Biomolecules

Question1

Which of the following is a nucleotide?

[NEET 2024 Re]

Options:

A.

Uridine

B.

Adenylic acid

C.

Guanine

D.

Guanosine

Answer: B

Solution:

Uridine is a nucleoside. Thus, option (1) is incorrect.
Adenylic acid is a nucleotide. Thus, option (2) is correct.
Guanine is a nitrogenous base. Thus, option (3) is incorrect.
Guanosine is a nucleoside. Thus, option (4) is incorrect.

Question2

Ligases is a class of enzymes responsible for catalysing the linking together of two compounds.

Which of the following bonds is not catalysed by it?

[NEET 2024 Re]

Options:

A.

C − C

B.

P − O

C.

C − O

D.

C − N

Answer: A

Solution:

Option (1) is the correct answer because, ligases are the enzymes that catalyse the linking together of 2 compounds, e.g., enzymes which catalyse joining of C − O, C − S, C − N, P − O etc. bonds.

⇒ Options (2), (3) and (4) are wrong as ligase catalyse the joining of P − O, C − O & C − N bonds.

Question3

Which of the following are not fatty acids?
A. Glutamic acid
B. Arachidonic acid
C. Palmitic acid
D. Lecithin
E. Aspartic acid

Choose the correct answer from the options given below :

[NEET 2024 Re]

Options:

A.

C, D and E only

B.

A and B only

C.

A, D and E only

D.

B and C only

Answer: C

Solution:

Option (3) is the correct answer because glutamic acid and aspartic acid are amino acids while lecithin is a phospholipid. Palmitic acid and arachidonic acid are fatty acids.

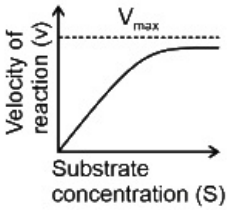
Question4

Which of the following graphs depicts the effect of substrate concentration on velocity of enzyme catalysed reaction?

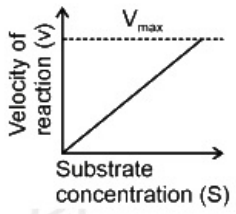
[NEET 2024 Re]

Options:

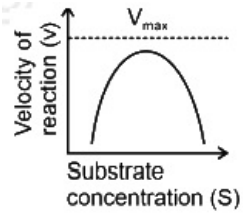
A.



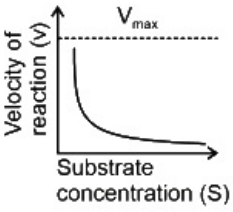
B.



C.



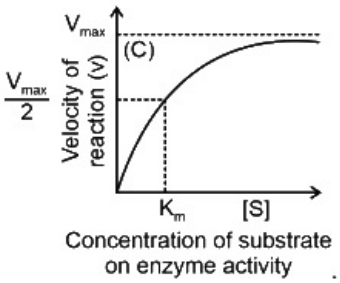
D.



Answer: A

Solution:

Option (1) is the correct answer because with the increase in substrate concentration, the velocity of enzymatic reaction rises at first. The reaction ultimately reaches maximum velocity (V_{max}.) which is not exceeded by anyfurther rise in concentration of the substrate. This is because the enzyme molecules are fewer than substrate molecules and after saturation of these molecules, there are no free enzyme molecules to bind the additional substrate molecules



Option (2) is incorrect as velocity of reaction is continuously increasing in the given graph.

In option (3) after reaching at V_{max}, velocity declines while in option (4) velocity of reaction declines from high on increasing substrate concentration. So, option (3) and (4) are incorrect.

Question5

Enzymes that catalyse the removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds, are known as :

[NEET 2024 Re]

Options:

A.

Transferases

B.

Oxidoreductases

C.

Dehydrogenases

D.

Lyases

Answer: D

Solution:

The correct answer is option (4) because lyases are group of enzymes that catalyse the removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds.
Option (1) is incorrect because transferases are enzymes catalysing a transfer of a group G (other than hydrogen) between a pair of substrate S and S′ .
Option (2) is incorrect because oxidoreductases are enzymes which catalyse oxidoreduction between two substrates S and S′.
Option (3) is incorrect because dehydrogenases are also known as oxidoreductases.

Question6

Match List-I with List-II.

	List-I		List-II
A.	Primary structure of protein	I	Human haemoglobin
B.	Secondary structure of protein	II	Disulphide bonds
C.	Tertiary structure of protein	III	Polypeptide chain
D.	Quaternary structure of protein	IV	Alpha helix and β sheet

Choose the correct answer from the options given below :

[NEET 2024 Re]

Options:

A.

A-III, B-IV, C-II, D-I

B.

A-III, B-II, C-I, D-IV

C.

A-I, B-III, C-II, D-IV

D.

A-IV, B-III, C-II, D-I

Answer: A

Solution:

The correct answer is option (1) because

	List-I		List-II
A.	Primary structure of protein	III	Polypeptide chain with positional information of aminoacids
B.	Secondary structure of protein	IV	Alpha helix and β sheet structure
C.	Tertiary structure of protein	II	Hollow woolen ball like structure with hydrogen and disulphide bonds
D.	Quaternary structure of protein	I	Assembly of more than one polypeptides, seen in adult human haemoglobin

Hence, A-III, B-IV, C-II, D-I is the correct match.

Question7

The cofactor of the enzyme carboxypeptidase is:

[NEET 2024]

Options:

A.

Zinc

B.

Niacin

C.

Flavin

D.

Haem

Answer: A

Solution:

The correct answer is option (1) as the cofactor of the enzyme carboxypeptidase is zinc.

Niacin is associated with coenzyme NAD and NADP.

Option (4) is incorrect as haem is the prosthetic group in peroxidase and catalase.

Question8

Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:

[NEET 2024]

Options:

A.

Cofactor inhibition

B.

Feedback inhibition

C.

Competitive inhibition

D.

Enzyme activation

Answer: C

Solution:

Correct answer is option (3) because malonate shows close structural similarity with the substrate and it competes with the substrate for the substrate binding site of the enzyme succinic dehydrogenase.

Option (1), (2) and (4) are incorrect as enzyme activation, co-factor inhibition are not showing structural similarity with substrate.

Question9

Match List-I with List-II

	List-I		List-II
A.	GLUT-4	I.	Hormone
B.	Insulin	II.	Enzyme
C.	Trypsin	III.	Intercellular ground substance
D.	Collagen	IV.	Enables glucose transport into cells

Choose the correct answer from the options given below

[NEET 2024]

Options:

A.

A-IV, B-I, C-II, D-III

B.

A-I, B-II, C-III, D-IV

C.

A-II, B-III, C-IV, D-I

D.

A-III, B-IV, C-I, D-II

Answer: A

Solution:

Correct answer is option (1)

	List-I		List-II
A.	GLUT-4	IV.	Enables glucose transport into cells
B.	Insulin	I.	Hormone
C.	Trypsin	II.	Enzyme
D.	Collagen	III.	Intercellular ground substance

Question10

Match List I with List II :

	List-I		List-II
A.	Cocaine	I.	Effective sedative in surgery
B.	Heroin	II.	Cannabis sativa
C.	Morphine	III.	Erythroxylum
D.	Marijuana	IV.	Papaver somniferum

Choose the correct answer from the options given below:

[NEET 2024]

Options:

A.

A-IV, B-III, C-I, D-II

B.

A-I, B-III, C-II, D-IV

C.

A-II, B-I, C-III, D-IV

D.

A-III, B-IV, C-I, D-II

Answer: D

Solution:

The correct option is (4) as

A. Cocaine – Obtained from plant Erythroxylum coca, stimulating action on CNS.

B. Heroin – Formed by the acetylation of morphine which is obtained from plant Papaver somniferum.

C. Morphine – Obtained from Papaver somniferum, is an effective sedative in surgery.

D. Marijuana – Obtained from Cannabis sativa, produces hallucinogenic effect and affects cardiovascular system of the body.

Question11

Match List I with List II :

	List-I		List-II
A.	Lipase	I.	Peptide bond
B.	Nuclease	II.	Ester bond
C.	Protease	III.	Glycosidic bond
D.	Amylase	IV.	Phosphodiester bond

Choose the correct answer from the options given below :

[NEET 2024]

Options:

A.

A-IV, B-II, C-III, D-I

B.

A-III, B-II, C-I, D-IV

C.

A-II, B-IV, C-I, D-III

D.

A-IV, B-I, C-III, D-II

Answer: C

Solution:

The correct answer is option (3) as

	List-I		List-II
A.	Lipase	-	Digests ester bond found in lipids.
B.	Nuclease	-	Helps in digestion of phosphodiester bonds found in nucleic acids.
C.	Protease	-	Helps in digestion of peptide bond found in proteins.
D.	Amylase	-	Digests/breaks the glycosidic bonds found in carbohydrates i.e., digest starch into smaller molecules, ultimately yielding maltose, which in turn is cleaved into two glucose molecules by maltase.

Question12

Regarding catalytic cycle of an enzyme action, select the correct sequential steps :
A. Substrate enzyme complex formation.
B. Free enzyme ready to bind with another substrate.
C. Release of products.
D. Chemical bonds of the substrate broken.
E. Substrate binding to active site.

Choose the correct answer from the options given below :

[NEET 2024]

Options:

A.

E, A, D, C, B

B.

A, E, B, D, C

C.

B, A, C, D, E

D.

E, D, C, B, A

Answer: A

Solution:

The correct answer is option (1) which is E, A, D, C, B.

