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| Division | 11th |
| Subject | Biology |
| Chapter | Biomolecules |
| Author | Anand |
| Category | 1 |

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| Read the following statements on lipids and find out correct set of statement.  (I) Lecithin found in the plasma membrane is a glycolipid  (II) Saturated fatty acids possess one or more bonds  (III) Gingely oil has lower melting point, hence remains as oil in winter  (IV) Lipids are generally insoluble in water but soluble in some organic solvents  (V) When fatty acid is esterified with glycerol, monoglycerides are formed  Choose the correct answer from the options given below. |
| (I), (II) and (III) only |
| (I), (IV) and (V) only |
| (III), (IV) and (V) only |
| (I), (II) and (IV) only |
| c |
| Lecithin is a phospholipid. Saturated fatty acids do not possess double bond. |
| Statement (III), (IV) and (V) are the properties of lipids. Therefore, these statements are correct. However, Lecithin found in the plasma membrane is a phospholipid not glycolipid. Saturated fatty acids are without double bond, whereas one or more C=C double bonds are possesed by unsaturated fatty acids |
| Lipids: Types |

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| A dehydration reaction links two glucose molecules to produce maltose. If the formula for glucose is then what is the formula for maltose?  2025 |
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|  |
| c |
| Disaccharides |
| Maltose is a disaccharide made up two units of glucose with a chemical formula . |
| Polysaccharides:Examples |

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| Following are the statements with reference to lipids.  (I) Lipids having only single bonds are called unsaturated fatty acids.  (II) Lecithin is a phospholipid.  (III) Trihydroxy propane is glycerol.  (IV) Palmitic acid has 20 carbon atoms including carboxyl carbon.  (V) Arachidonic acid has 16 carbon atoms.  Choose the correct answer from the options given below.  (2021) |
| (II) and (V) only |
| (I) and (II) only |
| (III) and (IV) only |
| (II) and (III) only |
| d |
| Lipid properties |
| Unsaturated fatty acids contain one or more double bonds. Palmitic acids and arachidonic acid has 16 and 20 carbons respectively including carboxyl carbon. |
| Lipids:Types |

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| Identify the basic amino acid from the following |
| Tyrosine |
| Glutamic Acid |
| Lysine |
| Valine |
| c |
| For muscle and bone strength |
| The correct answer is Lysine Proteins are formed from amino acids. Lysine is essential for muscle growth, bone strength maintenance, injury and surgery recovery, and hormone, antibody, and enzyme regulation. It also has antiviral properties. Lysine is a type of basic amino acid.Glutamic acid, valine and tyrosine are acidic, neutral and aromatic acid respectively. |
| Amino acids; Types |

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| The two functional groups characteristic of sugars are |
| hydroxyl and methyl |
| carbonyl and methyl |
| carbonyl and phosphate |
| carbonyl and hydroxyl. |
| d |
| Aldehydes or ketones |
| The correct answer is Aldehydes or ketones; Carbohydrates (commonly called sugars) are chemically defined as polyhydroxy aldehyde or ketones. All sugar molecules have one carbonyl group in addition to hydroxyl group on other carbon atoms. |
| Polysaccharides: Structure |

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| A typical fat molecule is made up of  NEET-I 2016 |
| one glycerol and one fatty acid molecule |
| three glycerol and three fatty acid molecules |
| three glycerol molecules and one fatty acid molecule |
| one glycerol and three fatty acid molecules. |
| d |
| Triglycerides also called as fatty molecules |
| The correct answer is one glycerol and three fatty acid molecules; 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). |
| Lipids: Structure |

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| A phosphoglyceride is always made up of  2013 |
| a saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached |
| a saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule |
| only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached |
| only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached. |
| a |
| PUFA |
| The correct answer is a saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached ; Phosphoglycerides are the triesters of fatty acids (either saturated or unsaturated) and glycerol to which a phosphate group is also attached. |
| Lipds: Types |

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| Uridine, present only in RNA is a  Karnataka NEET 2013 |
| Nucleoside |
| Nucleotide |
| Purine |
| Pyrimidine |
| a |
| Uracil |
| The correct answer is Nucleoside; A nucleoside is pentose sugar and base together, without the phosphate group. Uracil is present as uridine in RNA only. |
| Nucleotides: Types |

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| Which one out of given below correctly represents the structural formula of the basic amino acid? |
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|  |
|  |
|  |
| b |
| Examples were Arginine |
| The correct answer is IV; Basic amino acids have an additional amino group without forming amides, thus they are diamino monocarboxylic acids e.g., arginine, lysine, etc. |
| Amino acids; Structure |

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| 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 " " in it. |
| Cholesterol |
| Amino acid |
| Nucleotide |
| Nucleoside |
| d |
| Amino acids |
| The correct answer is nucleoside; 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. |
| Elements in living organisms |

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| Which one of the following biomolecules is correctly characterized?  Mains 2012 |
| Lecithin-a phosphorylated glyceride found in cell membrane. |
| Palmitic acid - an unsaturated fatty acid with 18 carbon atoms. |
| Adenylic acid - adenosine with a glucose phosphate molecule. |
| Alanine amino acid - contains an amino group and an acidic group anywhere in the molecule. |
| a |
| Amphipathic phospholipid |
| The correct answer is Lecithin is a triglyceride lipid where one fatty acid is replaced by phosphoric acid which is linked to additional nitrogenous group called choline. It is a common membrane lipid. It is an amphipathic phospholipid having both hydrophilic polar and hydrophobic non-polar groups. The hydrocarbon chains of two fatty acids function as hydrophobic non-polar tails whereas the phosphate and choline behave as hydrophilic polar head group of the molecule. Palmitic acid is a saturated fatty acid (as it does not possess double bonds in its carbon chain) and contains 16 carbon atoms with formula . Adenylic acid or adenosine monophosphate is a nucleotide formed by union of adenine (nitrogenous base), ribose (pentose sugar) and phosphate. It is formed through phosphorylation of nucleoside as phosphate combines with sugar molecule at its carbon atom. Amino acids are organic acids with carboxylic group having amino group generally attached to -carbon or carbon next to carboxylic group. Alanine is a nonpolar and neutral amino acid having one methyl group and having amino group attached to carbon next to carboxylic group. Alanine |
| Lipids: Types |

