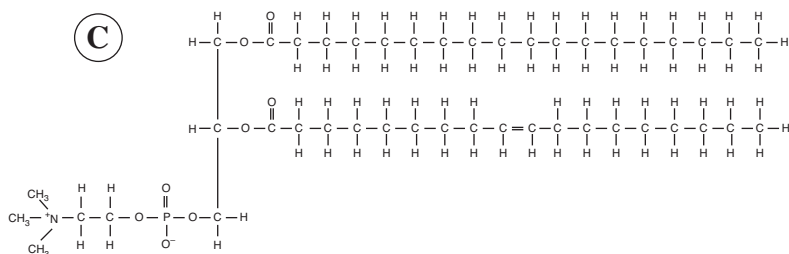
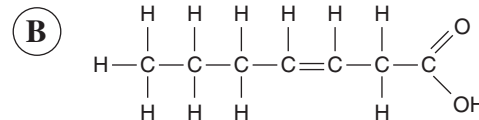
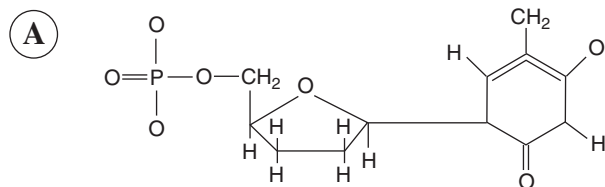
7. An important biological function of carbohydrates is to

- A. insulate organs.
- B. initiate cell growth.
- C. maintain constant blood pH.
- D. store energy for ATP production.

8. The formation of a neutral fat molecule requires
- A. one glycogen and three fatty acids.
 - B. three fatty acids and one glycerol molecule.
 - C. three phospholipids and one glycerol molecule.
 - D. two fatty acids, a phosphate and a glycerol molecule.

9. Which of the following molecules is soluble in both polar and non-polar substances?
- A. oils
 - B. water
 - C. glycerol
 - D. phospholipid

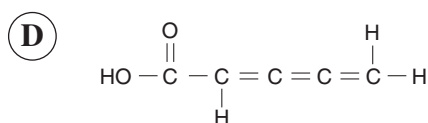
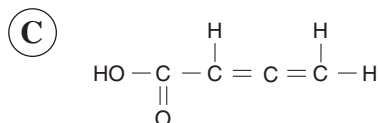
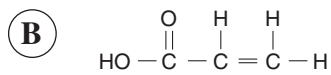
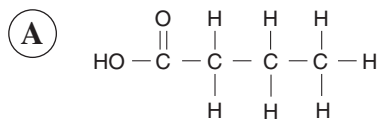
Use the following molecular diagrams to answer question 10.



10. Which of the above molecules is an integral part of all cell membranes?

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

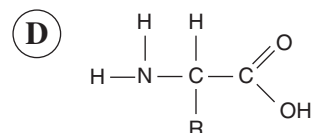
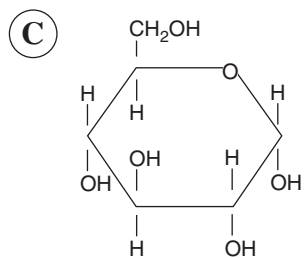
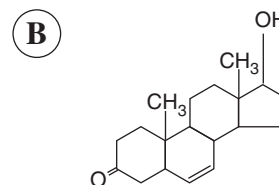
Use the following molecular diagrams to answer question 11.



11. Which of these molecules is saturated?

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

Use the following molecular diagrams to answer question 12.

