Q-1 - 34341928

Which one of the following statements is correct, with reference to enzymes?

(A) Apoenzyrne = Holbenzyme + Coenzyme

(B) Holoenzyme = Apoenzyme + Coenzyme

(C) Coenzyme = Apoenzyme + Holoenzyme

(D) Holoenzyme = Coenzyme + Cofactor

CORRECT ANSWER: B

SOLUTION:

Holoenzyme It is a conjugate catalytically active enzyme

together with its coenzyme. Apoenzyme The protein part of catabolically active enzyme is called apoenzyme. Coenzyme Some enzymes require additional organic or metallo-organic -molecules for their activity. These molecules are called coenzyme. So. holoenzyme is apoenzyme together with coenzyme hence option (b) is correct

Q-2 - 34341947

Which one is the most abundant protein in the animal world

(A) Trypsin

(B) Haemoglobin

(C) Collagen

(D) Insulin

CORRECT ANSWER: C

SOLUTION:

Collegen is the most abundant protein (structural protein) in the animal world while Ribulose Bisphosphate Carboxylase Oxygenase (RuBisCO) is the most abundant protein in the whole of the plant world.

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Q-3 - 34341972

An enzyme that can stimulate germination of barley seeds is

(A) α-amylase

(B) lipase

(C) protease

(D) invertase

CORRECT ANSWER: A

SOLUTION:

Barley seeds are rich in carbohydrate (starch). The starch is hydrolysed by α-amylase to monosaccharides unit at the time of germination of seeds.

Q-4 - 15600309

Which one of the following is the sweetest sugar or laevorotatory suger

Or

Inulin is a polymer of

(A) Fructose

(B) Glucose

(C) Galactose

(D) Sucrose

CORRECT ANSWER: A

SOLUTION:

(a) Fructose is the most common form of sugar. It is the sweetest among naturally occurring sugars. It has sweetening index of 170 (where as the sweetening index of glucose is 70).

Q-5 - 15600331

Which one of the following statements is wrong

(A) Sucrose is a disaccharide

(B) Cellulose is a poysaccharide

(C) Uracil is a pyrimidine

(D) Glycine is a sulphur containing amino acid

CORRECT ANSWER: D

Q-6 - 34341929

Which of the following are not polymeric

(A) Nucleic acid

(B) Proteins

(C) Polysaccharides

(D) Lipids

CORRECT ANSWER: D

SOLUTION:

Among the given options except lipids all are polymers.

These are formed by the polymerisation of monomers.

The basic unit of lipid are fatty acids and glycerol molecules that do not form repetitive chains Instead they form triglycerides frorn three fatty acids and one glycerol molecules.

Q-7 - 15600400

Nucleoside is made up of

(A) Sugar only

(B) Phosphate only

(C) Sugar and phosphate

(D) Sugar and base

CORRECT ANSWER: D

Q-8 - 15600313

Pentoses and hexoses are the most common

Or

The simple polyhydroxy ketone molecule containing 3-7 carbons is

a

(A) Disaccharides

(B) Monosaccharides

(C) Oligosaccharides

(D) Polysaccharides

CORRECT ANSWER: B

SOLUTION:

(b) Pentoses and hexoses are the example of monosaccharides.

Q-9 - 34341935

A non-proteinaceous enzyme is

(A) lysozyme

(B) ribozyme

(C) ligase

(D) dexyribonuclease

CORRECT ANSWER: B

SOLUTION:

Ribozyme is a form of ribosomal RNA (23 SrRNA) which

acts as a cotalyst in splicing of RNA during protein synthesis. It is the only non-protein enzyme known so far, rest all the enzymes are proteinaceous Hence, option (b) is correct.

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Q-10 - 15600333

α-helical model of protein was discovered by

(A) Pauling and Correy

(B) Watson

(C) Morgan

(D) Berzelus

CORRECT ANSWER: A

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Q-11 - 34342007

Feedback inhibition of an enzymatic reaction is caused by

(A) end product

(B) substrate

(C) enzyme

(D) rise in temperature

CORRECT ANSWER: A

SOLUTION:

In feedback inhibition, the product of an. enzyme-catalysed reaction accumulates and acts as inhibitor of the reaction.