The catalytic cycle of an enzyme action can be described in the following steps.

(1) First, the substrate binds to the active site of the enzyme, fitting into the active site.

(2) The binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate.

(3) The active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme-product complex is formed.

(4) The enzyme releases the products of the reaction and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle once again.

Options (2), (3) and (4) are incorrect as the steps mentioned are in the wrong sequence.

Question13

Cellulose does not form blue colour with Iodine because

[NEET 2023]

Options:

A.

It is a helical molecule

B.

It does not contain complex helices and hence cannot hold iodine molecules

C.

It breakes down when iodine reacts with it

D.

It is a disaccharide

Answer: B

Solution:

Solution:

Option (2) is the correct answer because cellulose does not contain complex helices and hence cannot hold iodine molecules.

Option (1), (3) and (4) are not correct as cellulose is a polysaccharide.

Question14

Melonate inhibits the growth of pathogenic bacteria by inhibiting the activity of

[NEET 2023]

Options:

A.

Amylase

B.

Lipase

C.

Dinitrogenase

D.

Succinic dehydrogenase

Answer: D

Solution:

Solution:

Option (4) is correct answer of this question because malonate is a competitive inhibitor of enzyme succinate dehydrogenase.

Inhibition of succinic dehydrogenase by malonate occurs due to close resemblance of malonate with substrate succinate in structure. Competitive inhibitors are often used in the control of bacterial pathogens.

Question15

Given below are two statements :
Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.
Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.
In the light of the above statements, choose the correct answer from the options given below :

[NEET 2023]

Options:

A.

Both Statement I and Statement II are false.

B.

Statement I is true but Statement II is flase.

C.

Statement I is false but Statement II is true.

D.

Both Statement I and Statement II are true.

Answer: D

Solution:

Solution:

The correct answer is option (4) as low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

Competitive inhibitor due to its close structural similarity with the substrate, competes with the substrate for the substrate-binding site of the enzyme.

Question16

Given below are two statements:
Statement I: A protein is imagined as a line, the left end represented by first amino acid (C-terminal) and the right end represented by last amino acid (N-terminal).
Statement II: Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits of β type.)
In the light of the above statements, choose the correct answer from the options given below

[NEET 2023]

Options:

A.

Both Statement I and Statement II are false.

B.

Statement I is true but Statement II is false.

C.

Statement I is false but Statement II is true.

D.

Both Statement I and Statement II are true

Answer: C

Solution:

Solution:

The correct answer is option (3) as a protein is imagined as a line, the left end represented by the first amino acid and the right end is represented by the last amino acid. The first amino acid is also called N-terminal amino acid. The last amino acid is called the C-terminal amino acid.

Question17

Match List-I with List-II

	List - I		List - II
(A)	Protein	(I)	C=C double bonds
(B)	Unsaturated fatty acid	(II)	Phosphodiester bond
(C)	Nucleic acid	(III)	Glycosidic bonds
(D)	Polysaccharide	(IV)	Peptide bonds

Choose the correct answer from the options given below :

[NEET 2023 mpr]

Options:

A.

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

B.

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

C.

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

D.

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

Answer: C

Solution:

The correct matchings are :
(A) Protein - This is a polymer made up of amino acids linked by peptide bonds. So, (A) matches with (IV) Peptide bonds.
(B) Unsaturated fatty acid - These have one or more C=C double bonds in their hydrocarbon chain. So, (B) matches with (I) C=C double bonds.
(C) Nucleic acid - These are polymers made up of nucleotides linked by phosphodiester bonds. So, (C) matches with (II) Phosphodiester bond.
(D) Polysaccharide - These are polymers made up of monosaccharides linked by glycosidic bonds. So, (D) matches with (III) Glycosidic bonds.

So, the correct answer is Option C : (A)-(IV), (B)-(I), (C)-(II), (D)-(III).

Question18

Inulin is a polymer of :

[NEET 2023 mpr]

Options:

A.

Fructose

B.

Galactose

C.

Amino acids

D.

Glucose

Answer: A

Solution:

Inulin is a polymer of fructose. Therefore, the correct answer is Option A : Fructose.

Question19

Which of the following is not a secondary metabolite?

[NEET 2023 mpr]

Options:

A.

Curcumin

B.

Morphine

C.

Anthocyanin

D.

Lecithin

Answer: D

Solution:

Secondary metabolites are organic compounds produced by organisms that are not directly involved in the normal growth, development, or reproduction of the organism. Examples include antibiotics, pigments, and toxins.

Curcumin, morphine, and anthocyanin are all examples of secondary metabolites.

Lecithin, however, is a type of phospholipid, which is a primary metabolite as it is directly involved in the normal growth and development of cells by being a key component of cell membranes.

Question20

List-I	List-II
(a) Adenine	(i) Pigment
(b) Anthocyanin	(ii) Polysaccharide
(c) Chitin	(iii) Alkaloid
(d) Codeine	(iv) Purine

Choose the correct answer from the options given below . [NEET Re-2022]

Options:

A. (a) - (i), (b) - (iv), (c) - (iii), (d) - (ii)

B. (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

C. (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

D. (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

Answer: B

Solution:

Solution:

Adenine: Purine (double ringed structure) found in both DNA and RNA)

Anthocyanin Pigment (secondary metabolite)

Chitin Homopolysaccharide of mathrmN-acetylglucosamine found in fungal cell wall and exoskeleton of Arthropods

Codeine Alkaloid (secondary metabolite)

Question21

Primary proteins are also called as polypeptides because: [NEET Re-2022]

Options:

A. They can assume many conformations

B. They are linear chains

C. They are polymers of peptide monomers

D. Successive amino acids are joined by peptide bonds

Answer: D

Solution:

Primary proteins are the linear chains of amino acids, joined by peptide bonds.

Question22

Given below are two statements : Statement I : Amino acids have a property of ionizable nature of — NH2 and — COOH groups, hence have different structures at different pH. Statement II : Amino acids can exist as Zwitterionic form at acidic and basic pH. In the Light of the above statements, choose the most appropriate answer from the options given below : [NEET Re-2022]

Options:

A. Statement I is incorrect but Statement II is correct

B. Both Statement I and Statement II are correct

C. Both Statement I and Statement II are incorrect

D. Statement I is correct but Statement II is incorrect

Answer: B

Solution:

Solution:

Statement I :Correct

Statement ll: Correct, Zwitterion formation takes place at isoelectric point that can be at acidic or basic pH.

Question23

In the enzyme which catalyses the breakdown of: $H_2O_2 \rightarrow H_2O + O_2$ the prosthetic group is: [NEET Re-2022]

Options:

A. Niacin

B. Nicotinamide adenine dinucleotide

C. Haem

D. Zinc

Answer: C

Solution:

Peroxidase and catalase enzymes catalyze the breakdown of Hydrogen peroxide to water and oxygen, Haem is the prosthetic group.

Question24

Read the following statements on lipids and find out correct set of statements:
(a) Lecithin found in the plasma membrane is a glycolipid
(b) Saturated fatty acids possess one or more c = c bonds
(c) Gingely oil has lower melting point, hence remains as oil in winter
(d) Lipids are generally insoluble in water but soluble in some organic solvents
(e) When fatty acid is esterified with glycerol, monoglycerides are formed
Choose the correct answer from the option given below:
[NEET-2022]

Options:

A. (a), (b) and (c) only

B. (a), (d) and (e) only

C. (c), (d) and (e) only

D. (a), (b) and (d) only

Answer: C

Solution:

Solution:

Option (3) is the correct answer because statements (c), (d) and (e) are correct as oils have lower melting point and hence remain oil in winters. Lipids are generally insoluble in water but soluble in some organic solvents.

Option (1), (2) and (4) are incorrect because statements (a) and (b) are incorrect. Lecithin is a type of phospholipid found in plasma membrane. Saturated fatty acids are without double bond.

Question25

A dehydration reaction links two glucose molecules to product maltose. If the formula for glucose is $C_6H_{12}O_6$ then what is the formula for maltose?
[NEET-2022]

Options:

A. $C_{12}H_{20}O_{10}$

B. $C_{12}H_{24}O_{12}$

C. $C_{12}H_{22}O_{11}$

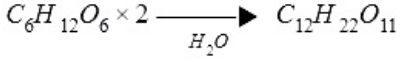
D. $C_{12}H_{24}O_{11}$

Answer: C

Solution:

Solution:

Option (3) is correct because maltose is a disaccharide formed by dehydration process i.e., synthesis by elimination of one water molecule to form a glycosidic bond in between two glucose molecules. So, its molecular formula is.



Question26

Which of the following are not secondary metabolites in plants? [NEET 2021]

Options:

A. Morphine, codeine

B. Amino acids, glucose

C. Vinblastin, curcumin

D. Rubber, gums

Answer: B

Solution:

Solution:
The correct option is (2)
• Amino acids and glucose are included under the category of primary metabolites as they have identifiable functions and play known roles in normal physiological processes.
• Rubber, gums, morphine, codeine, vinblastin and curcumin are included under the category of secondary metabolites as their role or functions in host organisms is not known yet. However, many of them are useful to human welfare.

Question27

Match List-I with List-II.