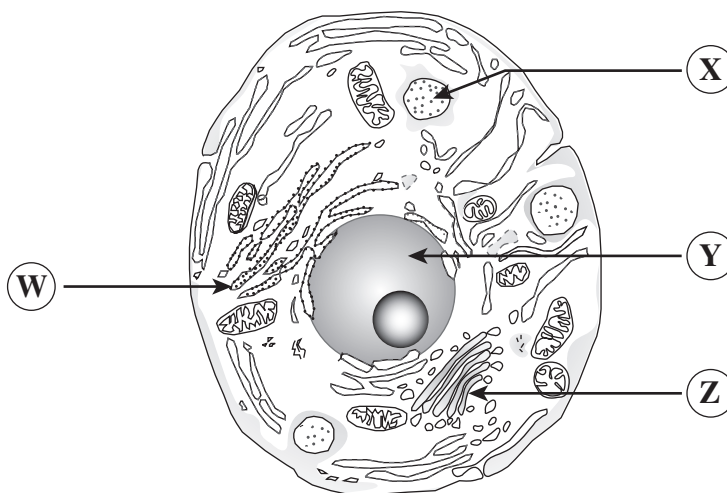


12. Which of the above molecules have hydrogen bonding?

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

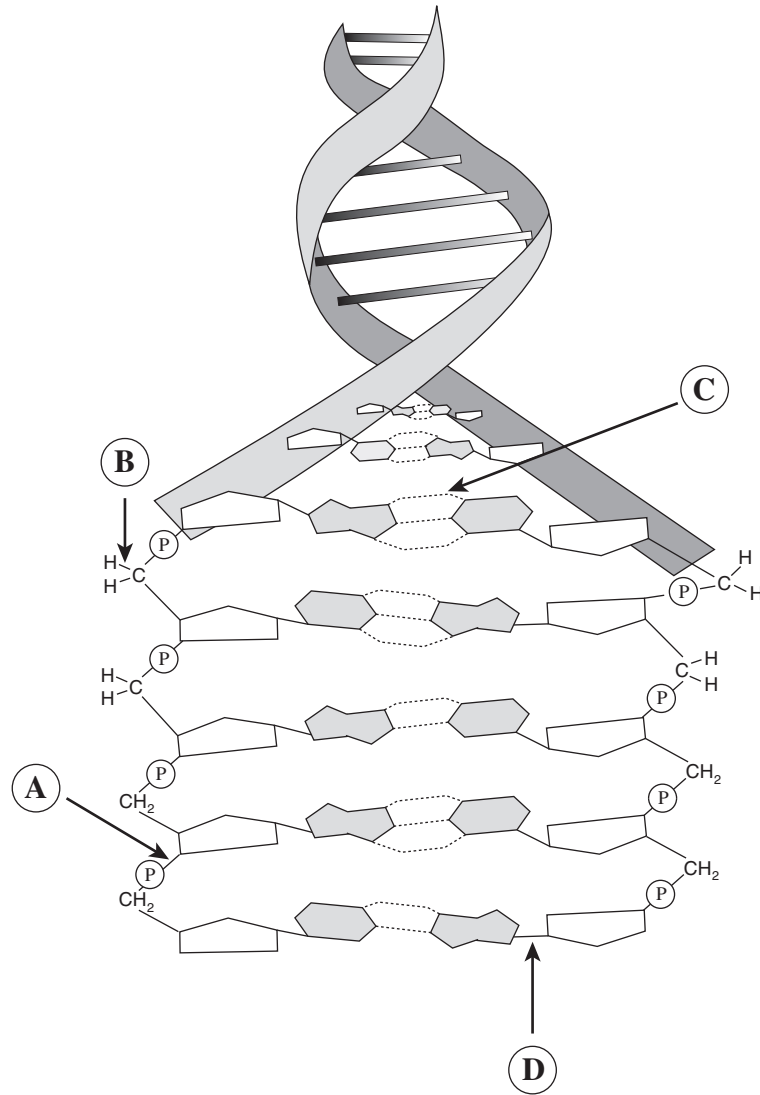
13. During replication, bonds form between
- A. adenine and uracil.
 - B. guanine and adenine.
 - C. ribose and phosphate.
 - D. deoxyribose and phosphate.
14. Analysis of a strand of DNA shows that it contains 23% thymine. What is the percentage of guanine that it contains?
- A. 23%
 - B. 27%
 - C. 46%
 - D. 54%

Use the following diagram to answer question 15.



15. In which indicated area(s) does complementary base pairing occur?
- A. **Y** only
 - B. **W** and **Y** only
 - C. **X** and **Z** only
 - D. **W**, **X**, **Y** and **Z**

Use the following diagram to answer question 16.



16. The enzyme DNA polymerase is active in the formation of which indicated bond?

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

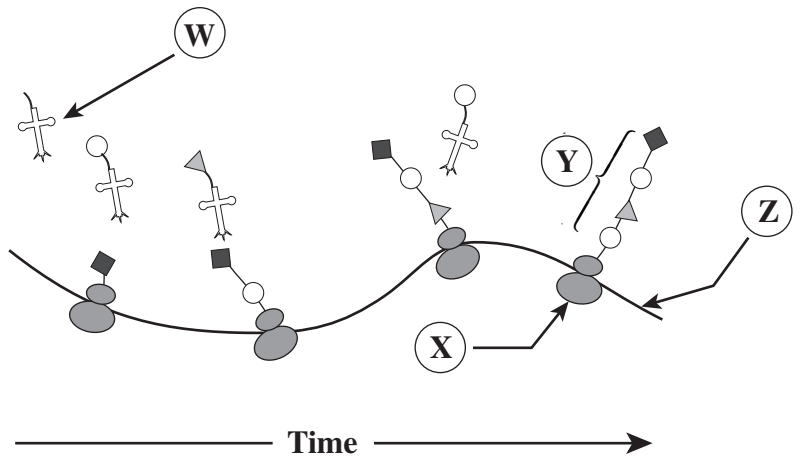
17. Which of the following is a possible use of recombinant DNA technology?
- culturing cells for tissue transplants
 - identifying crime suspects from DNA samples
 - the production of pure strains of certain crop plants
 - the use of microorganisms to produce human hormones
18. Which of the following molecules is the product of translation?
- DNA
 - tRNA
 - protein
 - mRNA

Use the following chart to answer question 19.