Q-12 - 15600409

Nucleic acids were discovered by

Or ltBrgt DNA was first discovered by

(A) Watson and Crick

(B) Khorana

(C) Wilkins

(D) Miescher

CORRECT ANSWER: D

Q-13 - 34341930

A typical fat molecule is made up of

(A) One glycerol and three fatty acid molecules

(B) One glycerol and 'one fatty acid molecule

(C) Three glycerol and three fatty acid molecules

(D) Three glycerol molecules and one fatty acid molecule

CORRECT ANSWER: A

SOLUTION:

A typical fat molecule is triglyceride formed by esterification of one glycerol and three fatty acid molecules. The three fatty acids can be of same type or different depending on the type of the fat molecules.

Q-14 - 15600420

Who first used the term "enzyme"

(A) J.B. Sumner

(B) Kuhne

(C) Thompson

(D) Garnier

CORRECT ANSWER: B

SOLUTION:

(b) The term enzyme was used by Willy Kuhne while working on fermentation.

Q-15 - 34342014

Lactose is composed of

(A) glucose + glucose

(B) glucose + fructose

(C) fructose + galactose

(D) glucose + galactose

CORRECT ANSWER: D

SOLUTION:

Lactose $(C_{12}H_{22}O_{11})$ is a disaccharide found in mammalian milk. It comprises of galactose and glucose units which are linked together by β,1-4 glycosidic bonds. It is a reducing sugar.

Q-16 - 15600360

Which of the following promotes softening of fruits

(A) Polygalacturonase

(B) Colchicine

(C) Polyethylene glycol

(D) Cellulase

CORRECT ANSWER: A

Q-17 - 15600424

Who got the Nobel prize working on enzymes in the year 1978

(A) W. Arber and D. Nathans

(B) Nass and Nass

(C) R. Misra

(D) H.G. Khorana

CORRECT ANSWER: A

SOLUTION:

(a) Arber and Nathans got nobel prize in 1978 for the discovery of restriction endonucleases.

Q-18 - 34341936

The chitinous exoskeleton of arthropods is formed by the polymerisation of

(A) keratin, sulphate and chondroitin sulphate

(B) D-glucosamine

(C) N-acetyl glucosamine

(D) lipoglycans

CORRECT ANSWER: C

SOLUTION:

The chitinous exoskeleton of arthropods if formed by the polymerisation of N-acetyl glucosamine which is a derivative of glucose. It is alos a characteristic component of the cell wall of fungi, the tadulase of

molluscs and the beaks and internal shells of cephalopods, including squid and octopuses.

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Q-19 - 34342031

AN enzyme brings about

(A) decrease in reaction time

(B) increase in reaction time

(C) increase in activation energy

(D) reduction in activation energy

CORRECT ANSWER: D

SOLUTION:

Enzymes act by reducing the arnount of activation

energy. The binding energy is the source of energy used by enzyme to lower the activation energy of reaction. Activation energy is the minimum energy required from outside to overcome the energy barrier of reactants. Enzymes lower energy of activation by two ways- bringing reactants molecules together, and developing strain in bonds of reactants.

Q-20 - 15600425

To explain the mechanism of enzymatic action, who proposed "Lock and key hypothesis"

(A) Fischer

(B) Jacob

(C) Koshland

(D) Sumner

CORRECT ANSWER: A

SOLUTION:

(a) Lock and key theory : Emil Fischer proposed this theory, according to which on the surface of enzymes a few elevations and ditches are found known as active sites and enzymes bind reactants on these sites to create reaction between them.

Q-21 - 34341983

Which form of RNA has a structure resembling clover leaf?

(A) rRNA

(B) hnRNA

(C) mRNA

(D) tRNA

CORRECT ANSWER: D

SOLUTION:

The basic plan of the structure of tRNA assumes the pattern of a clover leaf. The structures cf different tRNAs for almost all amino acids are now available and all of these fit the clover leaf model. The tRNA structure can be decomposed into its prirmary structure and its secondary structure (usually seen as clover leaf structure) and tertiary structure.