	List-I		List-II
(a)	Protein	(i)	$C = C$ double bonds
(b)	Unsaturated fatty acid	(ii)	Phosphodiester bonds
(c)	Nucleic acid	(iii)	Glycosidic bonds
(d)	Polysaccharide	(iv)	Peptide bonds

Choose the correct answer from the options given below.
[NEET 2021]

Options:

A. (a)-(iv) (b)-(i) (c)-(ii) (d)-(iii)

B. (a)-(i) (b)-(iv) (c)-(iii) (d)-(ii)

C. (a)-(ii) (b)-(i) (c)-(iv) (d)-(iii)

D. (a)-(iv) (b)-(iii) (c)-(i) (d)-(ii)

Answer: A

Solution:

Solution:
• In a polypeptide or a protein, amino acids are linked by a peptide bond which is formed when the carboxyl (–COOH) group of one amino acid reacts with amino (– NH_2) group of the next amino acid with the elimination of a water moiety.
• Unsaturated fatty acids are with one or more C = C double bonds.
• In nucleic acids, a phosphate moiety links the 3′-carbon of one sugar of one nucleotide to the 5′-carbon of the sugar of the succeeding nucleotide. The bond between the phosphate and hydroxyl group is an ester bond. As there is one such ester bond on either side, it is called phosphodiester bond.
• In a polysaccharide, the individual monosaccharides are linked by a glycosidic bond.

Question28

Following are the statements with reference to 'lipids'.
(a) Lipids having only single bonds are called unsaturated fatty acids
(b) Lecithin is a phospholipid.
(c) Trihydroxy propane is glycerol.
(d) Palmitic acid has 20 carbon atoms including carboxyl carbon.
(e) Arachidonic acid has 16 carbon atoms.
Choose the correct answer from the options given below.
[NEET 2021]

Options:

A. (a) and (b) only

B. (c) and (d) only

C. (b) and (c) only

D. (b) and (e) only

Answer: C

Solution:

● The correct option is (3) because lipids having only single bonds are called saturated fatty acids and lipids having one or more C = C double bonds are called unsaturated fatty acids.
● Palmitic acid has 16 carbon atoms including carboxyl carbon.
● Arachidonic acid has 20 carbon atoms including the carboxyl carbon.
● Lecithin is a phospholipid found in cell membrane.
● Glycerol has 3 carbons, each bearing a hydroxyl (–OH) group.

Question29

Identify the substances having glycosidic bond and peptide bond, respectively in their structure [2020]

Options:

A. Glycerol, trypsin

B. Cellulose, lecithin

C. Inulin, insulin

D. Chitin, cholesterol

Answer: C

Solution:

Solution:
(c) Inulin is a mixture of linear fructose polymers with different chain length and a glucose molecule at each C2 end. Adjacent fructose units are linked through glycosidic bond. The inulin that is used for medicine is most commonly obtained by soaking chicory roots in hot water.
Insulin is a protein composed of 51 amino acids and acts as a hormone which is secreted by beta-cells of pancreas. Adjacent amino acids are attached through peptide bond.
Insulin is the first protein which is sequenced by Fredrick Sanger. He was awarded the 1958 Nobel Prize for Chemistry.
Inulin is commonly used by mouth for high blood fats, including cholesterol and triglycerides and is also used for weight loss, constipation, diarrhea, and diabetes.

Question30

Match the following

(a) Inhibitor of	(i) Ricin catalytic activity
(b) Possess peptide	(ii) Malonate bonds
(c) Cell wall material	(iii) Chitin in fungi
(d) Secondary	(iv) Collagen metabolite

	(a)	(B)	(C)	(D)
(a)	(iii)	(i)	(iv)	(ii)
(b)	(iii)	(iv)	(i)	(ii)
(c)	(ii)	(iii)	(i)	(iv)
(d)	(ii)	(iv)	(iii)	(i)

[2020]

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: D

Solution:

Solution:
(d) is the correct answer because malonate is the competitive inhibitor of catalytic activity of succinic dehydrogenase, Collagen is proteinaceous in nature and possesses peptide bonds, Chitin is a homopolymer present in the cell wall of fungi and exoskeleton of arthropods, Abrin and Ricin are toxins, secondary metabolites.

Question31

“Ramachandran plot” is used to confirm the structure of
[OD NEET 2019]

Options:

A. DNA

B. RNA

C. Proteins

D. Triacylglycerides

Answer: C

Solution:

(c) A Ramachandran plot, is a way to visualise energetically allowed regions for backbone dihedral angles y against f of amino acid residues to protein structure. It is used to analyse the structure of a protein, the conformation of the amino acids present in the protein and close contacts between the atoms.

Question32

Purines found both in DNA and RNA are:
[2019]

Options:

A. Adenine and thymine

B. Adenine and guanine

C. Guanine and cytosine

D. Cytosine and thymine

Answer: B

Solution:

Solution:
(b) Purines, a heterocyclic compound, such as adenine and guanine are found both in DNA and RNA.

Question33

Prosthetic groups differ from co-enzymes in that-
[OD NEET 2019]

Options:

A. They can serve as co-factors in a number of enzyme - catalysed reactions.

B. They require metal ions for their activity.

C. They (prosthetic groups) are tightly bound to apoenzymes.

D. Their association with apoenzymes is transient.

Answer: C

Solution:

(c) Prosthetic groups are non-peptide (non-protein) compounds that mostly attach to proteins and assist them in different ways. They can be inorganic (like metals) or organic (carbon-containing). Prosthetic groups are tightly bound to the apoenzyme but coenzymes associated with the apoenzyme last for a short period of time i.e. transiently

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Question34

Which of the following glucose transporters is insulin-dependent? [2019]

Options:

A. GLUT I

B. GLUT II

C. GLUT III

D. GLUT IV

Answer: D

Solution:

Solution:
GLUT-IV glucose transporter is insulin dependent and is responsible for majority of glucose transport into muscle and adipose cells in anabolic conditions. Whereas GLUT-I is insulin independent and is widely distributed in different tissues.

Question35

Consider the following statements:
a) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group.
b) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme.
Select the correct option.
[2019]

Options:

A. Both (a) and (B) are true.

B. (a) is true but (B) is false.

C. Both (a) and (B) are false.

D. (a) is false but (B) is true.

Answer: B

Solution:

Solution:
(b) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group. A complete catalytic active enzyme with its bound prosthetic group is called holoenzyme A
protein that forms an active enzyme system by combination with a coenzyme and determines the specificity of this system for a substrate is called apoenzyme

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Question36

The two functional groups characteristic of sugars are [2018]

Options:

A. Hydroxyl and methyl

B. Carbonyl and methyl

C. Carbonyl and hydroxyl

D. Carbonyl and phosphate

Answer: C

Solution:

Solution:
(c) Sugar is a carbohydrate. These are polyhydroxy aldehyde, ketone or their derivatives, which means they have carbonyl and hydroxyl groups in its structure

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Question37

Which of the following statements is correct with reference to enzymes? (NEET 2017)

Options:

A. Holoenzyme = Apoenzyme + Coenzyme

B. Coenzyme = Apoenzyme + Holoenzyme

C. Holoenzyme = Coenzyme + Co-factor

D. Apoenzyme = Holoenzyme + Coenzyme

Answer: A

Solution:

Solution:
(a) : Holoenzyme is the complete conjugate enzyme consisting of an apoenzyme and a cofactor. Cofactor may be organic or inorganic in nature. Organic cofactors are of two types-coenzyme and prosthetic group.

Question38

Which of the following are not polymeric? (NEET 2017)

Options:

A. Proteins

B. Polysaccharides

C. Lipids

D. Nucleic acids

Answer: C

Solution:

Solution:
(c) : Lipids are fatty acids esters of alcohols and related substances. Polysaccharides are polymers of monosaccharides. Proteins are polymers of amino acids and nucleic acids are polymer of nucleotides.

Question39

A non-proteinaceous enzyme is (NEET II 2016)

Options:

A. lysozyme

B. ribozyme

C. ligase

D. deoxyribonuclease.

Answer: B

Solution:

(b) : A ribozyme is a ribonucleic acid (RNA) enzyme that catalyses a chemical reaction in a similar way to that of a protein enzyme. These are found in ribosomes and are also called catalytic RNAs.

Question40

Which of the following is the least likely to be involved in stabilising the three-dimensional folding of most proteins?
(NEET II 2016)

Options:

A. Hydrogen bonds

B. Electrostatic interaction

C. Hydrophobic interaction

D. Ester bonds

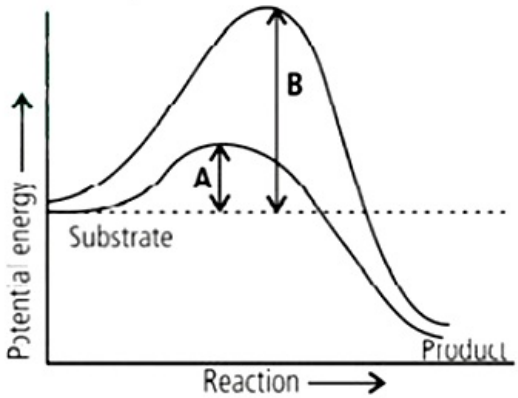
Answer: D

Solution:

Solution:
(d) : Tertiary structure or three dimensional structure of protein is stabilised by several types of bonds - hydrogen bonds, ionic bonds, van der Waal's interactions, covalent bonds and hydrophobic bonds.

Question41

Which of the following describes the given graph correctly?



