

Bio 211 Exam

December 2024

Part I Answer all Questions

The yield of greenhouse crops is higher than that of field crops, due to increased photosynthetic activity by the plants. Which of the following factors may contribute to this?

- I. Constant application of farmyard manure
- II. Humid air and moist soil conditions
- III. Rotation of plants
- IV. Higher than average carbon dioxide levels

- (A) I and II only
- (B) I and III only
- (C) II and IV only
- (D) III and IV only

Which of the following combinations correctly describes the MAIN factors affecting the rate of photosynthesis?

- I. Light intensity and temperature
- II. Carbon dioxide concentration and state of the stomata
- III. NAD and ATP availability
- IV. Phytochromes and the availability of ions

- (A) I and II only
- (B) I and III only
- (C) I, II and III only
- (D) I, II, III and IV

In muscle tissue undergoing strenuous contractions, the formation of lactate is due to the

- (A) low concentration of glucose
- (B) low concentration of oxygen
- (C) high concentration of glycogen
- (D) high concentration of carbon dioxide

The two MAIN products of oxidative phosphorylation in the mitochondrion are

- (A) ATP and water
- (B) NAD and FAD
- (C) oxygen and water
- (D) hydrogen and oxygen

Bananas produced in the Caribbean are exported to markets all over the world. The bananas are harvested mature but still green, yet must arrive at the markets ready to eat. Which of the following procedures ensures that the fruit is still marketable after shipping?

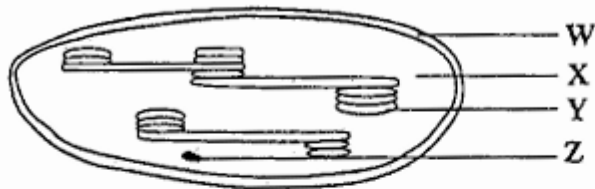
- (A) Ethylene application and chilling during shipping
- (B) Storage of the fruit in chillers with minimum lighting
- (C) Use of carbon dioxide during shipping and ethylene application later
- (D) Storage of the fruit in chillers followed by increased temperature when approaching port

29.

Which of the following structural features prevents molecules, with a molecular mass greater than 68 000, passing from the glomerular capillaries into Bowman's capsule?

- (A) The basement membrane of the epithelial cell of Bowman's capsule
- (B) The cell surface membrane of the endothelial cells of the capillaries
- (C) The cell surface membrane of the epithelial cells of the Bowman's capsule
- (D) The spaces between the extensions of the podocytes of Bowman's capsule

Item 1 refers to the following diagram which shows the structure of a chloroplast.

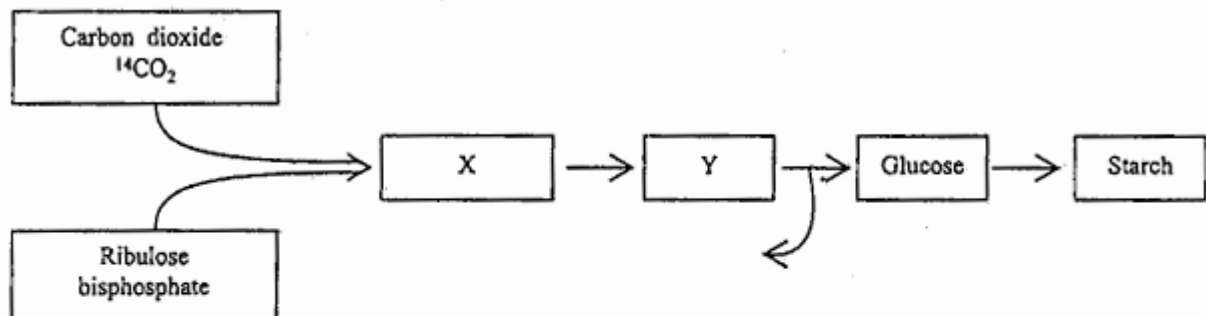


The photosystems are located in the structure labelled

- (A) W
- (B) X
- (C) Y
- (D) Z

The role of the antenna complex in Photosystems I and II is to

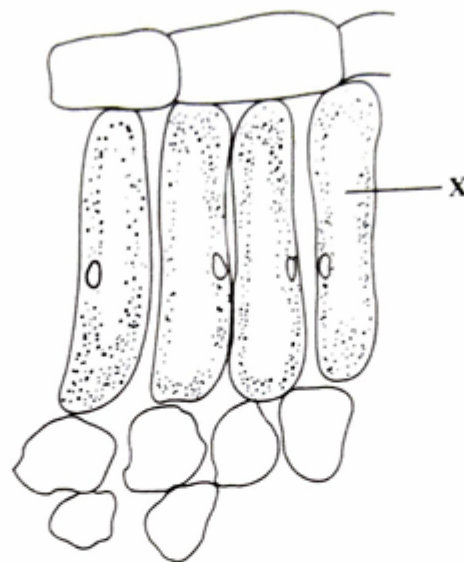
- (A) produce oxygen
- (B) regenerate RuBP
- (C) produce carbohydrates
- (D) collect light energy



3. Which of the following correctly identifies the compounds, X and Y?

- | X | Y |
|--------------------------|----------------------|
| (A) Phosphoglyceric acid | Triose phosphate |
| (B) Triose phosphate | Phosphoglyceric acid |
| (C) Simple sugars | Proteins |
| (D) Acetyl CoA | Succinic acid |

Item 1 refers to the following diagram of a longitudinal section through a dicotyledonous leaf.



Which of the following combinations correctly identifies Cell X and its importance in photosynthesis?