Three-letter codons of messenger RNA and the amino acids specified by the codons			
AAU } AAC }	Asparagine	CAU } CAC }	Histidine
GAU } GAC }	Aspartic acid	UAU } UAC }	Tyrosine
AAA } AAG }	Lysine	CAA } CAG }	Glutamine
GAA } GAG }	Glutamate	UAA } UAG }	Stop
ACU } ACC } ACA } ACG }	Threonine	CCU } CCC } CCA } CCG }	Proline
GCU } GCC } GCA } GCG }	Alanine	UCU } UCC } UCA } UCG }	Serine
AGU } AGC }	Serine	CGU } CGC } CGA } CGG }	Arginine
GGU } GGC } GGA } GGG }	Glycine	UGU } UGC }	Cysteine
AGA } AGG }	Arginine	UGA } UGG }	Stop Tryptophan
AUU } AUC } AUA }	Isoleucine	CUU } CUC } CUA } CUG }	Leucine
AUG } AUG }	Methionine	GUU } GUC } GUA } GUG }	Valine
		UUU } UUC }	Phenylalanine
		UUA } UUG }	Leucine

19. If a tRNA molecule displays an anticodon of CCG, which of the following is attached to the molecule?
- ATP
 - proline
 - glycine
 - stop codon

Use the following diagram of a cellular process to answer question 20.



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

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

21. Glycolipids in the cell membrane function to

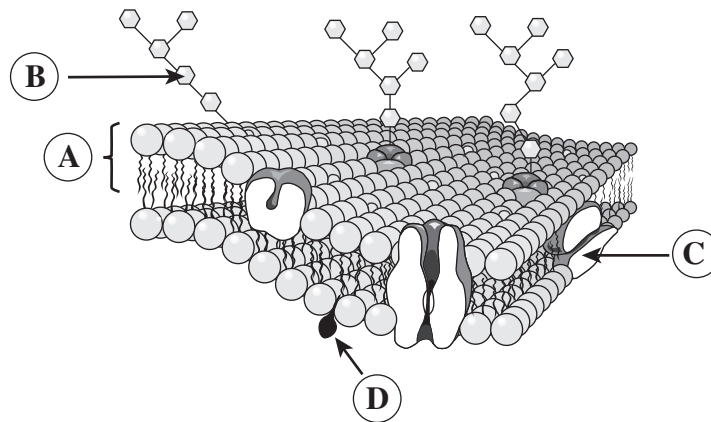
- A. repel water.
- B. act as a carrier molecule.
- C. identify the cell to the immune system.
- D. allow lipids to diffuse by facilitated transport.

22. Which of the following describes the result when potato slices are placed into distilled water?

- A. Salt enters the cells by diffusion.
- B. Water enters the cells by osmosis.
- C. Salt leaves the cells by active transport.
- D. Water leaves the cells by facilitated transport.

23. Carbon dioxide leaves the cells of the alveoli by the process of
- A. osmosis.
 - B. diffusion.
 - C. active transport.
 - D. facilitated transport.

Use the following diagram of a cell membrane to answer question 24.



24. Which labelled structure is the mosaic component of the cell membrane?

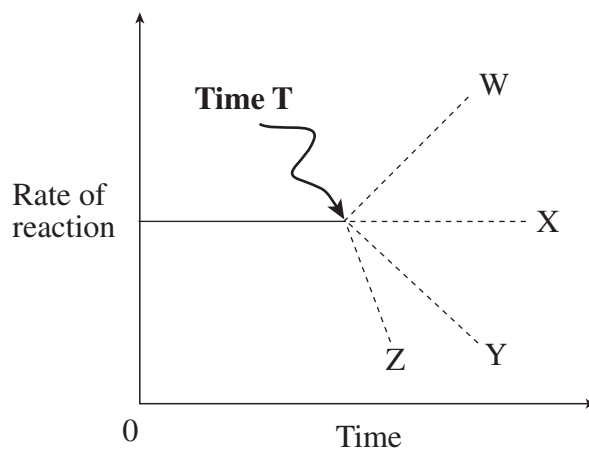
- A. **(A)**
- B. **(B)**
- C. **(C)**
- D. **(D)**

25. Which of the following is a function of carrier proteins embedded in the cell membrane?

- A. to attract water
- B. maintain ion balance in cells
- C. to maintain the fluidity of the membrane
- D. to identify the cell to the immune system

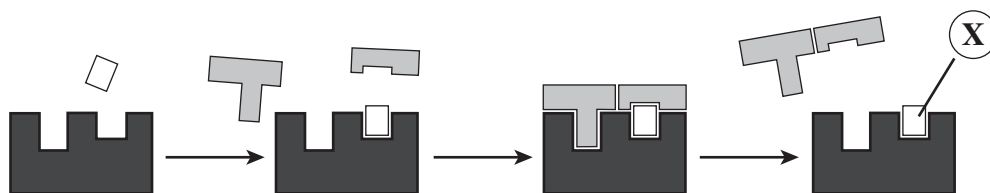
26. If a cell is placed in a hypotonic solution, its surface area-to-volume ratio
- increases.
 - decreases.
 - remains unchanged.

Use the following graph to answer question 27.