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| Which one of the following structural formulae of two organic compounds is correctly identified along with its related function?    (2011) |
| B : Adenine A nucleotide that makes up nucleic acids |
| A : Triglyceride - Major source of energy |
| B : Uracil - A component of DNA |
| A : Lecithin - A component of cell membrane |
| d |
| Lipid |
| The correct answer is '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. |
| Lipids: Structure |

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| About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and |
| sulphur and magnesium |
| magnesium and sodium |
| calcium and phosphorus |
| phosphorus and sulphur. |
| d |
| Essential elements |
| The correct answer is Phosphorous and sulphur; Living organisms requires 6 elements in relatively large amounts. . These elements contribute to the structural organization of living organisms. |
| Elements in living organisms |

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| Which of the following is the simplest amino acid? |
| Alanine |
| Asparagine |
| Glycine |
| Tyrosine |
| c |
| One amino and carboxylic group |
| The correct answer is Glycine is considered as the simplest amino acid as it has one amino group, one carboxylic group and no substituent functional group. |
| Amino acids: Types |

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| The major role of minor elements inside living organisms is to act as |
| co-factors of enzymes |
| building blocks of important amino acids NEET-AIPMT Chapterwise Topicwise Solutions Biology |
| constituent of hormones |
| binder of cell structure. |
| a |
| Minors’ elements were Cl, Mn, B, Zn |
| The correct answer is cofactor of enzymes; Minor elements 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., , etc. These elements work as non-protein cofactor in enzymes e.g., etc. They also take part in oxidation reduction reactions e.g., , with variable valency. Chloride ion enhances activity of salivary amylase. Zinc is required for activity of carbonic anhydrase and alcohol dehydrogenase, etc. |
| Importance of co-factors |

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| Lipids are insoluble in water because lipid molecules are  2005 |
| Hydrophilic |
| Hydrophobic |
| Neutral |
| Zwitter ions. |
| b |
| Soluble in organic solvents |
| The correct answer is Hydrophobic; 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. |
| Lipids: Structure |

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| Spoilage of oil can be detected by which fatty acid? |
| Oleic acid |
| Linolenic acid |
| Linoleic acid |
| Erucic acid |
| d |
| It is used as binder in paints |
| The correct answer is Erucic acid ; It is an unsaturated fatty acid belonging to the oleic acid series, occurring as glycerides in rapeseed oil and other vegetable oils. It is the cis-isomer, the transisomer is known as brassidic acid. Erucic acid is used as a binder for oil paints. It is useful in manufacture of emulsions to coat photographic films and papers. Spoilage of oil can be detected by erucic acid. Oleic acid is found in various animal and vegetable sources. It is widely used in industries including textile, chemical, medicine, leather, stationary, paper making, etc. Linolenic acid is used in making soaps, emulsifiers and quick-drying oils, in beauty products. It helps in acne reduction, moisture retention, etc. Linoleic acid is an important fatty acid especially for growth and development of infants. Commercially it is used in margarine, animal feeds, soaps and drugs. |
| Lipids: Examples |

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| Essential amino acid is |
| phenylalanine |
| glycine |
| aspartic acid |
| serine. |
| a |
| Non-essential amino acid; should be ingested |
| The correct answer is phenylalanine; Essential amino acids are those amino acids that must be ingested in food for survival as they are not synthesised in the body. There are 7 essential amino acids. Glycine, aspartic acid and serine are non-essential amino acids as they can be synthesized in the body. |
| Amino acids: Types |

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| What are the most diverse molecules in the cell?  1996 |
| Lipids |
| Mineral salts |
| Proteins |
| Carbohydrates |
| c |
| Chain of amino acids |
| The correct answer is Proteins, which 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 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, metalloprotein, etc. Functionally, proteins may be structural protein, enzymes, hormones, respiratory pigment, etc. |
| Biomolecules |

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| The four elements that make up of all elements found in a living system are  1994 |
| C, H, O and |
| C, N, O and P |
| and |
| C, H, O and S |
| c |
| Essential elements |
| the correct answer is Carbon, hydrogen, oxygen and nitrogen are called four big elements of living body. They make up about of the mass of most cells. As C, H, O and 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 of the dry matter. It has been observed that human body contains hydrogen, carbon, oxygen and nitrogen. Other elements are present in very lesser amount. |
| Elements in living organisms |

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| --- |
| Amino acids are mostly synthesized from |
| mineral salts |
| fatty acids |
| volatile acids |
| -ketoglutaric acid. |
| d |
| Five carbon compounds |
| The correct answer Amino acids are mostly synthesised from -ketoglutaric acid. These are the precursors of amino acids. A five carbon compound formed during Krebs' cycle is -ketoglutaric acid which is the first dicarboxylic acid formed. Pyruvic acid converted into alanine, -ketoglutaric acid into glutamic acid, OAA into aspartic acid, polymerization of such amino acids results into formation of proteins. |
| Amino acid; Types |

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| Living cell contains water. Water present in human body is |
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| . |
| d |
| Abundant and essential |
| 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 found in the embryo is . Water content decreases thereafter in adult and the aged where it is . |
| Elements in living organisms |

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| Which of the following are not secondary metabolites in plants? |
| Rubber, gums |
| Morphine, codeine |
| Amino acids, glucose |
| Vinblastin, curcumin |
| c |
| AA and Sugar |
| The correct answer is Amino acid and glucose, which are required for basic metabolic processes and are directly involved in normal growth and development, so these are categorised under primary metabolites. |
| Secondary metabolites |

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| Identify the incorrect pair.  2021 |
| Drugs- Ricin |
| Alkaloids-Codeine |
| Toxin -Abrin |
| Lectins-Concanavalin A |
| a |
| Ricin is a toxin. |
| The correct answer is Drugs-Ricin; Generally, Ricin is a toxin, a carbohydrate binding protein; which is matched incorrectly with drugs. |
| Secondary metabolites |