	Cell X	Importance in Photosynthesis
(A)	Spongy	Contains numerous chloroplasts
(B)	Palisade	Contains photosynthetic pigments
(C)	Spongy	Contains photosynthetic pigments
(D)	Palisade	Contains numerous mitochondria

In non-cyclic photophosphorylation, photolysis occurs, oxygen is released and hydrogen is taken up by an acceptor molecule. Which of the following molecules accepts hydrogen in this process?

- (A) FAD
- (B) NAD
- (C) RuBP
- (D) NADP

Which of the following statements BEST explains the significance of the control centre in homeostasis?

- (A) It acts as a stimulus to send information towards the effector.
- (B) It stimulates both the detector and the effector to produce a response.
- (C) It acts as a reference point to determine the mode of action by the effector.
- (D) It stimulates the detector to measure the incoming information in the system.

Which of the following contributes MOST electrons to the electron transport chain?

- (A) Glycolysis
- (B) Krebs's cycle
- (C) Calvin cycle
- (D) Fermentation

Mitochondria in muscle have more cristae than mitochondria in skin cells. What is the significance of this?

- (A) Increased surface area for absorption of pyruvate for ATP production
- (B) Increased surface area for Krebs's cycle reactions
- (C) Steeper hydrogen ion concentration gradient in the mitochondria
- (D) More ATP-ase for ATP production

During aerobic respiration in mammals, pyruvic acid is

- (A) used in the Krebs's cycle
- (B) converted to lactic acid
- (C) used to synthesise glycogen
- (D) one of the products of the Krebs's cycle

The target cells of the antidiuretic hormone are cells of the

- (A) loop of Henlé and distal convoluted tubule
- (B) glomerular capillary and renal capsule
- (C) proximal convoluted tubule and collecting duct
- (D) collecting duct and distal convoluted tubule

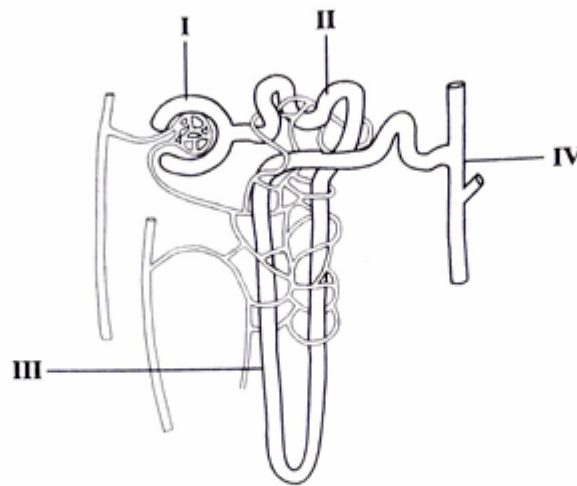
In **anaerobic** respiration, pyruvate does not enter the Krebs cycle but instead undergoes 'fermentation'. Which of the following is NOT a possible product of this process?

- (A) Ethanol
- (B) Lactic acid
- (C) Oxidized NAD
- (D) Reduced NAD

The target cells of the antidiuretic hormone are cells of the

- (A) glomerular capillary and renal capsule
- (B) loop of Henlé and distal convoluted tubule
- (C) collecting duct and distal convoluted tubule
- (D) proximal convoluted tubule and collecting duct

Item 27 refers to the following diagram which shows the mammalian nephron and its associated blood vessels.



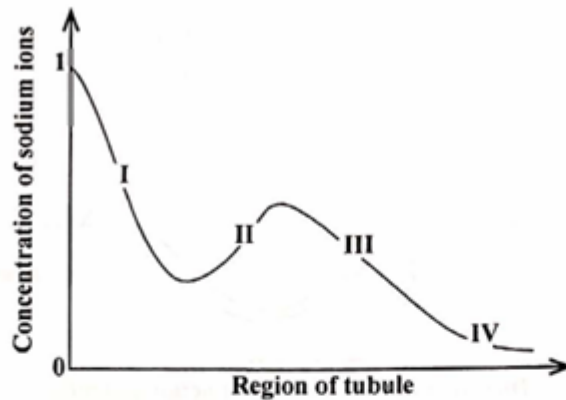
Which region has cells with numerous mitochondria and microvilli lining its lumens?

- (A) I
- (B) II
- (C) III
- (D) IV

Which of the following is NOT a property of hormones?

- (A) Hormones travel in the bloodstream to the target organ.
- (B) A large amount of hormones must be secreted to produce the desired effects.
- (C) Hormones are secreted by ductless glands which have a rich supply of blood.
- (D) Hormones produce their effects at sites different from where they are made.

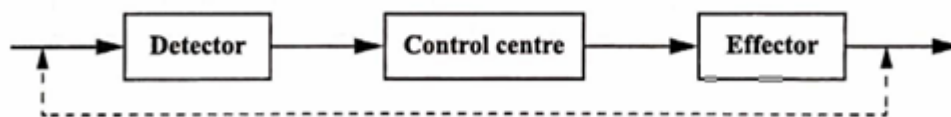
Item 29 refers to the following graph which shows the sodium ion concentration as fluid passes along the kidney tubule.



The region of the descending loop of Henlé is represented by

- (A) I
- (B) II
- (C) III
- (D) IV

Item 30 refers to the following diagram of a model of major components of a generalized homeostatic system in an organism.



Which of the following statements BEST explains the significance of the control centre?

- (A) It acts as a stimulus to send information towards the effector.
- (B) It stimulates both the detector and the effector to produce a response.
- (C) It acts as a reference point to determine the mode of action by the effector.
- (D) It stimulates the detector to measure the incoming information in the system.