27. 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?
- W
 - X
 - Y
 - Z

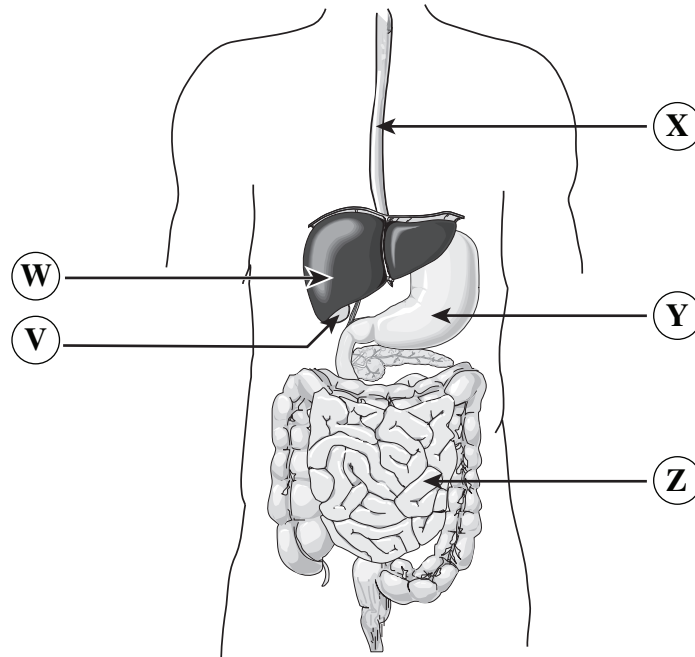
Use the following diagram to answer question 28.



28. The molecule indicated by the letter (X) can be
- ATP.
 - a protein.
 - a vitamin.
 - a heavy metal.

29. A structure attached to the large intestine that may play a role in fighting infections is the
- A. rectum.
 - B. stomach.
 - C. appendix.
 - D. small intestine.
30. 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
31. Gastric juices are produced by the
- A. intestine and contain hydrochloric acid.
 - B. stomach and contain hydrochloric acid.
 - C. stomach and contain sodium bicarbonate.
 - D. intestine and contain sodium bicarbonate.

Use the following diagram of the digestive system to answer questions 32-34.



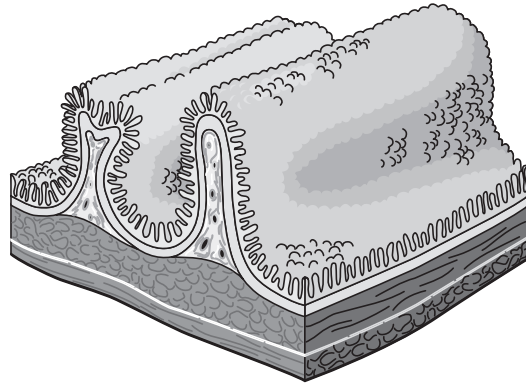
32. After leaving the structure labelled **Y**, chyme encounters which of the following?

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

33. Which of the labelled structures stores bile?

- A. **V**
- B. **W**
- C. **Y**
- D. **Z**

Use the following diagram to answer question 34.



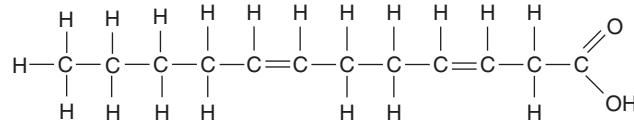
34. The structures illustrated above are located in the

- A. stomach.
- B. esophagus.
- C. large intestine.
- D. small intestine.

35. Which of the following choices indicates where nucleases are produced in the digestive system and their optimum pH?

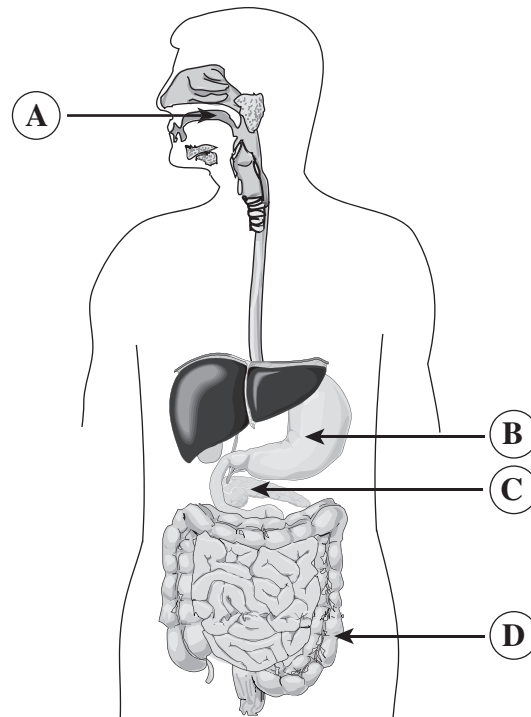
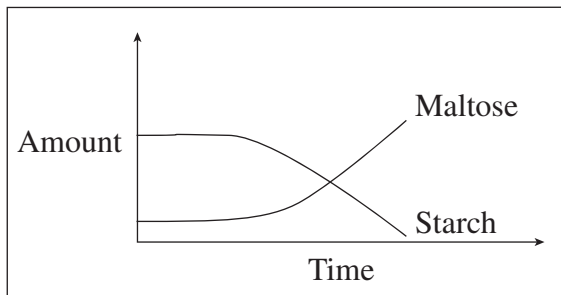
	Site of Production	pH
A.	pancreas	basic
B.	small intestine	neutral
C.	small intestine	acidic
D.	pancreas	neutral

Use the following molecular diagram to answer question 36.