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| Secondary metabolites such as nicotine, strychnine and caffeine are produced by plants for their  2020 |
| nutritive value |
| growth response |
| defense action |
| effect on reproduction. |
| c |
| Alkaloids |
| The correct answer is defense action; Nicotine, strychnine and caffeine are the examples of alkaloids. These are produced by plants and are used by them in their defense against herbivores and pathogens. |
| Secondary metabolites |

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| Concanavalin is  2019 |
| a pigment |
| an alkaloid |
| an essential oil |
| a lectin. |
| d |
| Plant compound |
| The correct answer is lectin; Concanavalin A, a lectin is a secondary metabolite, which has no direct function in growth and development of plants, rather are found at particular stages of development. |
| Secondary metabolites |

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| Which one of the following is the most abundant protein in the animals? |
| Haemoglobin |
| Collagen |
| Lectin |
| Insulin |
| b |
| Found in tissue and skins |
| The correct answer is Collagen is the most abundant protein in animal world. RuBisCO is the most abundant protein in the world of the bisphere. Collagen is an insoluble fibrous protein found extensively in the connective tissue of skin, tendons and bone. Collagen accounts for over of the total body proteins of mammals and it is the most abundant animal protein. |
| Proteins: Examples |

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| Which of the following glucose transporters is insulin-dependent?  2019 |
| GLUT IV |
| GLUT I |
| GLUT II |
| GLUT III |
| a |
| Transport glucose |
| The correct answer is GLUT IV; GLUT IV is the insulin-dependent glucose transporter. Its function is to transport glucose to muscle and adipose tissues under anabolic conditions. |
| Metabolic basics for living; ATP |

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| --- |
| Which one is the most abundant protein in the animal world?  2015 |
| Trypsin |
| Haemoglobin |
| Collagen |
| Insulin |
| c |
| Found in tissue and skins |
| The correct answer is Collagen is the most abundant protein in animal world. RuBisCO is the most abundant protein in the world of the biosphere. Collagen is an insoluble fibrous protein found extensively in the connective tissue of skin, tendons and bone. Collagen accounts for over of the total body proteins of mammals and it is the most abundant animal protein. |
| Proteins: Examples |

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| Which of the following have carbohydrate as prosthetic group?  2000 |
| Glycoprotein |
| Chromoprotein |
| Lipoprotein |
| Nucleoprotein |
| a |
| IgG-immunoglobulin |
| The Glycoproteins are proteins that contain sugars like carbohydrates as prosthetic group. In most glycoproteins, the linkage is between asparagine and -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 |
| Quaternary structure |

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| Which one of the following statements is wrong?  NEET-I 2016 |
| Uracil is a pyrimidine. |
| Glycine is a sulphur containing amino acid. |
| Sucrose is a disaccharide. |
| Cellulose is a polysaccharide |
| b |
| Glycine is a sulphur containing amino acid |
| The correct answer is Glycine, which is an amino acid with the chemical formula of NH2​‐CH2​‐COOH. Sucrose is a disaccharide formed by the glycosidic linkage between glucose and fructose.  Cellulose is a polysaccharide. It is formed by the linkage of beta 1,4 linkage of the glucose unit. It is an important component of the cell wall of the plant. The nitrogenous bases are purines and pyrimidines. The purines are adenine and guanine. The pyrimidines are thymine and cytosine. In RNA, the thymine is replaced by uracil. |
| Nature of bond linking monomers in a polymer |

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| The chitinous exoskeleton of arthropods is formed by the polymerisation of |
| - acetyl glucosamine |
| Lipoglycans |
| keratin sulphate and chondroitin sulphate |
| D - glucosamine. |
| a |
| Chitinous exoskeleton |
| The correct option is N-acetyl glucosamine; The chitinous exoskeleton of arthropods is formed by the polymerization of N-acetyl glucosamine. |
| Nature of bond linking monomers in a polymer |

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| --- |
| Which one of the following is a non - reducing carbohydrate?  2014 |
| Maltose |
| Sucrose |
| Lactose |
| Ribose 5-phosphate |
| b |
| Disaccharide |
| The correct option is Sucrose; A reducing sugar is any sugar that is capable of acting as a reducing agent because it has a free aldehyde group or a free ketone group. All monosaccharides are reducing sugars, along with some disaccharides, oligosaccharides, and polysaccharides. Of the given option, sucrose is the only non-reducing sugar. It is disaccharide composed of glucose and fructose. |
| Polysaccharides: Types |

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| Macromolecule chitin is |
| sulphur containing polysaccharide |
| simple polysaccharide |
| nitrogen containing polysaccharide |
| phosphorus containing polysaccharide. |
| c |
| Abundant in plants |
| The correct answer is Nitrogen containing polysaccharide; Chitin is the most abundant amino polysaccharide polymer found in nature, and it is the building material that gives crustaceans, insects, and fungi their exoskeletons and cell walls their strength. Chitin is a nitrogen-containing modified polysaccharide made up of units of N-acetyl-D-glucosamine (more precisely, 2-(acetylamino)-2-deoxy-D-glucose). |
| Polysaccharides; Function |

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| 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 |
| (1), (3) and (5) |
| (1) and (5) |
| (2) and (3) |
| (2) and (4). |
| c |
| Properties |
| The correct answer is (2) and (3), Glucose is synthesised during photosynthesis and translocated as sucrose to various plant parts and stored as starch. Starch is ideal for storage as it is chemically non-reactive when compared to monosaccharides and osmotically inactive and hence does not alter the water potential of cell sap. |
| Polysaccharides: Examples |

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| Cellulose is the major component of cell walls of |
| Pseudomonas |
| Saccharomyces |
| Pythium |
| Xanthomonas |
| a |
| Plant |
| The correct option is Pythium; Pseudomonas and Xanthomonas are bacteria. Bacterial cell walls are made of peptidoglycan. Saccharomyces cerevisiae is a fungus Fungal cell walls are mainly made of chitin. Based on elimination, and since it is unlikely to know what kind of organism Pythium is, you can conclude that Pythium is the right answer. In reality, Pythium is kind of fungus that does not have Chitin, but cellulose as a major cell wall component. |
| Polysaccharides: Examples |

