Biomolecules

Assertion Reason Questions

Given below are two statements labelled as Assertion (A) and Reason (R). Select the most appropriate answer from the options given below:

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

1. Assertion (A): Starch gives a blue-black colour in the presence of Iodine.
Reason (R): Iodine gets trapped in the helix-like structure of starch.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Starch gives a positive iodine test because its structure is helix-like in which iodine gets trapped.

2. Assertion (A): Palmitic acid is a saturated fatty acid
Reason (R): Palmitic acid does not contain any double bond between two carbon atoms.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Saturated fatty acids do not contain any double bond between two carbon atoms, e.g. Palmitic acid.

3. Rubber based products are essential commodities in the present day market. Natural rubber, being renewable with its unique qualities, plays a critical role in rubber product manufacture. Most natural rubber are produced in tropical Asian countries and their processing seems to be material and energy-intensive, hence challenged by cost-

ineffectiveness and various environmental issues.

Assertion (A): Rubber is the primary metabolite. are directly involved in
Reason (R): Primary physiological metabolites function in the body of a living organisms.

Ans. (d) A is false but R is true.
Explanation: Rubber is a secondary metabolite. Secondary metabolites do not take part in physiological functions in the body of a living organism.

4. Assertion (A): Glucose comes under the acid-soluble pool.
Reason (R): Its molecular weight is more than 1000 Dalton.

Ans. (c) A is true but R is false.
Explanation: The molecules under the acid- soluble pool have a molecular weight between 18 to 800 Dalton.

5. Assertion (A): The group of amino acids that can be supplied by an organism under a defined condition are the non- essential amino acids.
Reason (R): Non-essential amino acids are those amino acids which can be synthesised by the body.

Ans. (b) Both A and R are true and R is not the correct explanation of A.
Explanation: Non-essential amino acids are those amino acids which can be synthesised by the body in sufficient amounts. These are total eleven in number, i.e. alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, proline, serine, and tyrosine. Out of these, six (arginine, cysteine, glycine, glutamine, proline, and tyrosine) are considered as conditional amino acids. These are usually not

essential, except in times of illness and stress. Thus, this group of amino acids can be supplied by an organism under a defined condition.

6. Assertion (A): Protein interacts and assembles with other proteins.
Reason (R): The interaction or assembly provide multifunctional activity and specificity.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Protein interacts and assembles with other proteins through a combination of hydrophobic bonding, van der Waals forces, and salt bridges at specific binding domains on each protein. These domains can be small binding clefts or large surfaces and can be just a few peptides long or span hundreds of amino acids. Thus, on interaction or assemblage, new functions and specificity become available. These protein interactions provide multifunctional activity and specificity.

7. Assertion (A): ATP is an example of a nucleotide. It is also known as the energy currency of a cell.
Reason (R): The energy is stored in phosphate bonds.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: ATP (stands for adenosine triphosphate) is an example of nucleotide. The ATP molecules are the high energy molecules which store energy in their phosphate bonds and whenever energy is needed for any chemical reaction, these bonds are broken and energy is released.

8. Assertion (A): Essential amino acids cannot be synthesised by the human body and must

Reason (R): be ingested for the mature formation of proteins. These are nine essential amino acids, acids, histidine, isoleucine, asparagine, lysine, methionine, glutamic acid, threonine, tryptophan, and proline.

Ans. (c) A is true but R is false.
Explanation: Essential amino acids are also known as indispensable amino acids. These are nine in number, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. These amino acids cannot be synthesised by the human body and therefore they must be taken from the diet. On the other hand, asparagine, glutamic acid, and proline are the non-essential amino acids.

9. Assertion (A): Each enzyme possesses an appropriate pH where it performs best.
Reason (R): Trypsin and pepsin are digestive enzymes that break down protein chains present in food into smaller pieces.

Ans. (b) Both A and R are true and R is not the correct explanation of A.
Explanation: Each enzyme possesses an appropriate pH where it shows maximum activity, but this is not explained by the fact that trypsin and pepsin are digestive enzymes that break down protein chains in food into smaller pieces.

10. Assertion (A): Proteins which have the high catalytic power are called enzymes.
Reason (R): Amino acids are also considered as they have no charge.

Ans. (c) A is true but R is false.
Explanation: The monomeric unit of protein is amino acids and when amino acids are present in the aqueous environment then, they are called zwitter ion which possesses no charge.

11. Assertion (A): When a protein chain's backbone folds upon itself, the chain criss-crosses itself, and many crevices or pockets are formed.
Reason (R): This protein is said to possess a tertiary structure.

Ans. (a) Both A and R are true and R is the correct explanation of A.

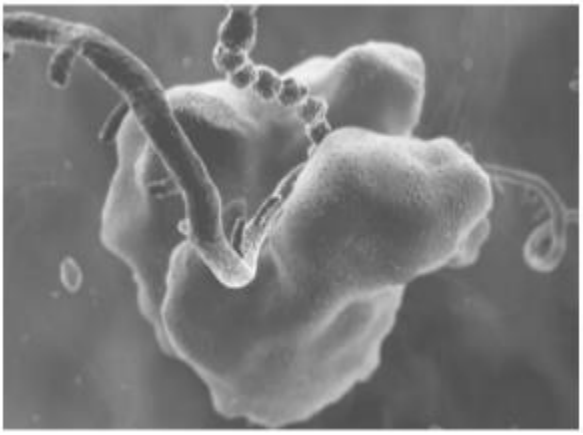
12. Assertion (A): Trypsin functions best in the small Intestine.
Reason (R): This is because trypsin can only function at a low pH.

Ans. (c) A is true but R is false.
Explanation: Trypsin functions in the small intestine, and is functional only in alkaline conditions, i.e. high pH.

13. Assertion (A): The reaction eventually achieves a maximum velocity (Vmax) that is not exceeded by any additional increase in the concentration of the substrate.
Reason (R): Vmax is achieved at the velocity where substrate is reduced to half of its concentration.

Ans. (c) A is true but R is false.
Explanation: Vmax refers to the maximum velocity of the reaction. This does not increase or decrease with the addition of more substrate.

14. Enzymes have become one of the major industrial products of biotechnology. Growth of the enzyme market has been dramatic over the last 20 years and its expansion continues, new growth being often initiated from unusual and unexpected sources.



Assertion (A): Enzymes are very sensitive towards changes in pH and temperature.
Reason (R): Enzymes are only made up of proteins.

Ans. (c) A is true but R is false.
Explanation: Enzymes are made up of proteins but they may also contain non-protein parts like organic or metallic groups in them. Due to the presence of proteins, enzymes are susceptible towards changes in the environment and such changes can affect their function and physiological structure.

15. Assertion (A): Proteins with catalytic power are called enzymes.
Reason (R): Enzymes perform chemical reactions at a fast pace.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Enzymes are made up of proteins and they catalyse the chemical reactions to speed up the metabolism.