(NEET II 2016)

Options:

A. Endothermic reaction with energy A in presence of enzyme and B in absence of enzyme.

B. Exothermic reaction with energy A in presence of enzyme and B in absence of enzyme.

C. Endothermic reaction with energy A in absence of enzyme and B in presence of enzyme.

D. Exothermic reaction with energy A in absence of enzyme and B in presence of enzyme.

Answer: B

Question42

A typical fat molecule is made up of (NEET I 2016)

Options:

A. one glycerol and one fatty acid molecule

B. three glycerol and three fatty acid molecules

C. three glycerol molecules and one fatty acid molecule

D. one glycerol and three fatty acid molecules.

Answer: D

Solution:

Solution:
(d) : Neutral or true fats are triglycerides which are formed by esterification of three molecules of fatty acids with one molecule of trihydric alcohol, glycerol (glycerine or trihydroxy propane).

Question43

Which one of the following statements is wrong? (NEET I 2016)

Options:

A. Uracil is a pyrimidine.

B. Glycine is a sulphur containing amino acid.

C. Sucrose is a disaccharide.

D. Cellulose is a polysaccharide.

Answer: B

Solution:

(b) : Glycine is a neutral amino acid. Cysteine and methionine are sulphur containing amino acid.

Question44

The chitinous exoskeleton of arthropods is formed by the polymerisation of
(2015)

Options:

A. N - acetyl glucosamine

B. lipoglycans

C. keratin sulphate and chondroitin sulphate

D. D - glucosamine.

Answer: A

Solution:

Solution:
(a) : Chitin is a structural polysaccharide that constitutes the exoskeleton of arthropods. It is a complex carbohydrate in which N -acetyl glucosamine monomers are joined together by (1,4) β-linkages. Chitinous exoskeleton provides strength and elasticity to arthropods.

Question45

Which of the following biomolecules does have a phosphodiester bond?
(2015)

Options:

A. Amino acids in a polypeptide

B. Nucleic acids in a nucleotide

C. Fatty acids in a diglyceride

D. Monosaccharides in a polysaccharide

Answer: B

Question46

Which one of the following statements is incorrect? (2015 Cancelled)

Options:

A. The competitive inhibitor does not affect the rate of breakdown of the enzyme-substrate complex.

B. The presence of the competitive inhibitor decreases the K_m of the enzyme for the substrate.

C. A competitive inhibitor reacts reversibly with the enzyme to form an enzyme inhibitor complex.

D. In competitive inhibition, the inhibitor molecule is not chemically changed by theenzyme.

Answer: B

Solution:

Solution:
(b): Competitive inhibition is a reversible inhibition where inhibitor competes with the normal substrate for the active site of enzyme. A competitive inhibitor is usually chemically similar to the normal substrate and therefore, fits into the active site of an enzyme and binds with it. The inhibition is thus due to substrate analogue. The enzyme, now cannot act upon the substrate and reaction products are not formed. E.g., the activity of succinate dehydrogenase is inhibited by malonate. K_m value or Michaelis constant is defined as the substrate concentration at which half of the enzyme molecules are forming enzyme substrate (ES) complex, or concentration of the substrate when the velocity of the enzyme reaction is half the maximal possible. A smaller K_m value indicates greater affinity of the enzyme for its substrate, hence, shows a quicker reaction. The competitive inhibitor decreases the affinity of enzyme for substrate, thus increases the K_m value.

Question47

Select the option which is not correct with respect to enzyme action. (2014)

Options:

A. Substrate binds with enzyme at its active site.

B. Addition of lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate.

C. A non-competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate.

D. Malonate is a competitive inhibitor of succinic dehydrogenase.

Answer: B

Solution:

(b) : The reduction of activity of succinate dehydrogenase by malonate is an example of competitive inhibition. Competitive inhibition is a reversible inhibition where inhibitor competes with the normal substrate for the active site of enzyme. A competitive inhibitor is usually similar to the normal substrate and, therefore, fits into the active site of an enzyme and binds with it. The enzyme, now cannot act upon the substrate and reaction products are not formed. Hence, action of an enzyme may be reduced or inhibited. since a competitive inhibitor occupies the site only temporarily, the enzyme action is not permanently affected. Thus, addition of a lot of succinate can reverse the inhibition of succinic dehydrogenase by malonate.

Question48

Which one of the following is a non - reducing carbohydrate? (2014)

Options:

A. Maltose

B. Sucrose

C. Lactose

D. Ribose 5 -phosphate

Answer: B

Solution:

Solution:
(b) : In non-reducing sugars, a free aldehyde or ketonic group is absent. Sucrose is a non-reducing sugar formed by condensation of one molecule each of glucose and fructose with release of a water molecule. A glycosidic bond is established between carbon atom 1 of glucose and carbon atom 2 of fructose.

Question49

A phosphoglyceride is always made up of (NEET 2013)

Options:

A. a saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached.

B. a saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule.

C. only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached.

D. only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached.

Answer: A

Solution:

(a) : Phosphoglycerides are the triesters of fatty acids (either saturated or unsaturated) and glycerol to which a phosphate group is also attached.

Question50

Macromolecule chitin is
(NEET 2013)

Options:

A. sulphur containing polysaccharide

B. simple polysaccharide

C. nitrogen containing polysaccharide

D. phosphorous containing polysaccharide.

Answer: C

Solution:

Solution:
(c) : Chitin is a structural polysaccharide that constitutes the exoskeleton of arthropods. It is a complex carbohydrate in which N -acetyl glucosamine monomers are joined together by (1,4) β-linkages. Chitinous exoskeleton provides strength and elasticity to arthropods.

Question51

Transition state structure of the substrate formed during an enzymatic reaction is
(NEET 2013)

Options:

A. transient and unstable

B. permanent and stable

C. transient but stable

D. permanent but unstable.

Answer: A

Solution:

(a) : Transition state is formation of unstable intermediate structural state. During this, substrate bonds are broken and new bonds are established that transform the substrate molecules into products. This state is transient and highly unstable.

Question52

The essential chemical components of many coenzymes are (NEET 2013)

Options:

A. carbohydrates

B. vitamins

C. proteins

D. nucleic acids.

Answer: B

Solution:

Solution:
(b) : Coenzyme is the non protein organic group which gets attached to the apoenzyme to form holoenzyme or conjugate enzyme. It helps in removing a product of chemical reaction besides bringing contact between the substrate and the enzyme. Most of the coenzymes are made of water soluble vitamins B and C, e. g., thiamine, riboflavin, nicotinamide, pyridoxine.

Question53

Which of the following statements about enzymes is wrong? (KN NEET 2013)

Options:

A. Enzymes are denatured at high temperatures.

B. Enzymes are mostly proteins but some are lipids also.

C. Enzymes are highly specific.

D. Enzymes require optimum pH and temperature for maximum activity.

Answer: B

Solution:

(b) : Enzymes are mostly proteins but some are RNA (ribozymes). No lipid working as enzymes are known.

Question54

Uridine, present only in RNA is a (KN NEET 2013)

Options:

A. nucleoside

B. nucleotide

C. purine

D. pyrimidine.

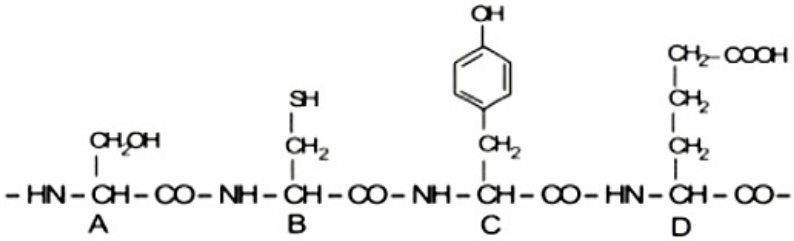
Answer: A

Solution:

Solution:
(a) : The combination of pentose sugar with nitrogenous bases (purines or pyrimidines) is called nucleoside. Examples are adenosine, guanosine, cytidine, thymidine and uridine.

Question55

The figure shows a hypothetical tetrapeptide portion of a protein with parts labelled A -D. Which one of the following options is correct?



(KN NEET 2013)

Options:

A. D is the acidic amino acid-glutamic acid.

B. C is an aromatic amino acid-tryptophan.

C. A is the C-terminal amino acid and D is N-terminal amino acid.

D. A is a sulphur containing amino acid methionine.

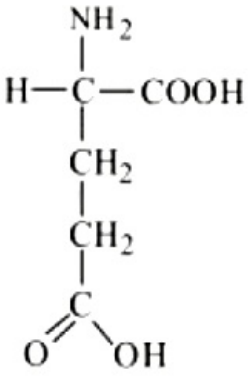
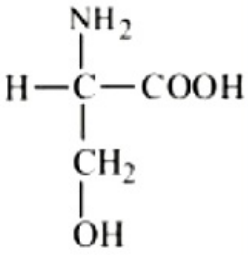
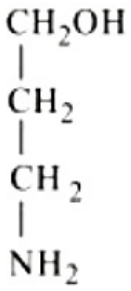
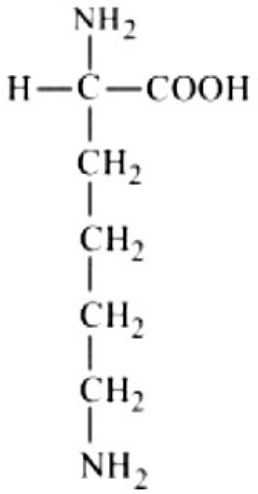
Answer: A

Solution:

(a) Glutamic acid and aspartic acid are acidic amino acids with two carboxylic groups and one amino group.

Question56

Which one out of A − D given below correctly represents the structural formula of the basic amino acid?