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| Carbohydrates, the most abundant biomolecule on earth, are produced by |
| some bacteria, algae and green plant cells |
| fungi, algae and green plant cells |
| all bacteria, fungi and algae |
| viruses, fungi and bacteria. |
| a |
| For photosynthesis |
| The correct option is Some bacteria, algae and green plants; Carbohydrates are produced by the process of photosynthesis. Photosynthesis is the process of transforming light energy into carbohydrates. Bacteria such as the cyanobacteria, algae and green plants are the major producers of carbohydrates on the Earth since they all possess the green pigment chlorophyll and perform photosynthesis. |
| Polysaccharides: Examples |

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| Which of the following is a reducing sugar? |
| Galactose |
| Gluconic acid |
| -methyl galactoside |
| Sucrose |
| a |
| It has free aldehyde and ketone group |
| The correct option is Galactose; A reducing sugar is any sugar that is capable of acting as a reducing agent because it has a free aldehyde group or a free ketone group. All monosaccharides are reducing sugars, along with some disaccharides, oligosaccharides, and polysaccharides. |
| Polysaccharides; Examples |

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| --- |
| Cellulose, the most important constituent of plant cell wall is made up of  1998 |
| branched chain of glucose molecules linked by glycosidic bond in straight chain and , 6 glycosidic bonds at the site of branching |
| unbranched chain of glucose molecules linked by glycosidic bond |
| branched chain of glucose molecules linked by glycosidic bond at the site of branching |
| unbranched chain of glucose molecules linked by glycosidic bond. |
| b |
| Unbranched chain of glucose molecules linked by glycosidic bond |
| The correct answer is Unbranded chains of glucose molecules linked by β-1,4 glycosidic bond Reason: Cellulose is the most abundant organic polymer found in the cell walls of plant cells. It is a polysaccharide and consists of long unbranched chains of glucose residues linked by β-1,4 glycosidic bonds. In plants, cellulose is produced from sugar. It serves as building material in the formation of cell wall. |
| Glycosidic bond |

|  |
| --- |
| Lactose is composed of  1998 |
| glucose + galactose |
| fructose + galactose |
| glucose + fructose |
| glucose + glucose. |
| a |
| Monomers |
| The correct option is Glucose + galactose; Lactose is popularly know 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 a glycoside bond or glycosidic linkage. It is a reducing sugar. |
| Glycosidic bond |

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| In which of the following groups are all polysaccharides? |
| Sucrose, glucose and fructose |
| Maltose, lactose and fructose |
| Glycogen, sucrose and maltose |
| Glycogen, cellulose and starch |
| d |
| Glycogen, cellulose and starch |
| The correct answer is Glycogen, cellulose and starch; Polysaccharides: It consists of more than six molecules of a monosaccharide joined together by glycosidic bonds with a loss of water each time a monosaccharide is added. |
| Glycosidic bonds |

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| Glycogen is a polymer of  1993 |
| Galactose |
| Glucose |
| Fructose |
| Sucrose |
| b |
| α-1,4-glycosidic bonds |
| The correct option is Glucose; Glycogen is a readily mobilized storage form of glucose. It is a very large, branched polymer of glucose residues that can be broken down to yield glucose molecules when energy is needed. Most of the glucose residues in glycogen are linked by α-1,4-glycosidic bonds. |
| Glycosidic bonds |

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| Which of the following are not polymeric? |
| Proteins |
| Polysaccharides |
| Lipids |
| Nucleic acids |
| c |
| Linkage of amino acids |
| The correct option is Lipids; Polysaccharides are polymers made up of monomeric monosaccharide units. Nucleic acids are polymers made up of monomeric nucleotide units. Proteins are polymers made up of monomeric amino acid units. Lipids are made up of fatty acids and alcohols (mostly glycerols) and may also contain some additional groups (in case of compound or conjugated lipids). They are insoluble in water and are not polymeric. |
| Peptide bonds |

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| Nucleotides are building blocks of nucleic acids. Each nucleotide is a composite molecule formed by |
| base-sugar-phosphate |
| base-sugar-OH |
| base-sugar-phosphate |
| sugar-phosphate |
| c |
| Phosphodiester bond |
| The correct option is Base-Sugar-Phosphate; Nucleotides are the building blocks of nucleic acid. Each nucleotide consists of three parts: a sugar (ribose for RNA and deoxyribose for DNA), a phosphate, and a nitrogenous base. |
| Phosphodiester bond |

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| Which purine base is found in RNA? |
| Thymine |
| Uracil |
| Cytosine |
| Guanine |
| d |
| Plant Purines |
| The bases are of two types-purines and pyrimidines. The purine derivatives adenine and guanine are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine and cytosine (C) are found in DNA and cytosine (C) and uracil (U) are found in RNA. |
| Nucleotides types |

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| Which of the following nucleotide sequences contains 4 pyrimidine bases? |
| GATCAATGC |
| GCUAGACAA |
| UAGCGGUAA |
| Both GCUAGACAA and UAGCGGUAA |
| a |
| Nucleotides are the building blocks of cell's DNA and RNA. Nucleic acids have five distinct nucleotide bases. There are three pyrimidines and two purines. Purine bases include adenine and guanine. |
| Nucleic acids are polynucleotide chains where ribonucleotide and deoxyribonucleotide are monomeric units of ribonucleic acid (RNA) and deoxyribonucleic acid (DNA) respectively. Nucleotides consist of three components: the heterocyclic ring structure, the pentose sugar and the phosphate group. Because of their chemically simple nature, they are referred to as nitrogenous bases. These nitrogenous bases are responsible for the essential biological activities of nucleic acid. Nucleotide hydrolysis creates two forms of compounds derived from purine and pyrimidine heterocyclic rings known as purine and pyrimidine bases. Purines are obtained from pyrimidines by adding to the imidazole group. Purines and pyrimidines both have all their atoms in the same plane. Purines have a double ring while pyrimidines are a single ring structure. Purine has a ring of pyrimidine attached to the ring of imidazole. The pyrimidine only has a ring containing pyrimidine. Thus, purine has four nitrogen atoms, while pyrimidine has two.The pyrimidine bases are thymine, cytosine, and uracil. In GATCAATGC, four pyrimidine bases are present, two thymines and two cytosines. Thus, the correct answer is option GATCAATGC. |
| Nucleic acids; Structure |