Q-22 - 34341939

Which one of the following is a non-reducing carbohydrate?

(A) Maltose

(B) Sucrose

(C) Lactose

(D) Ribose 5-phosphate

CORRECT ANSWER: B

SOLUTION:

Sucrose is a disaccharide of glucose and fructose It is a non-reducing sugar as it do not contain any free anomeric carbon atom. Maltose is a disaccharide of 2 glucose units. Its first glucose residue cannot undergo oxidation, whereas, second residue can undergo oxidation because it has a reactive free anomeric carbon atom. Hence. It is a reducing sugar Lactose and ribose-5-phosphate are also reducing in nature due to the

presence of a free ketonic or aildehyde group.

Q-23 - 15600319

Which is non-reducing sugar

(A) Glucose

(B) Galactose

(C) Mannose

(D) Sucrose

CORRECT ANSWER: D

SOLUTION:

(d) The carbohydrates or sugar where free aldehyde or ketonic group is absent (utilized in glycosidic bond

formation) can not reduce the above reagents are called non-reducing sugar i.e., Sucrose, glycogen, starch.

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Q-24 - 15600344

Which of the following amino acids is not optically active

(A) Glycine

(B) Valine

(C) Leucine

(D) Isoleucine

CORRECT ANSWER: A

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Q-25 - 34342025

A polysaccharide, which is synthesised and stored in liver cells is

(A) lactose

(B) galactose

(C) arabinose

(D) glycogen

CORRECT ANSWER: D

SOLUTION:

Glycogen is a storage, homopolysaccharides with digestable branched chain. Glycogen is synthesised from glucose through glycogenesis and is stored in hepatic cells of liver and muscles in human body. When needed, glycogen is hydrolysed to form glucose through glycogenolysis and released into blood stream.

Q-26 - 15600367

Which of the followings can bring about the denaturation of proteins

(A) Reaction to salts of heavy metals

(B) Reaction to acid and bases

(C) Reaction to inorganic neutral salts

(D) Preservation at a temperature below-$5^{\circ}C$

CORRECT ANSWER: A::B::C

Q-27 - 15600431

A competitive inhibitor of succinic dehydrogenase is

(A) α-ketoglutarate

(B) Malate

(C) Malonate

(D) Oxaloacetate

CORRECT ANSWER: C

Q-28 - 34341958

A competitive inhibitor of succinic dehydrogenase is

(A) malonate

(B) oxaloacetate

(C) α-ketoglutarate

(D) malate

CORRECT ANSWER: A

SOLUTION:

Succinic dehydrogenase oxidised the succinate to fumarate. Malonate, an analogue of succinate, which is a strong competitive inhibitor of succinate dehydrogenase and therefore, blocks the activity of citric acid cycle in eukaryotes In Krebs' cycle the reversible hydration of fumarate to malate is catalysed by fumarase enzyme.

Q-29 - 15600342

Which of the following fatty acids is liquid at room temperature

(A) Palmitic acid

(B) Stearic acid

(C) Oleic acid

(D) Linoleic acid

CORRECT ANSWER: C::D

Q-30 - 15600447

Inhbition of acetylcholine by DEP (Diisorprophl-fluorophosphate)

is an example of

(A) Competitive inhibition

(B) Non-competitive inhibition

(C) Non-competitive iirreversible inhibition

(D) Allosteric inhibition

CORRECT ANSWER: C

Q-31 - 34341980

The catalytic efficiency of two different enzymes can be compared by the

(A) formation of the product

(B) pH optimum value

(C) $K_m$value

(D) molecular size of the enzyme

CORRECT ANSWER: C

SOLUTION:

K_m- Michaelis-Menten constant is defined as substrate

concentration at which reaction velocity ot enzyme

Cdtalysed reaction (V_0) is half of the maxi1num velocity

of this reaction

$(V_{\max})$,

$(i.e. K_M = (1)$

$/(2)V_{\max}).K_m$

can vary greatly from enzyme to eynzyme and even for

the different substrates of the same enzyrne.