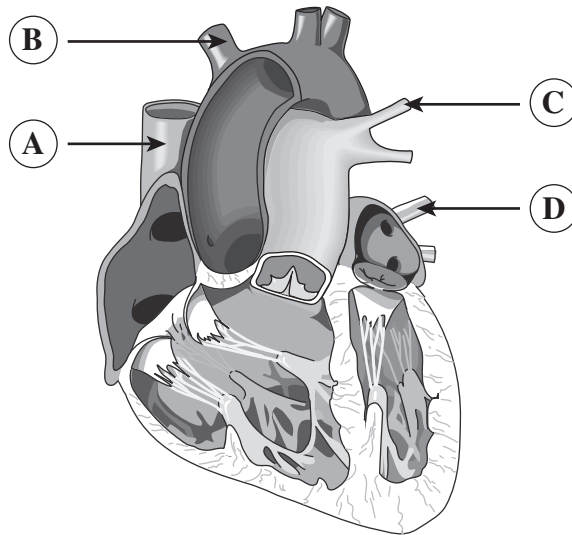
36. Which of the following catalyzes the reaction that produces this molecule?
- A. bile
 - B. lipase
 - C. amylase
 - D. peptidase

Use the following graph and diagram to answer question 37.



37. The contents of the digestive system were analyzed after eating a meal. In which organ were the results on the graph recorded?
- A. **(A)**
 - B. **(B)**
 - C. **(C)**
 - D. **(D)**

Use the following cross section of the heart to answer question 38.



38. Which letter indicates the superior vena cava?

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

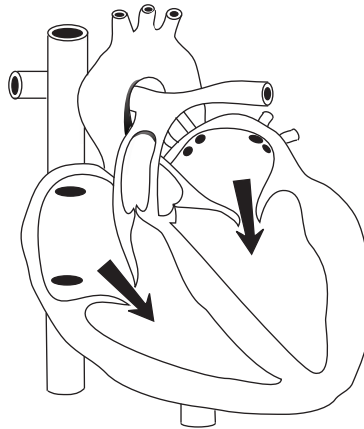
39. The atrio-ventricular (AV) node is located in the

- A. right atrium.
- B. left ventricle.
- C. purkinje fibres.
- D. atrio-ventricular (AV) valve.

40. Increased stimulation of the sino-atrial (SA) node by the sympathetic nervous system causes

- A. decreased heart rate.
- B. increased blood pressure.
- C. increased production of red blood cells.
- D. decreased impulses in the Purkinje fibres.

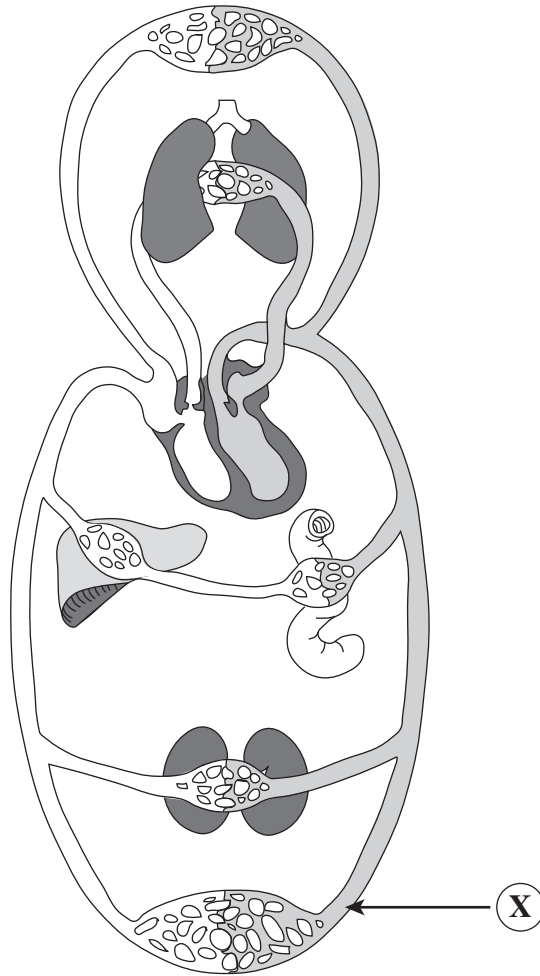
Use the following cross section of the heart to answer question 41.