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| --- |
| In RNA, thymine is replaced by |
| adenine |
| guanine |
| cytosine |
| uracil. |
| d |
| Purines and pyrimidines |
| The correct option is Uracil. In RNA instead of thymine, uracil is present. The bases are of two types-purines and pyrimidines. The purine derivatives adenine and guanine are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine and cytosine (C) are found in DNA and cytosine (C) and uracil (U) are found in RNA. |
| Nucleic Acids: Structure |

|  |
| --- |
| Adenine is |
| Purine |
| Pyrimidine |
| Nucleoside |
| Nucleotide |
| a |
| Double ring structure |
| The correct option is Purine; The bases are of two types-purines and pyrimidines. The purine derivatives adenine and guanine are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine and cytosine (C) are found in DNA and cytosine (C) and uracil (U) are found in RNA. |
| Nucleic acids: Types |

|  |
| --- |
| A nucleotide is formed of |
| purine, pyrimidine and phosphate |
| purine, sugar and phosphate |
| nitrogen base, sugar and phosphate |
| pyrimidine, sugar and phosphate |
| c |
| Phosphodiester bonds |
| 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. |
| Nucleotides: Types |

|  |
| --- |
| DNA is composed of repeating units of |
| Ribonucleosides |
| Deoxyribonucleosides |
| Ribonucleotides |
| deoxyribonucleotides. |
| d |
| Double helix structure due to |
| DNA is the largest macromolecule in the organisms. It is a long, double chain of deoxy-ribonucleotide 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, , a 5 -carbon deoxyribose sugar and a nitrogenous base. |
| Nucleic acids; structure |

|  |
| --- |
| The basic unit of nucleic acid is  1991 |
| Pentose sugar |
| Nucleoid |
| Nucleoside |
| Nucleotide |
| d |
| Nitrogen containing purine and pyrimidine called as |
| 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. |
| Nucleic acid: Functions |

|  |
| --- |
| RNA does not possess |
| Uracil |
| Thymine |
| Adenine |
| Cytosine |
| b |
| Purimidine |
| The correct option is Thymine. In RNA instead of thymine, uracil is present. The bases are of two types-purines and pyrimidines. The purine derivatives adenine and guanine are double ring structures whereas pyrimidine derivatives thymine, cytosine and uracil are single ring structures. Thymine and cytosine (C) are found in DNA and cytosine (C) and uracil (U) are found in RNA. |
| Nucleic acids: Types |

|  |
| --- |
| "Ramachandran plot" is used to confirm the structure of |
| RNA |
| Proteins |
| Triacylglycerides |
| DNA. |
| b |
| Dihedral angles |
| The correct option is Proteins ; This is because – “Ramachandran plot” is used to confirm the structure of proteins. A Ramachandran plot, is a way to visualize energetically allowed regions for backbone dihedral angles against of amino acid residues to protein structure. |
| Structure of proteins: Examples |

|  |
| --- |
| Which of the following is the least likely to be involved in stabilising the three-dimensional folding of most proteins?  NEET-II 2016 |
| Hydrogen bonds |
| Electrostatic interaction |
| Hydrophobic interaction |
| Ester bonds |
| d |
| Weaker bonds for primary and secondary |
| The correct answer is ester bonds. 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. |
| Structure of proteins: Tertiary structure |

|  |
| --- |
| The figure shows a hypothetical tetrapeptide portion of a protein with parts labelled A-D. Which one of the following options is correct?    (Karnataka NEET 2013) |
| is the acidic amino acid-glutamic acid. |
| is an aromatic amino acid-tryptophan. |
| is the C-terminal amino acid and is -terminal amino acid. |
| is a sulphur containing amino acid methionine |
| a |
| Acidic amino acid |
| In the given figure a tetrapeptide is shown. Here, amino acids are indicated as (a), (b) (c) and (d). (a) indicates N-terminal amino acid and (d) indicates C-terminal residue. As it can be seen from the figure sulphur containing amino acid is b and carboxyl group (-COOH) containing amino acid is (d). Residue (d) indicates glutamic acid, an acidic residue due to presence of (-COOH) group. So, the correct answer is 'd is acidic amino acid - glutamic acid'. |
| Nature of bond linking monomers in a polymer |

|  |
| --- |
| Identify the substances having glycosidic bond and peptide bond, respectively in their structure.  (2020) |
| Chitin, cholesterol |
| Glycerol, trypsin |
| Cellulose, lecithin |
| Inulin, insulin |
| d |
| Polysaccharide -2,1 glycosidic bond |
| Inulin is a polymer of fructose (polysaccharide). In a polysaccharide the individual monosaccharides are linked by a glycosidic bond. While insulin is a polymer of amino acids linked by a peptide bond. |
| Nature of bond linking monomers in a polymer; Peptide bond |

|  |
| --- |
| Which of the following biomolecules does have a phosphodiester bond? |
| Amino acids in a polypeptide |
| Nucleic acids in a nucleotide |
| Fatty acids in a diglyceride |
| Monosaccharides in a polysaccharide |
| b |
| DNA & RNA |
| The correct option is Nucleic acids in a nucleotide; One of the structural elements, or building blocks, of DNA and RNA, is the nucleotide. A nucleotide is made up of a base (one of the four substances adenine, thymine, guanine, and cytosine), a sugar molecule, and a phosphoric acid molecule. Between two nucleotides of nucleic acid, a phosphodiester link is created. Between the nucleotides, DNA ligase can produce a phosphodiester bond. It is well known that the phosphodiester bonds serve as the framework for the nucleic acid strands. The phosphodiester bond is known to pre-exist in DNA and RNA at the connection between a sugar molecule's ′ carbon atom and a sugar molecule's ′ carbon atom, which is deoxyribose in DNA and ribose in RNA. |
| Nature of bond linking monomers in a polymer: Phosphodiester bond |