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Q-32 - 15600317

The alpha helices and beta sheets are the example of which level of

protein organization

(A) Primary structure

(B) Secondary structure

(C) Tertiary structure

(D) Quaternary structure

CORRECT ANSWER: B

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Q-33 - 15600466

Lactose operon is considered to be glucose sensitive due to

(A) Catabolite induction

(B) Allosteric inhibition

(C) Anabolic inhibition

(D) None of these

CORRECT ANSWER: A

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Q-34 - 34342042

Mineral associated with cytochrome is

(A) Cu

(B) Mg

(C) Fe and Mg

(D) Fe and Cu

CORRECT ANSWER: D

SOLUTION:

Cytochromes are iron-porphyrin (haem) proteins discovered by Mac Cunn. Cytochromes are infact, the conjugated proteins, composed of a protein molecule and a non-protein group, i,e. inorganic factor iron. It is to be noted, that cell cytochromes have iron only, though cyt-a_3 possesses both Fe and Cu. Fe has a role in picking up of electrons and Cu hands over the electrons

to oxygen

Q-35 - 15600428

Enzymes were discovered for the first time in

(A) Yeast

(B) Maize

(C) Bacteria

(D) Algae

CORRECT ANSWER: A

SOLUTION:

(a) First time fermentative enzymes were discovered

from yeast.

Q-36 - 40481339

True statement for cellulose molecule

(A) β-1-4 linkage unbranched

(B) β-1-4 linkage branched

(C) β-1-4 linkage branched

(D) α-1-6 linkage unbranched

CORRECT ANSWER: A

Q-37 - 34341967

Antibodies in our body are complex

(A) steroids

(B) prostaglandins

(C) glycoproteins

(D) lipoproteins

CORRECT ANSWER: C

SOLUTION:

Antibodies are the proteins (glycoproteins) called immunoglobulins. These are produced by the lymphocytes in response to entry of a foreign substance or antigen into the body. Antibodies are of five types, e.g. IgG, IgM, IgA, IgD, IgE. Lipoproteins are the micellar complex of protein and lipids.

Steroids are a group of lipids derived from a saturated compound cyclopentano perhydroph- enanthrene, which

has a nucleus of four rings. Prostaglanclin is a group of organic compounds derived from essential fatty acids and causing a range of physiological effects in animals.

Q-38 - 15600458

Number of active sites in allosteric enzyme is

(A) One

(B) Two

(C) Three

(D) Four

CORRECT ANSWER: B

SOLUTION:

(b) One is active site and second is allosteric site.

Q-39 - 15600321

A complex polysaccharide produced from sucrose by the bacterium Leuconostoc mesenteroides is

(A) Chitin

(B) Starch

(C) Cellulose

(D) Dextran

CORRECT ANSWER: D

SOLUTION:

(d) Dextran is a complex polysaccharide prepared either

through partial hydrolysis of starch or polymerization of sucrose by the bacterium Leuconostoc mesenteroides.

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Q-40 - 40481330

Translocation of sugars in flowering plants occurs in the form of

(A) glucose

(B) sucrose disaccharide

(C) fructose

(D) maltose

CORRECT ANSWER: A

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Q-41 - 15600334

Which one of the following biomolecules is correctly characterrised

(A) Lecithin - a phosphorylated glyceride found in cell membrane

(B) Palmitic acid - an unsaturated fatty acid with 18 carbon atoms

(C) Adenylic acid - adenosine with a glucose phosphate molecule

(D) Alanine amino acid - Contains an amino group and an acidic group anywhere in the molecule

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CORRECT ANSWER: A

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Q-42 - 40481332

Which of the following amino acid is essential

(A) alanine

(B) glycine

(C) tryptophan

(D) tyrosine

CORRECT ANSWER: A

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Q-43 - 34341992

Hydrolytic enzyme which acts at low pH is

(A) proteases

(B) α-amylases

(C) hydrolases

(D) peroxidases

CORRECT ANSWER: C

SOLUTION:

Lysosomes are the reservoirs of acid hydrolases showing optimum activity at pH 5.0 maintained within the lysosome. These include proteases, nucleases, glycosidases, lipase, etc. Among these protease act a very low pH, i.e. 2.

