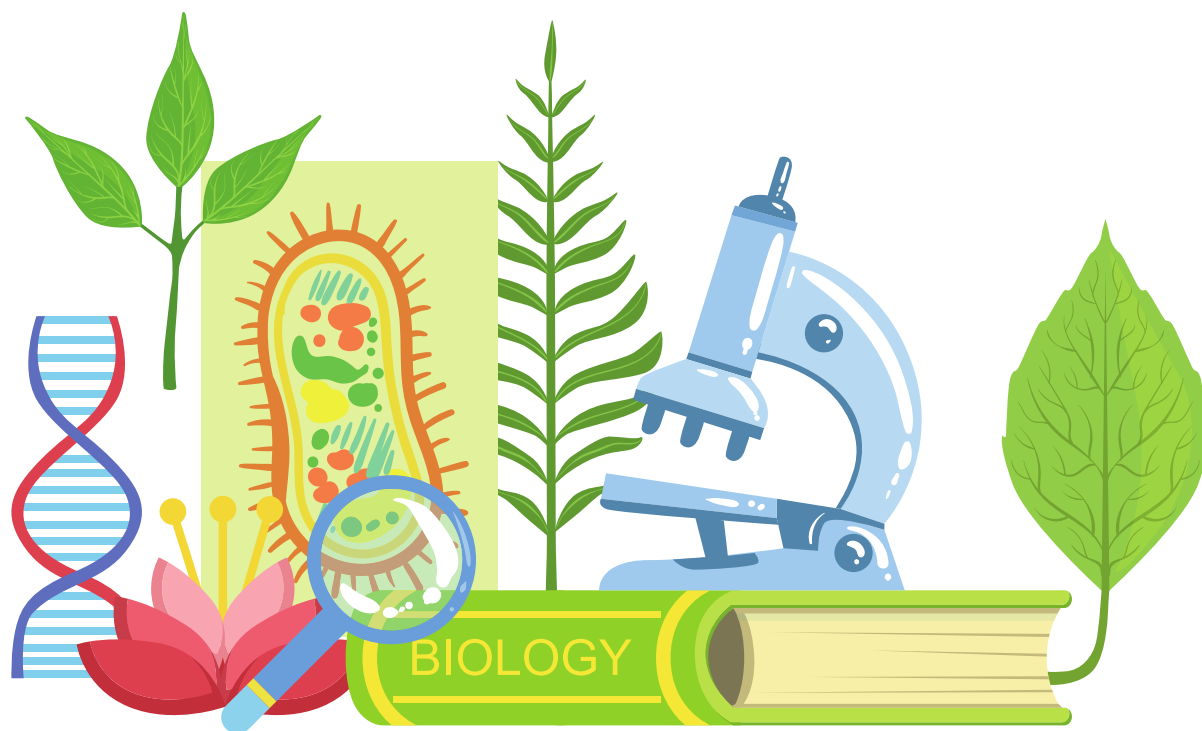




IB Biology HL Paper 1 Question Bank



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1. The components of a nucleosome are:

- A. Ribosomal RNA and DNA
- B. 8 histone proteins and DNA
- C. 8 histones proteins in a ball + 1 further histone
- D. 9 histone proteins and DNA

Solution: D

Explanation: There are 9 histone proteins and DNA in a nucleosome

2. Which of the following statements is correct about the structure of DNA?

- A. The purine base cytosine is linked to the pyrimidine base guanine through three hydrogen bonds.
- B. The sugar-phosphate strands are antiparallel and linked by complementary base pairing.
- C. The bases are linked to each other through a 3'-5' linkage.
- D. Complementary base pairing of guanine with cytosine and adenine with uracil means that the two sugar-phosphate strands lie parallel.

Solution: B

Explanation: Complementary base pairing is the phenomenon wherein DNA, guanine always binds to cytosine and adenine always binds to thymine.