41. 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
-

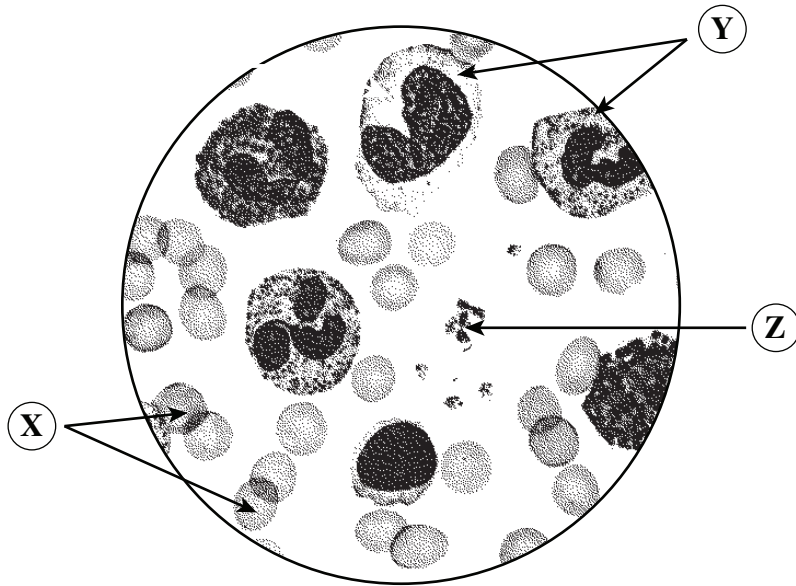
42. What vessel carries blood to the liver?
- A. the iliac artery
 - B. the hepatic vein
 - C. the mesenteric artery
 - D. the hepatic portal vein

Use the following diagram of the circulatory system to answer question 43.



43. (X) indicates the
- A. renal vein.
 - B. iliac artery.
 - C. mesenteric artery.
 - D. hepatic portal vein.

Use the following micrograph to answer question 44.



44. Blood clotting is initiated by

- A. **X** only.
 - B. **Y** only.
 - C. **Z** only.
 - D. **X** and **Y** only.
-

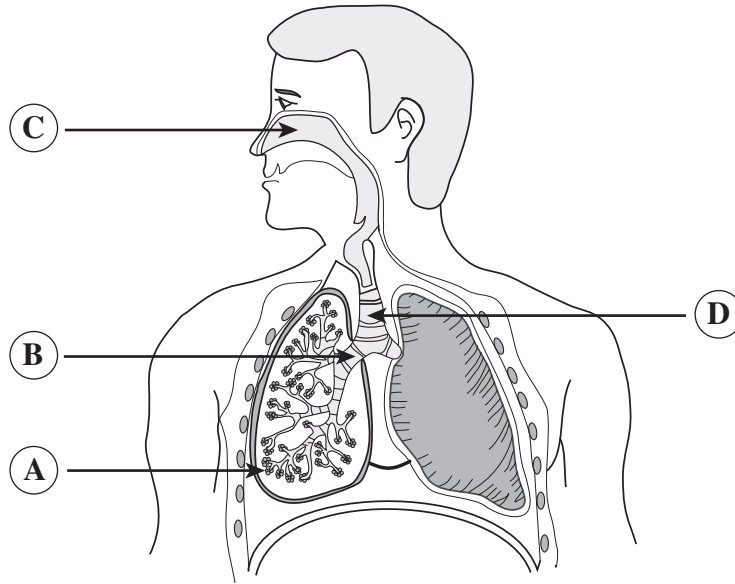
45. Which of the following vessels contains blood with the lowest concentration of oxygen?

- A. aorta
- B. carotid artery
- C. pulmonary vein
- D. pulmonary artery

46. 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 47.



47. Which letter indicates the bronchus?

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

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

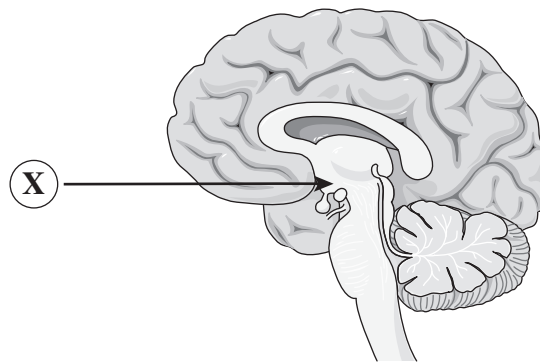
- A. water
- B. carbon dioxide
- C. oxyhemoglobin
- D. bicarbonate ions

49. The concentration of oxygen in the blood is monitored by chemoreceptors in the

- A. aorta.
- B. alveoli.
- C. medulla oblongata.
- D. pleural membranes.