Q-44 - 15600505

Which one of the following is wrongly matched

(A) Fungi - Chitin

(B) Phospholipid - Plasma membrane

(C) Enzyme - Lipopolysaccharide

(D) ATP - Nucleotide derivative

CORRECT ANSWER: C

Q-45 - 34342011

ATP is

(A) nucleotide

(B) nucleosome

(C) nucleoside

(D) purine

CORRECT ANSWER: A

SOLUTION:

A nucleotide contains (a) a 5-C sugar (b) a Phosphate

molecule (c) a nitrogenous base ATP is also a nucleotide. It also has a 5-C sugar (ribose), 3 phosphate molecules and a nitrogenous base (adenine).

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Q-46 - 15600444

Km is related to

(A) Morphology

(B) ABO blood group

(C) ES complex

(D) Chromatography

CORRECT ANSWER: C

SOLUTION:

(c) Km is a Michaelis Menten constant, which indicates the substrate concentration at which the chemical reaction catalysed by an enzyme attains half its maximu velocity.

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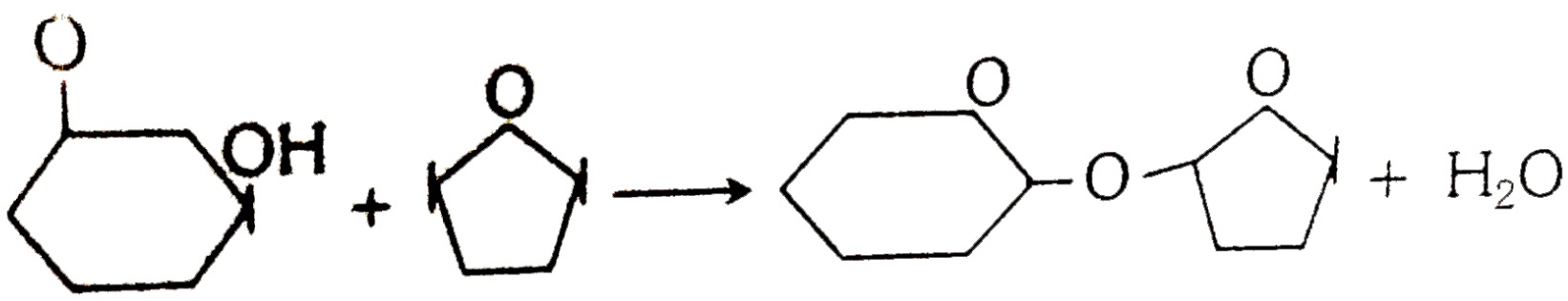
Q-47 - 15600451

Which type of reaction is shown by the following figure



Or

Formation of both peptide and glycosidic bonds involves

(A) Hydration

(B) Denaturation

(C) Dehydration

(D) Dydrolysis

CORRECT ANSWER: C

Q-48 - 34342019

Cofactor (coenzyme) is a part of holoenzyme it is

(A) loosely attached inorganic part

(B) accessory non-protein substance attached firmly

(C) loosely attached organic part

(D) None of the above

CORRECT ANSWER: C

SOLUTION:

Coenzyme/cofactors are organic substances (often

vitamins) which are loosely attached with apoenzymes.

A holoenzyme is a conjugated enzyme. It has a proteinaceous part called apoenzyme and a non-proteinaceous part called cofactor.

$$\begin{array}{c}\text{Holoenzyme}\\ \text{(conjugated enzyme)}\end{array}$$

$$\Leftrightarrow \begin{array}{c}\text{Apoenzyme}\\ \text{(Protein part)}\\ +\text{ Cofactor}\\ \text{non-protein part}\end{array}$$

Cofactor is very necessary for the activity of holoenzyme.

Cofactors can be separated from enzyme by dialysis.