A	B	C	D
			

(2012)

Options:

A. C

B. D

C. A

D. B

Answer: B

Solution:

(b) : Basic amino acids have an additional amino group without forming amides thus they are diamino monocarboxylic acids e.g., arginine, lysine, etc.

Question57

Which one is the most abundant protein in the animal world? (2012)

Options:

A. Trypsin

B. Haemoglobin

C. Collagen

D. Insulin

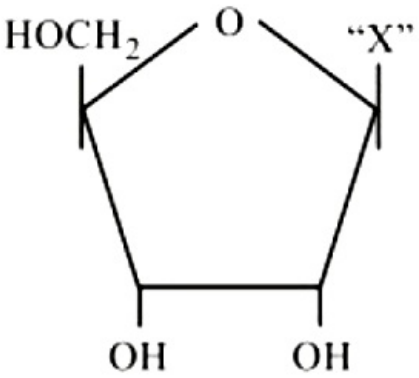
Answer: C

Solution:

(c) : Collagen is an insoluble fibrous protein found extensively in the connective tissue of skin, tendons and bone. Collagen accounts for over 30% of the total body proteins of mammals and it is the most abundant animal protein.

Question58

The given diagrammatic representation shows one of the categories of small molecular weight organic compounds in the living tissues. Identify the category shown and the one blank component "X" in it.



	Category	Component
(a)	Cholesterol	Guanine
(b)	Amino acid	NH_2
(c)	Nucleotide	Adenine
(d)	Nucleoside	Uracil

(2012)

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: D

Solution:

Solution:
(d) : The given structure corresponds with the structure of ribose sugar. As it lacks a phosphoric acid hence it can be a nucleoside not a nucleotide.

Question59

Which one of the following is wrong statement? (2012)

Options:

A. Anabaena and Nostoc are capable of fixing nitrogen in free-living state also.

B. Root nodule forming nitrogen fixers live as aerobes under free-living conditions.

C. Phosphorus is a constituent of cell membranes, certain nucleic acids and all proteins.

D. Nitrosomonas and Nitrobacter are chemoautotrophs

Answer: C

Solution:

(c) : Phosphorus is present in plasma membrane in the form of phospholipid bilayer. It is an essential component of all nucleic acids not 'certain' nucleic acids. Moreover, phosphorus is never found in proteins.

Question60

Which one of the following biomolecules is correctly characterized? (Mains 2012)

Options:

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.

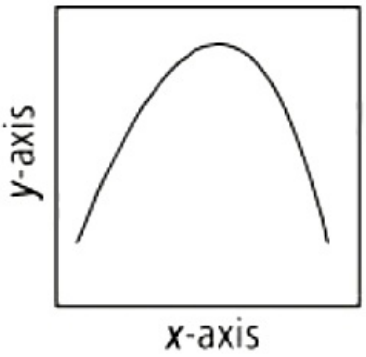
Answer: A

Solution:

(a) Palmitic acid is one of the most common, saturated fatty acids found in animals and plants. It has 16 carbons including the carboxyl carbon. Adenylic acid is a nucleotide consisting of adenine, ribose or deoxyribose, and a phosphate group. It is a constituent of DNA or RNA. It is also called adenosine monophosphate. Amino acids are organic acids (with carboxylic group COOH) having amino group ($-\mathrm{NH_2}$) generally attached to Carbon or carbon next to carboxylic group. The carbon also bears a variable alkyl group (R) or hydrogen or hydrocarbon. In alanine (R) is represented by methyl group.

Question61

The curve given below shows enzymatic activity in relation to three conditions (pH , temperature and substrate concentration). What do the two axes (x and y) represent?



	x -axis	y -axis
(a)	enzymatic activity	pH
(b)	temperature	enzyme activity
(c)	substrate concentration	enzymatic activity
(d)	enzymatic activity	temperature

(2011)

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: B

Solution:

Solution:
(b) : Enzymes generally function in a narrow range of temperature and pH. Each enzyme shows its highest activity at a particular temperature and pH called the optimum temperature and optimum pH. Activity declines both below and above the optimum values. X-axis always represents temperature or pH and Y axis represents enzyme activity.

Question62

Which one of the following structural formulae of two organic compounds is correctly identified along with its related function? (2011)

Options:

A. B : Adenine -A nucleotide that makes up nucleic acids

B. A : Triglyceride - Major source of energy

C. B : Uracil - A component of DNA

D. A : Lecithin- A component of cell membrane

Answer: D

Solution:

Solution:
(d) : 'A' is a structural formula of lecithin. It is probably the most common phospholipid. Phospholipids are major components in the lipid bilayers of cell membrane.

Question63

Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?
(Mains 2010)

Options:

A. Enzymes require optimum pH for maximal activity.

B. Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures $80^{circ} - 90^{circ}$ mathrm C

C. Enzymes are highly specific.

D. Most enzymes are proteins but some are lipids.

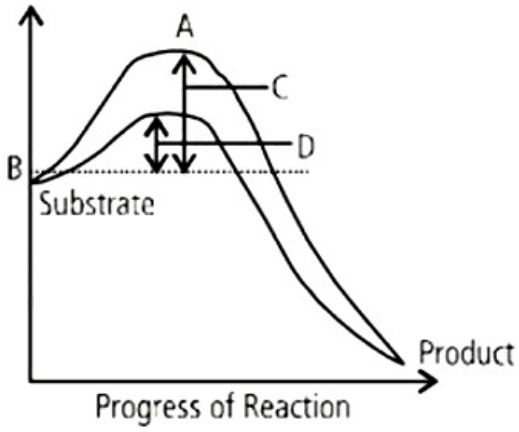
Answer: D

Solution:

Solution:
(d) : Enzymes are mostly proteins but some are RNA (ribozymes). No lipid working as enzymes are known.

Question64

The figure given below shows the conversion of a substate into product by an enzyme. In which one of the four options (a-d) the components of reaction labelled as A, B, C and D are identified correctly?



	A	B	C	D
(a)	Potential energy	Transition state	Activation energy with enzyme	Activation energy without enzyme
(b)	Transition state	potential energy	Activation energy without enzyme	Activation energy with enzyme
(c)	Potential energy	Transition state	Activation energy with enzyme	Activation energy without enzyme
(d)	Activation energy wit enzyme	Transition state	Activation energy without enzyme	Potential energy

(Mains 2010)

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: B

Question65

Carbohydrates are commonly found as starch in plants storage organs. Which of the following five properties of starch (1-5) make it useful as a storage material?
(1) Easily translocated

(2) Chemically non-reactive
(3) Easily digested by animals
(4) Osmotically inactive
(5) Synthesized during photosynthesis
The useful properties are
(2008)

Options:

A. (1),(3) and (5)

B. (1) and (5)

C. (2) and (3)

D. (2) and (4)

Answer: D

Solution:

Solution:
(d) : Starch is the major storage carbohydrate of plants. In most plant species it is accumulated in the chloroplast of leaves, whereas in storage organ it accumulates in amyloplast as reserve starch. It is the osmotically inactive form of photosynthetic product and is a hexosan polysaccharide made of large number of glucose unit so, chemically non reactive.

Question66

Cellulose is the major component of cell walls of
(2008)

Options:

A. Pseudomonas

B. Saccharomyces

C. Pythium

D. Xanthomonas.

Answer: C

Solution:

Solution:
(c) : The cell wall of most fungi consist of chitin or cellulose. In Pythium, the hyphal wall contains cellulose whereas, in yeast the cell wall is thin and is composed of chitin in combination with other compounds (carbohydrates, glucan and mannan). The bacterial cell wall contains N -acetyl glucosamine and N-acetyl muramic acid.

Question67

A competitive inhibitor of succinic dehydrogenase is (2008)

Options:

A. m - ketoglutarate

B. malate

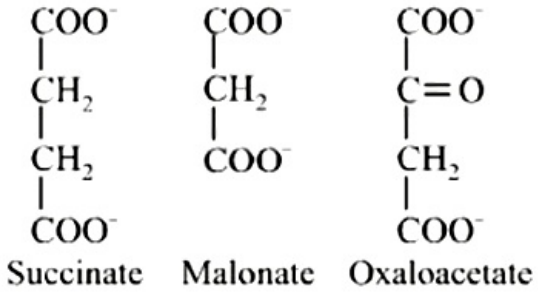
C. malonate

D. oxaloacetate.

Answer: D

Solution:

Solution:
(c, d) Malonate or oxaloacetate, which resemble succinate in structure and inhibit the activity of succinate dehydrogenase. Such competitive inhibitors are often used in control of bacterial pathogen.



Question68

Modern detergents contain enzyme preparations of (2008)

Options:

A. thermoacidophiles

B. thermophiles

C. acidophiles

D. alkaliphiles.

Answer: D

Solution:

(d) : Modern detergents contain enzyme preparation of alkaline protease which are called alkaliphiles, for removing protein stain.

Question69

About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and (2007)

Options:

A. sulphur and magnesium

B. magnesium and sodium

C. calcium and phosphorus

D. phosphorus and sulphur

Answer: D

Solution:

Solution:
(d) : Living organisms requires 6 elements in relatively large amounts. C, H, O, N, P, S. These elements contribute to the structural organization of living organisms.