|  |
| --- |
| Which is wrong about nucleic acids? |
| DNA is single stranded in some viruses. |
| RNA is double stranded occasionally. |
| Length of one helix is in B-DNA. |
| One turn of Z-DNA has 12 bases. |
| c |
| Each helix is about 10 A units |
| The correct answer is Length of one helix is 45 A in B-DNA; One complete turn of a DNA double helix is long and has 10 base pairs. The B DNA molecule has the shape of a double helix. The radius of each helix is about 10 angstroms (1 angstrom = 10^(-8) cm). Each helix rises about 34 angstroms during each complete turn and there are about 2.9 x 10^(8) complete turns. |
| Turnover of molecules |

|  |
| --- |
| A segment of DNA has 120 adenine and 120 cytosine bases. The total number of nucleotides present in the segment is |
| 120 |
| 240 |
| 60 |
| 480 |
| d |
| Chargaff rule |
| 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., and , therefore, the total number of nucleotides would be . |
| Turnover of molecules |

|  |
| --- |
| Which is not consistent with double helical structure of DNA? |
|  |
| Density of DNA decreases on heating. |
| is not constant. |
| Both and Density of DNA decreases on heating |
| c |
| Chargaff rule |
| 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 and . The base ratio may vary form species to species, but is constant for a given species. |
| Turnover of molecules |

|  |
| --- |
| In double helix of DNA, the two DNA strands are |
| coiled around a common axis |
| coiled around each other |
| coiled differently |
| coiled over protein sheath. |
| a |
| Watson crick model |
| The correct answer is Coiled around a common axis; 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. |
| Turnover of molecules |

|  |
| --- |
| ATP is |
| Nucleotide |
| Nucleoside |
| nucleic acid |
| Vitamin |
| a |
| Adenine and sugar molecules |
| 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. |
| Metabolic basics of living; ATP |

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| --- |
| Match the following.  (1) Inhibitor of catalytic activity  (2) Possess peptide bonds  (3) Cell wall material in fungi  (4) Secondary metabolite  (i) Ricin  (iii) Chitin  (iv) Collagen  Choose the correct option from the following: |
| (ii)(iv) (iii) (i) |
| (iii)(i) (iv) (ii) |
| (iii)(iv) (i) (ii) |
| (ii)(iii) (i) (iv) |
| a |
| Secondary metabolite functions |
| Malonate resembles succinate in structure. Succinate is the substrate of the enzyme succinate dehydrogenase. Hence, malonate acts as an inhibitor of succinate dehydrogenase enzyme. Collagen is a structural protein. Protein is made up of amino acids through peptide bonds and hence, collagen has peptide bonds. Cell wall of fungi is made of chitin. Chitin is a polysaccharide. Ricin, a toxin is a secondary metabolite. Secondary metabolites are biological products which are not directly involved in growth and development of the organisms. |
| Secondary metabolites |

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| Consider the following statements.  (I) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group.  (II) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme.  Select the correct option. |
| (I) is false but (II) is true. |
| Both and (II) are true. |
| (I) is true but (II) is false. |
| Both and are false. |
| c |
| Non-proteinaceous metal ion acts as a coenzyme |
| The correct answer is (I) is true but (II) is false; Enzymes could be simple or conjugated (holoenzyme). Conjugated enzymes are formed of two parts - a protein part called apoenzyme and a non-protein part named co-factor. Co-factors are bound to the enzyme to make it catalytically active. There are three types of cofactors: prosthetic groups, co-enzymes and metal ions. Prosthetic groups are organic compounds and are distinguished from other cofactors in which they are tightly bound to the apoenzyme. Co-enzymes are organic compounds but their association with the apoenzyme is only transient, occurring during the course of catalysis. A number of enzymes require metal ions for their activity which form coordination one or more coordination bonds with the substrate. |
| Enzymes: Characteristics |

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| --- |
| Prosthetic groups differ from co-enzymes in that  Odisha NEET 2019 |
| they require metal ions for their activity |
| they (prosthetic groups) are tightly bound to apoenzymes |
| their association with apoenzymes is transient |
| they can serve as co-factors in a number of enzyme-catalyzed reactions. |
| b |
| Apoenzymes |
| The correct answer is they (prosthetic groups) are tightly bound to apoenzymes. This is because – Prosthetic groups are organic compounds that are tightly bound to the apoenzyme but coenzymes are associated with the apoenzyme last for a short period of time i.e. transiently. |
| Enzymes: Characteristics |

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| --- |
| Which of the following statements is correct with reference to enzymes?  2017 |
| Holoenzyme Apoenzyme + Coenzyme |
| Coenzyme Apoenzyme + Holoenzyme |
| Holoenzyme Coenzyme + Co-factor |
| Apoenzyme Holoenzyme + Coenzyme |
| a |
| Holoenzyme consists of a protein part and a non-protein |
| the correct answer is Holoenzyme Apoenzyme + Coenzyme; 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. 69. (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. |
| Enzymes: Characteristics |

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| --- |
| A non-proteinaceous enzyme is  NEET-II 2016 |
| Lysozyme |
| Ribozyme |
| Ligase |
| Deoxyribonuclease |
| b |
| Autocatalyze at sequence-specific cleavage |
| The correct answer is Ribozymes; which are RNA molecules that catalyze or autocatalyze sequence-specific cleavage. They are found in viruses, plants, and mammals and operate as RNA cutting enzymes. Ligases, deoxyribonucleases, lysozymes are proteinaceous enzymes i.e., made up of proteins while ribozymes have RNA as structural components. Enzymes are highly efficient catalytic macromolecules with variable activity. |
| Nature of enzyme action |

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| Which of the following describes the given graph correctly?    NEET-II 2016 |
| Endothermic reaction with energy A in presence of enzyme and B in absence of enzyme. |
| Exothermic reaction with energy A in presence of enzyme and B in absence of enzyme. |
| Endothermic reaction with energy A in absence of enzyme and in presence of enzyme. |
| Exothermic reaction with energy A in absence of enzyme and B in presence of enzyme. |
| b |
| Competitive Inhibition |
| The correct answer is exothermic reaction with energy A in presence of enzyme and B in absence of enzyme; 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. 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 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 value. |
| Working of enzyme |