Cofactors may be inorganic (i.e. metal activators) or organic (i.e. coenzymes and prosthetic group).

Q-49 - 15600487

Substrate of amylase enzyme is

(A) Protein

(B) Fat

(C) Starch

(D) Sucrose

CORRECT ANSWER: C

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Q-50 - 15600330

Lipids are incoluble in water, because lipids molicules are

(A) Neutral

(B) Zwitter ions

(C) Hydrophobic

(D) Hydrophilic

CORRECT ANSWER: C

Q-51 - 15600405

DNA is not present in one of the following

(A) Mitochondria

(B) Chloroplast

(C) Bacteriophage

(D) Tobacco mosaic virus

CORRECT ANSWER: D

SOLUTION:

(d) Because plant viruses have RNA as genetic material.

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Q-52 - 15600363

Quarternary structure of protein

(A) Consists of four subunits

(B) May be either α or β

(C) Is unrelated to two function of the protein

(D) Is dictated by the primary structures of the individual subunits

---

CORRECT ANSWER: D

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Q-53 - 40481324

Fats in the body ar formed when

(A) glycogen is formed from glucose

(B) sugar level becomes stable in blood

(C) extra glycogen stroage in liver and muscles is stopped

(D) all of them

CORRECT ANSWER: C

Q-54 - 15600438

An example of non-competitive inhibition is

(A) The inhibition of succinic dehydrogenae by malonate

(B) Cyanide action of cytochrome oxidase

(C) Sulpha durg on folic acid synthesizing bacteria

(D) Reaction of succinic dehydrogenase

CORRECT ANSWER: B

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Q-55 - 34341953

In the DNA molecule

(A) the total amount of purine nucleotides and pyrimidine nucleotides is not always equal

(B) there are two strands which run parallel in the $5' \rightarrow 3'$ direction

(C) the proportion of adenine in relation to thymine varies with the organism

(D) there are two strands which run antiparallel one in $5' \rightarrow 3'$ direction and other in $3' \rightarrow 5'$

CORRECT ANSWER: D

SOLUTION:

In DNA molecule the adjacent deoxyribonucleotides are joined in a chain by phosphodiester bridges or bonds, which link the 5' carbon of deoxyribose of one mononucleotide unit with 3' carbon of deoxyribose of next mononucleotide unit.

According to Watson and Crick DNA molecule consists of two such polynucleotide chains wrapped helicaly around each other, with the sugar phosphate cham on the outside and purine and pyrimidine on the inside of helix. The two strands run antiparallel, i.e. one strand has phosphodiester linkage in 3 $\rightarrow$ 5' direction while other strand has phosphodiester linkage in 5' $\rightarrow$ 3' direction.

Chargaff (1950) suggested that despite wide

compositional variations exhibited by different types of DNA the total amount of purines equaled the total amount of pyrimidines (A + G = T + C).

Q-56 - 15600369

A ribose (but not deoxyribose) nucleotide is

(A) Cytosine - pentose sugar - phosphate

(B) Guanine - pentose sugar - phosphate

(C) Thymine - pentose sugar - phosphate

(D) Uracil - pentose sugar - phosphate

CORRECT ANSWER: D

Q-57 - 15600464

Which of the following enzyme can form RNA fron DNA

(A) Restriction enzyme

(B) DNA polymerase

(C) RNA polymerase

(D) Reverse transcriptase

CORRECT ANSWER: C

Q-58 - 15600345

Paraffin wax is

(A) Ester

(B) Acid

(C) Monohydric alcohol

(D) Cholesterol

CORRECT ANSWER: A

Q-59 - 40481337

Deficiency of protein leads to

(A) rickets

(B) scurvy

(C) kwashiorkor

(D) carotenemia

CORRECT ANSWER: A

Q-60 - 34341975

Which of the following is the simplest amino acid

(A) Alanine

(B) Asparagine

(C) Glycine

(D) Tyrosine

CORRECT ANSWER: C

SOLUTION:

Proteins are polymers of amino acids in which amino acids are joined by peptide bonds. Glycine is the simplest amino acid.