Question70

An organic substance bound to an enzyme and essential for its activity is called
(2006)

Options:

A. isoenzyme

B. coenzyme

C. holoenzyme

D. apoenzyme.

Answer: B

Solution:

(b) : Enzymes are simple if they are made of only proteins (e.g., pepsin, amylase etc.) while conjugate enzymes have an additional non-protein cofactor which may be organic or inorganic. Loosely attached organic cofactor is coenzyme. It plays an accessory role in enzyme catalyzed processes often by acting as a donor or acceptor of a substance involved in the reaction. ATP and NAD are common coenzymes.

Question71

The catalytic efficiency of two different enzymes can be compared by the (2006)

Options:

A. formation of the product

B. pH of optimum value

C. K_m value

D. molecular size of the enzyme.

Answer: C

Solution:

Solution:
(c) : K_m value or Michaelis constant is defined as the substrate concentration at which half of the enzyme molecules are forming (ES) complex or concentration of the substrate when the velocity of the enzyme reaction is half the maximal possible. The K_m varies from enzyme to enzyme and is used in characterizing the different enzymes. A smaller K value indicates greater affinity of the enzyme for its substrate, hence, shows a quicker reaction. K_m value is a constant characteristic of an enzyme for its conversion of a substrate.

Question72

Which one of the following statements regarding enzyme inhibition is correct?
(2005)

Options:

A. Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein.

B. Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme.

C. Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate.

D. Non-competitive inhibitors often bind to the enzyme irreversibly.

Answer: B

Solution:

(b): Competitive inhibition is a reversible inhibition where inhibitor competes with the normal substrate for the active site of enzyme. A competitive inhibitor is usually chemically similar to the normal substrate and therefore, fits into the active site of an enzyme and binds with it. The inhibition is thus due to substrate analogue. The enzyme, now cannot act upon the substrate and reaction products are not formed. E.g., the activity of succinate dehydrogenase is inhibited by malonate. K_m value or Michaelis constant is defined as the substrate concentration at which half of the enzyme molecules are forming enzyme substrate (ES) complex, or concentration of the substrate when the velocity of the enzyme reaction is half the maximal possible. A smaller K_m value indicates greater affinity of the enzyme for its substrate, hence, shows a quicker reaction. The competitive inhibitor decreases the affinity of enzyme for substrate, thus increases the K_m value.

Question73

Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these
(2005)

Options:

A. help in regulating metabolism

B. are exclusively synthesized in the body of a living organism as at present

C. are conjugated proteins

D. enhance oxidative metabolism.

Answer: A

Solution:

Solution:
(a) : Enzymes control all the life processes. They increase the rate of a biological reaction. The magnitude of increase may be greater than those affected by other catalysts. Vitamins are accessory indispensable food factor, organic in nature (organic acid, amino acid esters, alcohols, steroids etc.) required by an organism in small amounts to maintain normal growth and regulate the metabolic processes. Hormones are biologically active organic substance that are produced in minute quantities by some specialized organs and exert physiological effects at sites remote from their origin.

Question74

Which of the following is the simplest amino acid?
(2005)

Options:

A. Alanine

B. Asparagine

C. Glycine

D. Tyrosine

Answer: C

Solution:

Solution:
(c) : Glycine is considered as the simplest amino acid as it has one amino group, one carboxylic group and no substituent functional group.

Question75

Nucleotides are building blocks of nucleic acids. Each nucleotide is a composite molecule formed by
(2005)

Options:

A. base-sugar-phosphate

B. base-sugar-OH

C. (base-sugar-phosphate) n_n

D. sugar-phosphate.

Answer: A

Solution:

Solution:
(a) : Each nucleotide consists of three distinct units - a phosphate group derived from phosphoric acid, a pentose sugar and a ring shaped nitrogenous base.
Nucleoside + Phosphoric acid + Nucleotide + H_2O

Question76

Carbohydrates, the most abundant biomolecule on earth, are produced by
(2005)

Options:

A. some bacteria, algae and green plant cells

B. fungi, algae and green plant cells

C. all bacteria, fungi and algae

D. viruses, fungi and bacteria.

Answer: A

Solution:

(a) : Carbohydrates are organic compounds synthesized in the chlorophyll containing cells of some bacteria, algae and green plant cells, during photosynthesis. Certain photo-autotrophic bacteria e.g., Green sulphur bacteria and purple sulphur bacteria contain pigments like chlorobium chlorophyll and bacteriochlorophyll respectively that helps them in photosynthesis.

Question77

In which one of the following enzymes, is copper necessarily associated as an activator?
(2004)

Options:

A. Carbonic anhydrase

B. Tryptophanase

C. Lactic dehydrogenase

D. Tyrosinase

Answer: D

Solution:

Solution:
(d) : Copper is associated as an activator with tyrosinase. It is widely distributed in plants, animals and man. It is also known as polyphenol oxidase or catecholase. It oxidizes tyrosine to melanin in mammals and causes the cut surfaces of many fruits and vegetable to darken.

Question78

The major role of minor elements inside living organisms is to act as
(2003)

Options:

A. co-factors of enzymes

B. building blocks of important amino acids

C. constituent of hormones

D. binder of cell structure.

Answer: A

Solution:

(a) : Minor element are those which are required in quantity of less than milligram\/gram of dry matter but they are essential for proper growth and development of an organism e . g., Cl , M n, B, Z n, Cu Mo etc. These elements work as non-protein cofactor in enzymes e . g., Z n, Cu etc. They also take part in oxidation reduction reactions e . g., Cu, with variable valency. Chloride ion enhances activity of salivary amylase. Zinc is required for activity of carbonic anhydrase and alcohol dehydrogenase, etc.

Question79

Lipids are insoluble in water because lipid molecules are (2002)

Options:

A. hydrophilic

B. hydrophobic

C. neutral

D. zwitter ions.

Answer: B

Solution:

Solution:
(b) : Lipid molecules are insoluble or sparingly soluble in water but are freely soluble in organic solvents like ether, alcohol and benzene. Insolubility of lipids in water is due to the fact that the polar groups they contain are much smaller than their nonpolar portions. The nonpolar chains are long complex hydrophobic hydrocarbon chains. If shaken in water lipids often form small droplets or micelles. The complex formed is called emulsions. These non polar proteins give them water repellent or hydrophobic property.

Question80

Which of the following is a reducing sugar? (2002)

Options:

A. Galactose

B. Gluconic acid

C. β -methyl galactoside

D. Sucrose

Answer: A

Solution:

(a) : All those sugars which have free aldehyde or ketone group are called reducing sugars. These are able to reduce cupric ions (Cu^{+2}) into cuprous ions (Cu^{+}). Sucrose, starch are non-reducing sugars.

Question81

Enzyme first used for nitrogen fixation (2001)

Options:

A. nitrogenase

B. nitroreductase

C. transferase

D. transaminase.

Answer: A

Solution:

Solution:
(a) : Nitrogen fixation involves conversion of atmospheric nitrogen to ammonia. It is done with the help of nitrogenase enzyme which occurs inside thick walled heterocysts of the blue green algae. These provide suitable anaerobic environment for nitrogenase activity even in aerobic conditions.

Question82

Role of enzyme in reactions is to/as (2000)

Options:

A. decrease activation energy

B. increase activation energy

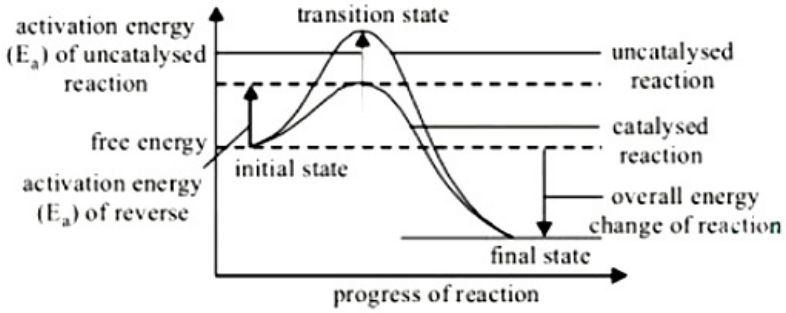
C. inorganic catalyst

D. none of the above.

Answer: A

Solution:

(a) : All molecules require certain amount of energy for activation (to overcome energy barrier) before they can react. This energy is called activation energy. This energy is recovered when products are formed. The essence of an enzyme is its ability to speed up (catalyze) a reaction by making or breaking specific covalent bonds (bonds in which atoms are held together by sharing of electrons). Enzymes act by somehow lowering the temperature at which a given bond is unstable i.e., they speed up a reaction by lowering the activation energy. It is the magnitude of the activation energy which determines how fast the reaction will proceed.



Graph showing energy requirement of catalysed and uncatalysed reactions.