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| --- |
| Which one of the following statements is incorrect?  2015 Cancelled |
| The competitive inhibitor does not affect the rate of breakdown of the enzyme-substrate complex. |
| The presence of the competitive inhibitor decreases the of the enzyme for the substrate. |
| A competitive inhibitor reacts reversibly with the enzyme to form an enzyme-inhibitor complex. |
| In competitive inhibition, the inhibitor molecule is not chemically changed by the enzyme. |
| b |
| Reduction activity of succinate dehydrogenase |
| The presence of the competitive inhibitor decreases the Km of the enzyme for the substrate; 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 succinate dehydrogenase by malonate. |
| How do enzymes bring about such high rates of chemical conversions; working of enzymes |

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| --- |
| Select the option which is not correct with respect to enzyme action. |
| Substrate binds with enzyme at its active site. |
| Addition of lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate. |
| A non-competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate. |
| Malonate is a competitive inhibitor of succinic dehydrogenase. |
| b |
| Competitive inhibitor binds to the enzyme at active site |
| The correct answer is Addition of lot of succinates does not reverse the inhibition of succinic dehydrogenase by malonate; Substrate binds with enzyme at its active site. A noncompetitive inhibitor binds the enzyme at a sight distinct from the active site, the site which binds the substrate. Hence, it does not have any effect on the substrate concentration. This type of inhibition cannot be reversed by addition of more substrate. A competitive inhibitor binds to the enzyme at the active site, the site which binds the substrate. This type of inhibition can be reversed by addition of more substrate. For example, malonate is a competitive inhibitor of succinic dehydrogenase. Succinate and malonate both binds to the same active site of the enzyme succinic dehydrogenase. |
| How do enzymes bring about such high rates of chemical conversions; working of enzymes |

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| --- |
| Transition state structure of the substrate formed during an enzymatic reaction is  2013 |
| transient and unstable |
| permanent and stable |
| transient but stable |
| permanent but unstable. |
| b |
| Highest energy forms |
| The correct option is transient and unstable; All enzymatic reactions go through a transition state. This state is in between the substrate and the product and has the highest energy. Therefore, it is transient and unstable. |
| How do enzymes bring about such high rates of chemical conversions; working of enzymes |

|  |
| --- |
| The essential chemical components of many coenzymes are  2013 |
| Carbohydrates |
| Vitamins |
| Proteins |
| Nucleic acids |
| b |
| NAD and NADP |
| The correct answer is vitamins; 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 and , e.g., thiamine, riboflavin, nicotinamide, pyridoxine. |
| Steps in catalytic cycle of enzyme action |

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| --- |
| Which of the following statements about enzymes is wrong?  Karnataka NEET 2013 |
| Enzymes are denatured at high temperatures. |
| Enzymes are mostly proteins but some are lipids also. |
| Enzymes are highly specific. |
| Enzymes require optimum and temperature for maximum activity. |
| B |
| Cofactors |
| The correct option is Most enzymes are proteins but some are lipids. All enzymes are proteins. They may be simple proteins or proteins conjugated with cofactors like mineral ions |
| How do enzymes bring about such high rates of chemical conversions; working of enzymes |

|  |
| --- |
| The curve given below shows enzymatic activity in relation to three conditions , temperature and substrate concentration).    What do the two axes and represent? -axis -axis  2011 |
| Enzymatic activity & |
| Temperature & Enzyme activity |
| Substrate & Enzymatic concentration activity |
| Enzymatic activity & Temperature |
| b |
| Enzyme kinetics |
| Enzymes are made up of proteins which accelerates the rate of the reaction. It lowers the activation energy and converts the reactants into the substrate. The increased temperature increases the kinetic energy of the enzymes which further accelerates the activity of the enzyme but at the temperature higher than the optimum temperature the enzyme gets denatured as the peptide bonds between the proteins molecules breaks which disrupts the structure of enzymes. |
| How do enzymes bring about such high rates of chemical conversions; working of enzymes |

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| --- |
| Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?  Mains 2010 |
| Enzymes require optimum for maximal activity. |
| Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures . |
| Enzymes are highly specific. |
| Most enzymes are proteins but some are lipids |
| d |
| Lipids |
| The correct option is Most enzymes are proteins but some are lipids. All enzymes are proteins. They may be simple proteins or proteins conjugated with cofactors like mineral ions. |
| How do enzymes bring about such high rates of chemical conversions; substrate |

|  |
| --- |
| The figure given below shows the conversion of a substrate into product by an enzyme. In which one of the four options (A-D) the components of    reaction labelled as and are identified correctly?  A  D Activation energy without enzyme Activation energy with enzyme Activation energy without enzyme Potential energy  Mains 2010 |
| Potential Transition Activation energy state energy with enzyme |
| Transition Potential Activation state energy energy without enzyme |
| Potential Transition Activation energy state energy with enzyme |
| Activation Transition Activation energy state energy with without enzyme enzyme |
| b |
| Enzyme kinetics |
| According to the most widely accepted mechanism of enzyme action, the enzyme molecule binds substrate molecule to form a temporary transition state (labelled as A) which rapidly degrades into enzyme molecule and product. The transition state has higher potential energy than that of substrate (labelled as B) or product molecule. Thus, a substrate has to pass through the energy barrier in order to form the product molecule. An uncatalyzed reaction (labelled as C) has to cross a higher barrier as compared to a reaction catalysed by an enzyme (labelled as D). Thus, enzymes work by reducing the energy barrier between substrate and the product molecules. |
| How do enzymes bring about such high rates of chemical conversions; substrate; Activation energy |

|  |
| --- |
| A competitive inhibitor of succinic dehydrogenase is |
| -ketoglutarate |
| Malate |
| Malonate |
| Oxaloacetate. |
| c |
| Enzyme inhibitors |
| The correct answer is Malonate, which resemble succinate in structure and inhibit the activity of succinate dehydrogenase. Such competitive inhibitors are often used in control of bacterial pathogen. |
| Nature of enzyme action; Steps in catalytic cycle of an enzyme action |