3. Which of the following statements is correct about DNA replication?

- A. The enzymes DNA ligase and RNA primase can be found on the lagging strand.
- B. Okazaki fragments are produced by DNA polymerase I and DNA polymerase III on the leading strand.
- C. On the lagging strand, the RNA primer is synthesised by RNA primase and then converted into a DNA strand with the enzyme DNA polymerase III.
- D. The enzyme DNA polymerase III uses deoxynucleoside triphosphates to build a new DNA strand only on the leading strand.

Solution: A

Explanation: DNA ligase fuses together Okazaki fragments on the lagging strand during replication.

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4. Which of the following statements is correct?

- A. Oxidation can involve the removal of oxygen from a compound.
- B. The solution inside a mitochondrion is called the matrix and the solution inside a chloroplast is called the stroma.
- C. The folds of the inner membrane of a mitochondrion are called grana.
- D. The photosynthetic pigments in a chloroplast are found on the cristae.

Solution: B

Explanation: In the structure of mitochondria, the inner membrane is called the matrix in mitochondria and the stroma in chloroplasts.

5. Which of the following statements about glycolysis is correct?

- A. It is anaerobic, occurs in the cytoplasm, and includes at least one phosphorylation reaction.
- B. It is aerobic and includes a lysis reaction.
- C. In the final stages, two molecules of ATP are used in the formation of pyruvate.
- D. It is aerobic and does not include a lysis reaction.

Solution: A

Explanation: While most aerobic respiration (with oxygen) takes place in the cell's mitochondria, and anaerobic respiration (without oxygen) takes place within the cell's cytoplasm

6. Which of the following statements about the link reaction and Krebs cycle is correct?

- A. Pyruvate in the mitochondrion matrix is oxidised to acetyl CoA.
- B. At the end of the link reaction, coenzyme A is recycled back into the cytoplasm to combine with another pyruvate molecule.
- C. During one rotation of the Krebs cycle there are three decarboxylation reactions.
- D. The link reaction occurs in the mitochondrial matrix and Krebs cycle occurs on the mitochondrial cristae.

Solution: A

Explanation: Pyruvate—three carbons—is converted to acetyl CoA, a two-carbon molecule attached to coenzyme A.

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7. Which of the following statements concerning plant structure and growth is correct?

- A. The veins in a leaf serve both to support the leaf and act as a transport system.
- B. Monocotyledonous plants have apical and lateral meristems.
- C. In an apical meristem, cell division by mitosis results in an increase in the diameter of the stem.
- D. Positive phototropism is due to increased growth as a result of auxin accumulating on the illuminated side of a shoot.

Solution: A

Explanation: Plant veins provide structure and support to plant leaves while also transporting water, nutrients, and energy to the rest of the plant.

8. A fruit fly of genotype GgTt was test crossed. The off spring genotype ratio was 1 : 1. The reason for this was:

- A. The genes are assorted independently.
- B. The genes were linked and crossing over occurred.
- C. The genes were linked and no crossing over occurred.
- D. Non-disjunction had taken place.

Solution: A

Explanation: The Principle of Independent Assortment describes how different genes independently separate from one another when reproductive cells develop.

Friend, Philosopher, Guide
9. Which of the following statements about defence is correct?

- A. During the process of blood clotting, thrombin causes the release of clotting factors from the platelets.
- B. Active immunity occurs as a result of the body being challenged by antigens.
- C. Monoclonal antibodies are produced by fusing a hybridoma cell with a myeloma cell.
- D. As a result of vaccination, the primary responsibility of the body will be greater when it is invaded by an antigen.

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Solution: B

Explanation: When there is exposure to disease, active immunity occurs as a result of the body being challenged by antigens.

10. Which of the following statements about muscles and movement is correct?

- A. During muscle contraction, the distance between Z lines decreases, and the dark bands get wider but the light bands get narrower.**
- B. Bones are held together at a joint by tendons, which also protect the joint.**
- C. Synovial fluid, secreted by the cartilage, lubricates the joint to prevent friction.**
- D. The elbow is an example of a ball-and-socket joint.**

Solution: A

Explanation: A sarcomere is defined as the distance between two consecutive Z discs or Z lines; when a muscle contracts, the distance between the Z discs is reduced.

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