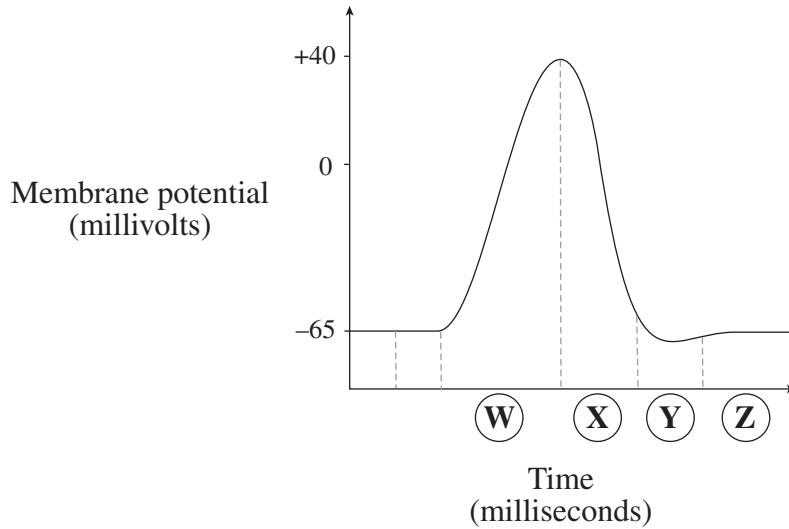
50. What is an effect of the secretion of epinephrine (adrenaline)?
- A. decreased breathing rate
 - B. slowing of the heartbeat
 - C. slower rate of peristalsis
 - D. constriction of the pupils

Use the following diagram of the brain to answer question 51.



51. 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 to answer question 52.



52. During which part of the action potential is the sodium-potassium pump active?

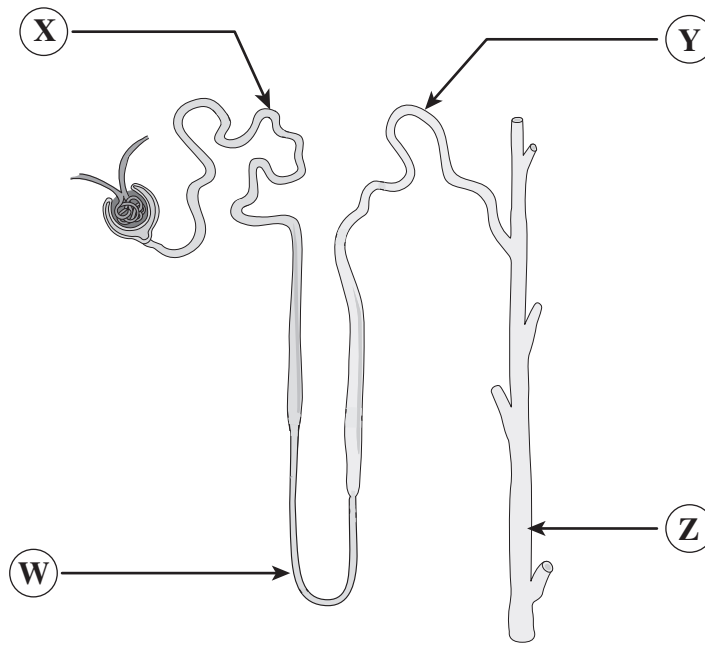
- A. (Y) only
- B. (Z) only
- C. (W) and (X)
- D. (W), (X), (Y) and (Z)

53. In the neuron, the sodium-potassium pump

- A. requires ATP and provides an equal distribution of ions across the axomembrane.
- B. requires ATP and provides an unequal distribution of ions across the axomembrane.
- C. doesn't require ATP and provides an equal distribution of ions across the axomembrane.
- D. doesn't require ATP and provides an unequal distribution of ions across the axomembrane.

54. Impulses from the sympathetic nervous system result in a
- A. constriction of the pupils.
 - B. decrease in cardiac output.
 - C. decrease in the release of aldosterone.
 - D. decrease in the release of pancreatic amylase.
55. Directly after leaving the kidneys, urine enters the
- A. ureters.
 - B. urethra.
 - C. the renal pelvis.
 - D. urinary bladder.
56. Increased solute concentration of the blood is detected by the
- A. hypothalamus.
 - B. adrenal glands.
 - C. anterior pituitary gland.
 - D. posterior pituitary gland.

Use the following diagram of a nephron to answer question 57.



57. 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

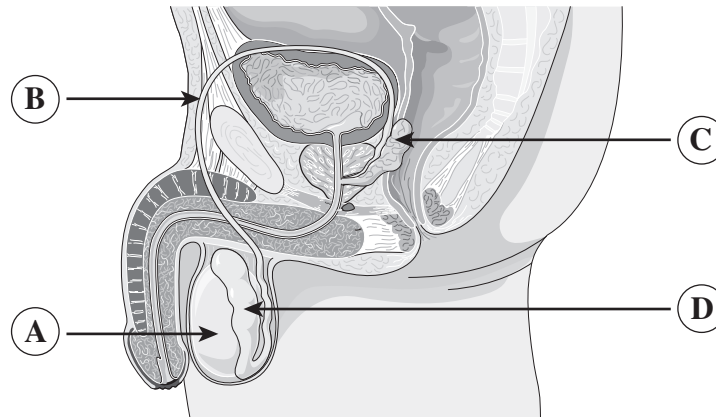
58. Which of the following correctly compares the characteristics of the blood in the afferent arteriole with that of the renal vein?