Question83

Which factor is responsible for inhibition of enzymatic process during feedback?
(2000)

Options:

A. Substrate

B. Enzymes

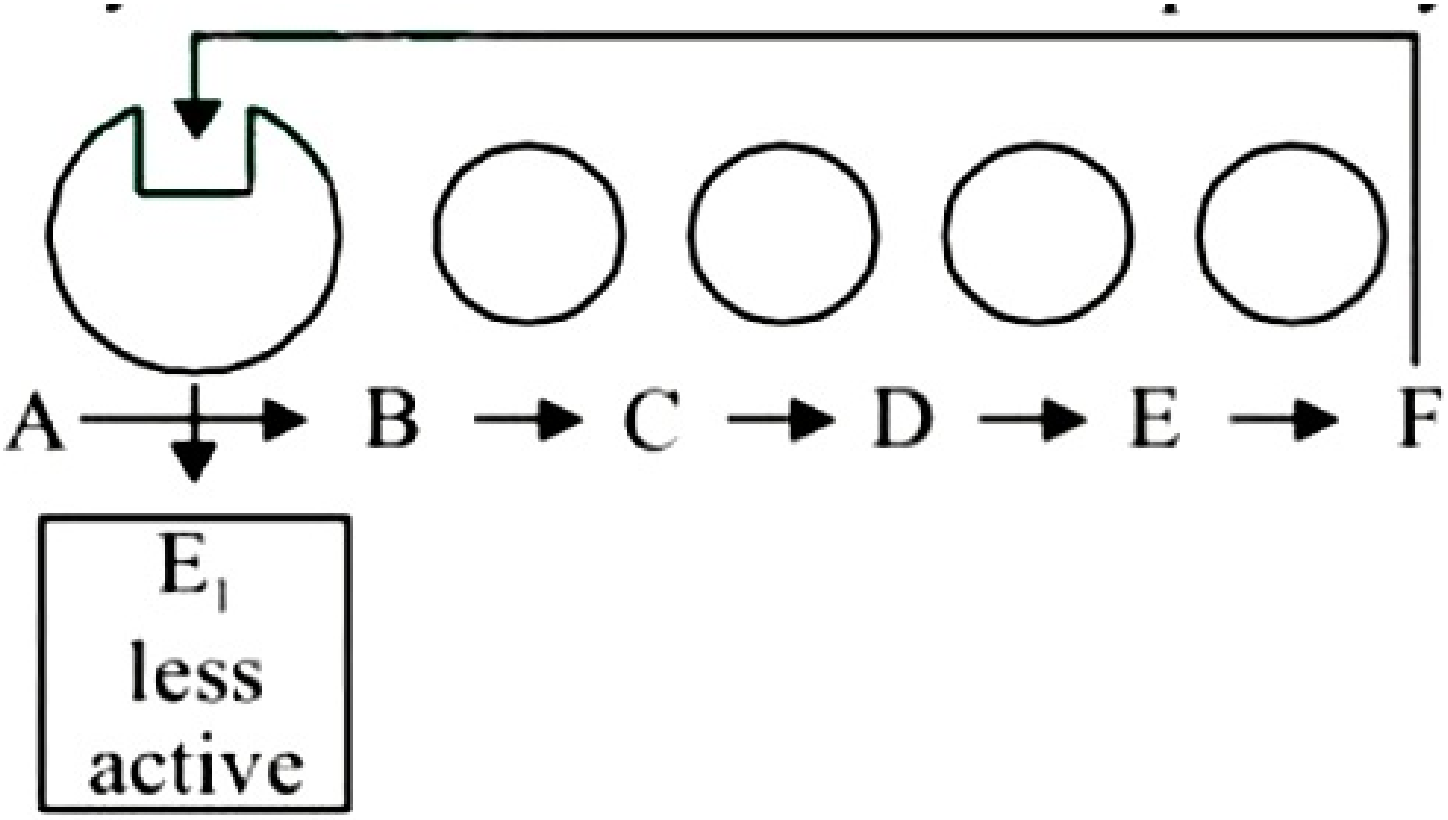
C. End product

D. Temperature

Answer: C

Solution:

(c) : Feedback inhibition or end product inhibition is the inhibition of the activity of an enzyme catalysing some early reactions of the series by the end product of the metabolic pathway. For example a substrate A is converted into a product F through B, C, D and E intermediate products. As the concentration of end product F increases, it diffuses to allosteric enzyme (E) causing a reduced synthesis of the product B which in turn lowers the rate of enzymatic reactions in rest of the pathway.



Feedback inhibition : Product F inhibits the action of enzyme E_1.

Question84

Enzymes are not found in (2000)

Options:

A. fungi

B. algae

C. virus

D. cyanobacteria.

Answer: C

Solution:

Solution:
(c) : Viruses do not have enzymes so they cannot synthesize proteins. They multiply only inside the living host cell and for multiplication and metabolism they take over the machinery of the host cell. They lack their own cellular machinery and enzymes.

Question85

ATP is
(2000)

Options:

A. nucleotide

B. nucleoside

C. nucleic acid

D. vitamin.

Answer: A

Solution:

Solution:
(a) : ATP is a nucleotide as it is composed of adenine, ribose sugar and phosphoric acid. There are two additional phosphate groups attached to the phosphate group of AMP. The last two phosphate molecules are connected by high energy bonds.

Question86

Which of the following have carbohydrate as prosthetic group?
(2000)

Options:

A. Glycoprotein

B. Chromoprotein

C. Lipoprotein

D. Nucleoprotein

Answer: A

Solution:

Solution:
(a) : Glycoproteins are proteins that contain sugars like carbohydrates as prosthetic group. In most glycoproteins, the linkage is between asparagine and N-acetyl-D-glucosamine. Some glycoproteins are immunoglobulins, membrane proteins and muscle proteins. Lipoproteins are protein complexed with lipids like triglycerides, phospholipids etc. Nucleoproteins are proteins associated with nucleic acids and chromoproteins are proteins associated with pigments e.g., cytochrome, phytochrome.

Question87

Cellulose, the most important constituent of plant cell wall is made up of
(1998)

Options:

A. branched chain of glucose molecules linked by $\beta - 1, 4$ glycosidic bond in straight chain and α-1,6 glycosidic bond at the site of branching

B. unbranched chain of glucose molecules linked by $\alpha - 1, 4$ glycosidic bond

C. branched chain of glucose molecules linked by $\alpha - 1, 6$ glycosidic bond at the site of branching

D. unbranched chain of glucose molecules linked by $\beta - 1, 4$ glycosidic bond.

Answer: D

Solution:

Solution:
Cellulose $(C_6H_{10}O_5)_n$ is the most abundant organic polymer. It is a polysaccharide and consists of long unbranched chains of glucose residues linked by $(\beta, 1 - 4$ glycosidic bonds. In plants, cellulose is formed from sugar. It serves as building material in the formation of cell wall.

Question88

Lactose is composed of
(1998)

Options:

A. glucose + galactose

B. fructose + galactose

C. glucose + fructose

D. glucose + glucose.

Answer: A

Solution:

Solution:
(a) : Lactose is popularly known as milk sugar. It is a disaccharide composed of one molecule of glucose and one molecule of galactose. The covalent bond that joins these two monosaccharide units is called glycosidic bond or glycosidic linkage. It is a reducing sugar.

Question89

Co-factor (prosthetic group) is a part of holoenzyme. It is (1997)

Options:

A. loosely attached organic part

B. loosely attached inorganic part

C. accessory non-protein substance attached firmly

D. none of these.

Answer: C

Solution:

Solution:

Question90

Which is a typical example of 'feedback inhibition'? (1996)

Options:

A. Cyanide and cytochrome reaction

B. Sulpha drugs and folic acid synthesizer bacteria

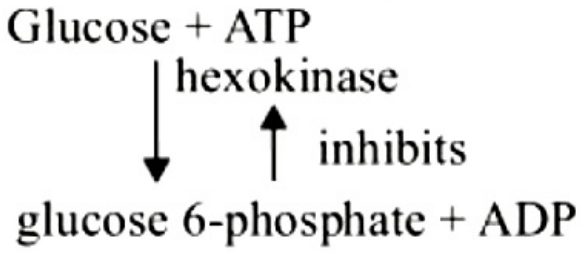
C. Allosteric inhibition of hexokinase by glucose 6 -phosphate

D. Reaction between succinic dehydro-genase and succinic acid

Answer: C

Solution:

Solution:
(c) : Feedback inhibition or end product inhibition occurs when the end product of a metabolic pathway inhibits the activity of an enzyme catalysing some early reactions of the series. The end product is the inhibitor and the enzyme inactivated is called allosteric enzyme. The enzyme is regulated by modulators that bind noncovalently at site other than the active site. An example of feedback inhibition is the inhibition of the activity of the enzyme hexokinase by glucose 6 -phosphate in glycolysis. This enzyme catalyses conversion of glucose into glucose 6 -phosphate but as the reaction proceeds, increase in concentration of glucose 6-phosphate inhibits the activity of hexokinase.



Question91

In which of the following groups are all polysaccharides? (1996)

Options:

A. Sucrose, glucose and fructose

B. Maltose, lactose and fructose

C. Glycogen, sucrose and maltose

D. Glycogen, cellulose and starch

Answer: D

Solution:

Solution:
(d) : Polysaccharides are complex long chain carbohydrates which are formed by dehydrate synthesis or polymerisation of more than 10 but generally very large number of units called monosacccharides. Starch,glycogen and cellulose are all polysaccharides. Starch is a glucosan homopolysaccharide which is the main reserve food of plants. Glycogen is also a glucosan homopoly-saccharide which is the major reserve food of fungi, animals and some bacteria. It is also called animal starch. Cellulose is the structural polysaccharide of plant cell walls, some fungi, protists. It is a fibrous glucosan homopolysaccharide of high tensile strength.

Question92

What are the most diverse molecules in the cell? (1996)

Options:

A. Lipids

B. Mineral salts

C. Proteins

D. Carbohydrates

Answer: C

Solution:

Solution:
(c) : Proteins show enormous diversity because of different proportions and sequences of twenty amino acid within the protein molecule. A large number of permutations and combinations of these amino acids are responsible for the unlimited variety of proteins. Proteins are the most abundant and most varied of the macromolecules having one or more polypeptides (chains of amino acids). The proteins constitute almost 50 % of the total dry weight of the cell. Proteins may

be simple or conjugated. Among conjugated, proteins may be phosphoprotein, glycoprotein, nucleoprotein, chromoprotein, lipoprotein, flavoprotein, metallo protein etc. Functionally proteins may be structural protein, enzymes, hormones, respiratory pigment etc.