|  |
| --- |
| Modern detergents contain enzyme preparations of  2008 |
| Thermoacidophiles |
| Acidophiles |
| Thermophiles |
| Alkaliphiles. |
| b |
| Factors affecting enzyme action |
| The correct option is Acidophiles, Enzymes containing hydrolases, proteases, and cellulases (25-30%) are used to make contemporary detergents. Non-ionic detergents and soaps that work in the pH range of 8 to 10 are available. They operate in a pH range that is higher and more alkaline. |
| Factors affecting enzyme action: Temperature: PH |

|  |
| --- |
| An organic substance bound to an enzyme and essential for its activity is called  2006 |
| Isoenzyme |
| Coenzyme |
| Holoenzyme |
| Apoenzyme. |
| b |
| Enzymes that help in hydrogen transfer or oxidation. |
| The correct answer is co-enzymes; 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 catalysed processes often by acting as a donor or acceptor of a substance involved in the reaction. ATP and NAD are common coenzymes. |
| Enzymes: Characteristics |

|  |
| --- |
| The catalytic efficiency of two different enzymes can be compared by the  2005 |
| formation of the product |
| of optimum value |
| value |
| molecular size of the enzyme |
| c |
| Molecular size of the enzyme generally has got little to do with its efficiency. |
| 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 varies from enzyme to enzyme and is used in characterizing the different enzymes. A smaller value indicates greater affinity of the enzyme for its substrate, hence, shows a quicker reaction. value is a constant characteristic of an enzyme for its conversion of a substrate. |
| Factors affecting enzyme action: Concentration of Substrate |

|  |
| --- |
| Which one of the following statements regarding enzyme inhibition is correct?  2005 |
| Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein. |
| Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme |
| Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate. |
| Non-competitive inhibitors often bind to the enzyme irreversibly. |
| b |
| Competitive Inhibition occurs when the binding of the inhibitor to the active site on the enzyme prevents the binding of the substrate |
| The correct option is Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme. Competitive Inhibition occurs when the binding of the inhibitor to the active site on the enzyme prevents the binding of the substrate and vice versa. The binding of competitive inhibitors to enzymes are reversible. Noncompetitive inhibition occurs when the inhibitor binds to the enzyme at a site away from the active site such that even on binding of the substrate, the enzyme functions less effectively. This type of inhibition is reversible and cannot be overcome by adding a large amount of substrate. |
| Factors affecting enzyme action: Inhibition |

|  |
| --- |
| Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these |
| help in regulating metabolism |
| are exclusively synthesized in the body of a living organism as at present |
| are conjugated proteins |
| enhance oxidative metabolism. |
| a |
| Hormones are biologically active organic substance |
| 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 specialised organs and exert physiological effects at sites far from their origin. |
| Advantages of enzymes |

|  |
| --- |
| In which one of the following enzymes, is copper necessarily associated as an activator? |
| Carbonic anhydrase |
| Tryptophanase |
| Lactic dehydrogenase |
| Tyrosinase |
| d |
| Production of melanin |
| The correct answer is tyrosinase; 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. |
| Nature of enzyme action: Steps in catalytic cycle of an enzyme action |

|  |
| --- |
| Role of an enzyme in reactions is to/as |
| decrease activation energy |
| increase activation energy |
| inorganic catalyst |
| none of the above. |
| a |
| The rate of reaction increases with decrease in activation energy |
| 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. |
| How do enzymes bring about such high rates of chemical conversions; Activation energy |

|  |
| --- |
| Which factor is responsible for inhibition of enzymatic process during feedback? |
| Substrate |
| Enzymes |
| End product |
| Temperature |
| c |
| Diffuse to allosteric enzyme |
| 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 is converted into a product through and intermediate products. As the concentration of end product increases, it diffuses to allosteric enzyme causing a reduced synthesis of the product which in turn lowers the rate of enzymatic reactions in rest of the pathway. |
| Factors affecting enzyme action: Inhibition |

|  |
| --- |
| Enzymes are not found in |
| Fungi |
| Algae |
| Virus |
| Cyanobacteria. |
| c |
| Lacking of metabolism in |
| 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. |
| Enzymes: Characteristics |

|  |
| --- |
| Co-factor (prosthetic group) is a part of holoenzyme. It is |
| loosely attached organic part |
| loosely attached inorganic part |
| accessory non-protein substance attached firmly |
| none of these. |
| c |
| Conjugate enzyme is known as apoenzyme |
| Conjugate enzymes (eg dehydrogenase enzymes) have an additional non protein cofactor attached to the protein part. The cofactor can be organic or inorganic. Loosely attached organic cofactor are called coenzymes example NAD, FAD etc. while firmly attached one is prosthetic group example heme, biotin etc. The protein part of conjugate enzyme is known as apoenzyme while the whole enzyme is called as holoenzyme. |
| Importance of cofactors |

|  |
| --- |
| Which is a typical example of 'feedback inhibition'? |
| Cyanide and cytochrome reaction |
| Sulpha drugs and folic acid synthesizer bacteria |
| Allosteric inhibition of hexokinase by glucose 6-phosphate |
| Reaction between succinic dehydrogenase and succinic acid |
| c |
| In feedback inhibition, the product of an enzyme-catalyzed reaction |
| Feedback inhibition or end product inhibition occurs when the end product of a metabolic pathway inhibits the activity of an enzyme catalyzing 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 non-covalently 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 catalyzes conversion of glucose into glucose 6-phosphate but as the reaction proceeds, increase in concentration of glucose 6-phosphate inhibits the activity of hexokinase. |
| Factors affecting enzyme action: Inhibition |

|  |
| --- |
| Enzymes having slightly different molecular structure but performing identical activity are |
| Holoenzymes |
| Isoenzymes |
| Apoenzymes |
| Coenzymes |
| b |
| Enzymes which have minor differences in their molecular structure |
| Enzymes having slightly different molecular structures but performing identical activities are called isoenzymes. Over 100 enzymes are known to have isoenzymes. |
| Types of co-factors |