	Afferent arteriole			Renal vein		
	Glucose	H ⁺	Urea	Glucose	H ⁺	Urea
A.	higher	higher	higher	lower	lower	lower
B.	lower	lower	lower	higher	higher	higher
C.	higher	lower	lower	lower	higher	higher
D.	lower	higher	higher	higher	lower	lower

59. Sperm cells are produced in the

- A. epididymis.
- B. endometrium.
- C. interstitial cells.
- D. seminiferous tubules.

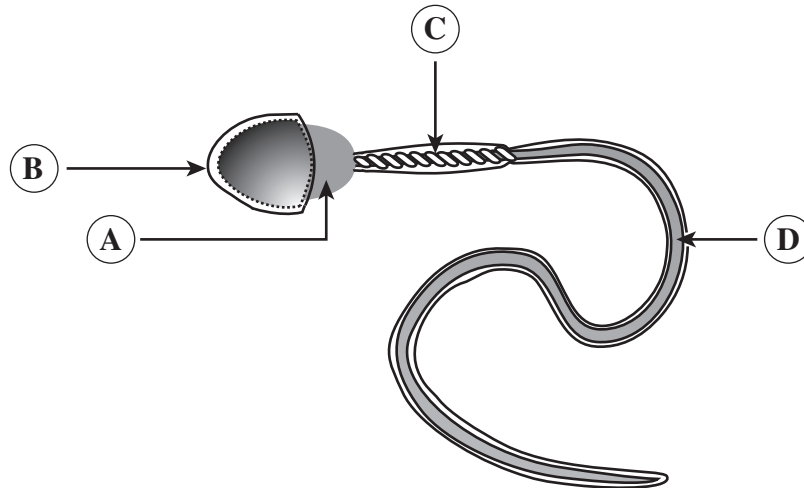
Use the following diagram of the male reproductive system to answer question 60.



60. Which indicated structure secretes fructose to provide energy for sperm cells?

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

Use the following diagram of a sperm cell to answer question 61.



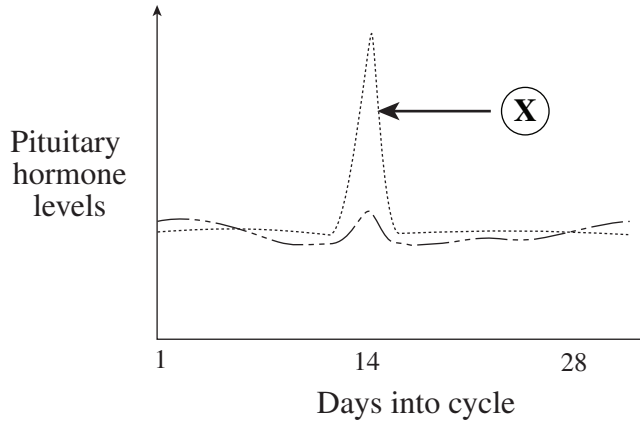
61. In which labelled area is there a relatively high concentration of nucleic acid?

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

62. Which female reproductive structure's function is most similar to that of the seminiferous tubules?

- A. uterus
- B. oviduct
- C. ovaries
- D. endometrium

Use the following graph to answer question 63.



63. What hormone is represented by (X)?

- A. estrogen
- B. progesterone
- C. luteinizing hormone (LH)
- D. follicle-stimulating hormone (FSH)

64. Which of the following mechanisms causes the onset of ovulation?

- A. active transport
- B. positive feedback
- C. negative feedback
- D. tissue-fluid exchange

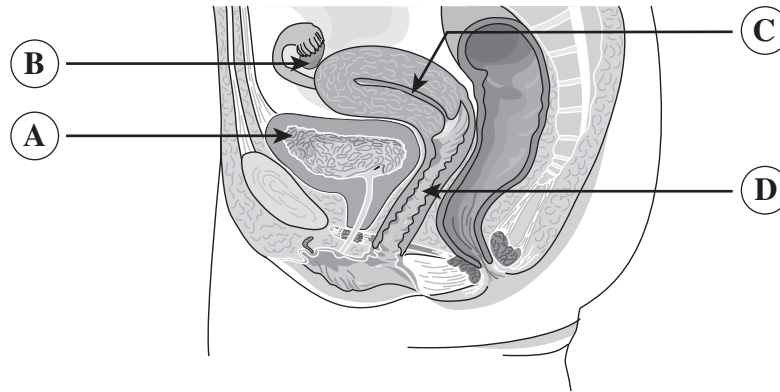
65. After ovulation, the follicle develops into the

- A. ovum.
- B. placenta.
- C. endometrium.
- D. corpus luteum.

66. Increasing levels of progesterone in the blood leads to negative feedback on the

- A. follicle.
- B. interstitial cells.
- C. anterior pituitary.
- D. seminiferous tubules.

Use the following diagram to answer question 67.



67. Which structure responds to increased blood levels of human chorionic gonadotropin (HCG)?

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

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