Question93

Which purine base is found in RNA?
(1996)

Options:

A. Thymine

B. Uracil

C. Cytosine

D. Guanine

Answer: D

Solution:

Solution:
(d) : The bases are of two types-purines and pyrimidines. The purine derivatives adenine (A) and guanine (G) are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine (T) and cytosine (C) are found in DNA and cytosine (C) and uracil (U) is found in RNA.

Question94

Which of the following nucleotide sequences contains 4 pyrimidine bases?
(1994)

Options:

A. GATCAATGC

B. GCUAGACAA

C. UAGCGGUAA

D. Both (b) and (c)

Answer: A

Solution:

Solution:
(a) : In the given question there are 4 pyrimidines as 2 cytosine and 2 thymine in option 'a'

Question95

The four elements that make up 99% of all elements found in a living system are
(1994)

Options:

A. C, H , O and P

B. C, N , O and P

C. H , O, C and N

D. C, H , O and S

Answer: C

Solution:

Solution:
(c) : Carbon, hydrogen, oxygen and nitrogen are called four big elements of living body they make up about 99% of the mass of most cells. As C, H , O and N are lightest elements so the bonds they form are the strongest covalent bonds. So that the compounds formed are stable, varied in size and shapes. Carbon constitutes more than 50% of the dry matter. It has been observed that human body contains 0.5% hydrogen, 18.5% carbon, 65% oxygen and 3.3% nitrogen. Other elements are present in very lesser amount.

Question96

Which is wrong about nucleic acids?
(1993)

Options:

A. DNA is single stranded in some viruses.

B. RNA is double stranded occasionally.

C. Length of one helix is 45Å in B-DNA.

D. One turn of Z-DNA has 12 bases.

Answer: C

Solution:

Solution:
(c) : One complete turn of DNA is 34Å long and has 10 base pairs.

Question97

Glycogen is a polymer of (1993)

Options:

A. galactose

B. glucose

C. fructose

D. sucrose.

Answer: B

Solution:

Solution:
(b) : Glycogen (animal starch) is a polysaccharide consisting of a highly branched polymer of glucose occurring in animal tissues, especially in liver and muscle cells. It is the major store of carbohydrate energy in animal cells.

Question98

In RNA, thymine is replaced by (1992)

Options:

A. adenine

B. guanine

C. cytosine

D. uracil.

Answer: D

Solution:

Solution:
(d) : The bases are of two types-purines and pyrimidines. The purine derivatives adenine (A) and guanine (G) are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine (T) and cytosine (C) are found in DNA and cytosine (C) and uracil (U) is found in RNA.

Question99

Amino acids are mostly synthesised from (1992)

Options:

A. mineral salts

B. fatty acids

C. volatile acids

D. α -ketoglutaric acid.

Answer: D

Solution:

Solution:
(d) : Amino acids are mostly synthesized from α -ketoglutaric acid. These are the precursors of amino acids. A five carbon compound formed during Krebs' cycle is a α -ketoglutaric acid which is the first dicarboxylic acid formed. Pyruvic acid converted into alanine, α -ketoglutaric acid into glutamic acid, OAA into aspartic acid, polymerization of such amino acids results into formation of proteins.

Question100

Which is distributed more widely in a cell? (1992)

Options:

A. DNA

B. RNA

C. Chloroplasts

D. Sphaerosomes

Answer: B

Solution:

Solution:
(b) : RNA occurs in the nucleus as well as in the cytoplasm of the eukaryotic cells and in prokaryotic cell, it is found in the cytoplasm. DNA is found in the nucleus, mitochondria and chloroplast. Chloroplast and sphaerosomes are found only in cytoplasm.

Question101

Living cell contains 60-95% water. Water present in human body is

(1992)

Options:

A. 60-65 %

B. 50-55 %

C. 75-80 %

D. 65-70 %

Answer: D

Solution:

Solution:
(d) : Water is the most abundant substance of living beings. The water content of actively living cells varies between 60-95 %. In human beings maximum water content is found in the embryo 90-95 %. Water content decreases thereafter in adult and the aged where it is 65 -70 %

Question102

Adenine is
(1992)

Options:

A. purine

B. pyrimidine

C. nucleoside

D. nucleotide

Answer: A

Solution:

Solution:
(a) : The bases are of two types-purines and pyrimidines. The purine derivatives adenine (A) and guanine (G) are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine (T) and cytosine (C) are found in DNA and cytosine (C) and uracil (U) is found in RNA.

Question103

Enzymes having slightly different molecular structure but performing identical activity are
(1991)

Options:

A. holoenzymes

B. isoenzymes

C. apoenzymes

D. coenzymes

Answer: B

Solution:

Solution:
(b) There are certain enzymes which have slightly different molecular structure but have similar catalytic function such enzymes are known as isoenzymes. Holoenzyme is the active compound formed by combination of a coenzyme and an apoenzyme. Apoenzyme is the protein component of an enzyme, to which the coenzyme attaches to form an active enzyme. Coenzymes are organic non-protein molecules that bind with the protein molecule (apoenzyme) to form the active enzyme (holoenzyme).

Question104

A nucleotide is formed of (1991)

Options:

A. purine, pyrimidine and phosphate

B. purine, sugar and phosphate

C. nitrogen base, sugar and phosphate

D. pyrimidine, sugar and phosphate

Answer: C

Solution:

Solution:
(c) : Nucleotide is an organic compound consisting of a nitrogen-containing purine or pyrimidine base linked to a sugar (ribose or deoxyribose) and a phosphate group.

Question105

DNA is composed of repeating units of (1991)

Options:

A. ribonucleosides

B. deoxyribonucleosides

C. ribonucleotides

D. deoxyribonucleotides

Answer: D

Solution:

Solution:
(d) : DNA is the largest macromolecule in the organisms. It is a long, double chain of deoxyribonucleotide, or deoxyribotide units. The two deoxyribonucleotide chains are twisted around a common axis to form a right-handed double helix (spiral) that encloses a cylindrical space in it. Each deoxyribonucleotide unit, in turn, consists of three different molecules : phosphate, (PO_4^{3-}), a 5 -carbon deoxyribose sugar ($C_5H_{10}O_4$) and a nitrogenous base.

Question106

A segment of DNA has 120 adenine and 120 cytosine bases. The total number of nucleotides present in the segment is
(1991)

Options:

A. 120

B. 240

C. 60

D. 480

Answer: D

Solution:

Solution:
(d) : According to Chargaff's rules, the amount of adenine is always equal to that of thymine, and the amount of guanine is always equal to that of cytosine i.e., A = T (120) and G = C(120), therefore, the total no. of nucleotides would be $120 \times 4 = 480$.

Question107

The basic unit of nucleic acid is
(1991)

Options:

A. pentose sugar

B. nucleoid

C. nucleoside

D. nucleotide.

Answer: D

Solution:

Solution:
(d) : The nucleic acids (DNA and RNA) are the molecules having complex structure and very high molecular weights. The nucleic acid is composed of a large number of nucleotide molecules joined into a linear, unbranched chain. Nucleotide is an organic compound consisting of a nitrogen-containing purine or pyrimidine base linked to a sugar (ribose or deoxyribose) and a phosphate group.

Question108

Mineral associated with cytochrome is (1991)

Options:

A. Cu

B. Mg

C. Cu and Mg

D. Fe

Answer: D

Solution:

Solution:
(d) : Cytochromes are generally membranebound hemoproteins that contain heme groups and carry out electron transport. The heme group is a highly conjugated ring system (which means its electrons are very mobile) surrounding a metal ion, which readily interconverts between the oxidation states. For many cytochromes the metal ion present is that of iron, which interconverts between Fe^{2+} (reduced) and Fe^{3+} (oxidized) states (electron-transfer processes) or between Fe^{2+} (reduced) and Fe^{3+} (formal, oxidized) states (oxidative processes). Cytochromes are thus capable of performing oxidation and reduction.

Question109

Which is not consistent with double helical structure of DNA? (1990)

Options:

A. A = T, C = G

B. Density of DNA decreases on heating.

C. A + T/C + G is not constant.

D. Both (a) and (b)

Answer: C

Solution:

Solution:
(c) : The density of DNA decreases on heating as hydrogen bonds breakdown. According to Chargaff's rules, the amount of adenine is always equal to that of thymine, and the amount of guanine is always equal to that of cytosine i.e., A = T and G = C. The base ratio A + T/G + C may vary form species to species, but is constant for a given species.

Question110

RNA does not possess
(1988)

Options:

A. uracil

B. thymine

C. adenine

D. cytosine.

Answer: B

Solution:

Solution:
(b) : The bases are of two types-purines and pyrimidines. The purine derivatives adenine (A) and guanine (G) are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine (T) and cytosine (C) are found in DNA and cytosine (C) and uracil (U) is found in RNA.

Question111

In double helix of DNA, the two DNA strands are
(1988)

Options:

A. coiled around a common axis

B. coiled around each other

C. coiled differently

D. coiled over protein sheath.

Answer: A

Solution:

Solution:
(a) : According to Watson-Crick model, the DNA molecule consists of two long, parallel chains which are joined together by short crossbars at regular intervals. The two chains are spirally coiled around a common axis in a regular manner to form a right handed double helix.
