JEE Main Chemistry Previous Year Questions With Solutions on Biomolecule

1. Observation of "Rhumann's purple" is a confirmatory te
st for the presence of:
(1) Starch
(2) Reducing sugar
(3) Cupric ion
(4) Protein

Solution:
Rhumann's purple is ninhydrin. It is used to detect alpha-amino acid or carboxylic acid. When reacting with the free amines (proteins), a deep blue or purple color known as Ruhemann's purple is produced. So observation of "Rhumann's purple" is a confirmatory test for the presence of protein.

Hence option (4) is the answer.

2. Synthesis of each molecule of glucose in photosynthesis involves:-
(1) 18 molecules of ATP
(2) 10 molecules of ATP
(3) 8 molecules of ATP
(4) 6 molecules of ATP

Solution:
$12H_2O + 12\ NADP + 18\ ADP \rightarrow 6O_2 + 18\ ATP + 12\ NADPH$ (light reaction)
$6CO_2 + 12\ NADPH + 18\ ATP \rightarrow C_6H_{12}O_6 + 12\ NADP + 18\ ADP + 6H_2O$ (dark reaction)
$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$ (Net reaction)
18 molecules of ATP is involved in the synthesis of each molecule of glucose in photosynthesis.

Hence option (1) is the answer.

3. Accumulation of which of the following molecules in the muscles occurs as a result of vigorous exercise:-
(1) Pyruvic acid
(2) L-lactic acid
(3) Glycogen
(4) Glucose

Solution:
As a result of vigorous exercise, the accumulation of L-lactic acid in the muscles happens. This is because of anaerobic respiration.

Hence option (2) is the answer.

4. Which of the vitamins given below is water-soluble?
(1) Vitamin E
(2) Vitamin K
(3) Vitamin C
(4) Vitamin D

Solution:
Vitamin C is a water-soluble vitamin. It is also called ascorbic acid.
Hence option (3) is the answer.

5. Biuret test is not given by:-
(1) proteins
(2) carbohydrates
(3) polypeptides
(4) urea

Solution:
Biuret test is given by an amide linkage. It is present in proteins, polypeptides and urea. It is not present in carbohydrates.
Hence option (2) is the answer.

6. RNA is different from DNA because RNA contains
(1) ribose sugar and thymine
(2) ribose sugar and uracil
(3) deoxyribose sugar and thymine
(4) deoxyribose sugar and uracil

Solution:
RNA is different from DNA because RNA contains ribose sugar and uracil base.
Hence option (2) is the answer.

7. Which base is present in RNA but not in DNA?
(1) Uracil
(2) Thymine
(3) Guanine
(4) Cytosine

Solution:
Uracil is present in RNA, but not present in DNA.
Hence option (1) is the answer.

8. The term anomers of glucose refer to
(1) isomers of glucose that differ in configurations at carbons one and four(C-land C-4)
(2) a mixture of (D)-glucose and (L)-glucose
(3) enantiomers of glucose
(4) isomers of glucose that differ in configuration at carbon one (C-l)

Solution:
An anomer is an epimer at the hemiacetal or hemiketal carbon in a cyclic saccharide, an atom called the anomeric carbon. Anomer is an example of a stereoisomer. The carbon atom at position 1 is anomeric.
Hence option (4) is the answer.

9. The pyrimidine bases present in DNA are
(1) cytosine and adenine
(2) cytosine and guanine
(3) cytosine and thymine
(4) cytosine and uracil

Solution:
The two pyrimidine bases present in DNA are cytosine and thymine
Hence option (3) is the answer.

10. The secondary structure of a protein refers to
(1) a -helical backbone
(2) hydrophobic interactions
(3) sequence of a-amino acids
(4) fixed configuration of the polypeptide backbone

Solution:
The secondary structure of protein include a-helical back bond and R-sheet structures.
Hence option (1) is the answer.

11. Which one of the following statements is correct?
(1) All amino acids except lysine are optically active
(2) All amino acids are optically active
(3) All amino acids except glycine are optically active
(4) All amino acids except glutamic acids are optically active

Solution:
Glycine contains two hydrogen atoms at the alpha carbon.
All amino acids except glycine are optically active.
Hence option (3) is the answer.

12. Which of the following compounds can be detected by Molisch's test?
(1) Nitrocompounds
(2) Sugars
(3) Amines
(4) Primary alcohols

Solution:
Molisch's test is a test for the presence of carbohydrates. The formation of a purple or a purplish-red ring at the point of contact between the H_2SO_4 and the analyte + Molisch's reagent mixture confirms the presence of carbohydrates in the analyte. The two forms of carbohydrates are sugars and starches. So sugars can be detected by Molisch's test.
Hence option (2) is the answer.

13. The presence or absence of hydroxy group on which carbon atom of sugar differentiates RNA and DNA?
(1) 3rd
(2) 4th
(3) 1st
(4) 2nd

Solution:
In RNA, ribose is present on second carbon atom. In DNA, deoxy ribose is present on second carbon atom.Thus, the presence or absence of hydroxy group on second carbon atom of sugar differentiates RNA and DNA.
Hence option (4) is the answer.

14. α-D (+)-glucose and β-D(+)-glucose are
(1) conformers
(2) epimers
(3) anomers
(4) enantiomers

Solution:
α-D (+)-glucose and β-D(+)-glucose are anomers.
Hence option (3) is the answer.

15. Complete hydrolysis of cellulose gives
(1) D-ribose
(2) D-glucose
(3) L-glucose
(4) D-fructose

Solution:
Complete hydrolysis of cellulose gives D-glucose.
$(C_6H_{10}O_5)_n + nH_2O \rightarrow nC_6H_{12}O_6$
Hence option (2) is the answer.

16. The reason for double helical structure of DNA is operation of
(1) dipole – dipole interaction
(2) hydrogen bonding
(3) electrostatic attractions
(4) van der Waal's forces

Solution:
Helical structure of DNA is stabilised by hydrogen bonds.
Hence option (2) is the answer.

17. Which one of the following bases is not present in DNA?
(1) Thymine
(2) Quinoline
(3) Adenine
(4) Cytosine

Solution:
Quinoline is not present in DNA.
Hence option (2) is the answer.

Also Read:- FAQ on Biomolecules