# EXERCISE-I

## Carbohydrates

**1.** The change in optical rotation, with time, of freshly prepared solution of sugar is known as
(A) Rotatory motion (B) Inversion
(C) Specific rotation (D) Mutarotation

**2.** Gun-cotton is
(A) Nitrosucrose (B) Nitrocellulose
(C) Nitroglucose (D) Nitropicrin

**3.** Which of the following monosaccharide is a pentose
(A) Galactose (B) Glucose
(C) Fructose (D) Arabinose

**4.** Amide group is present in
(A) Lipids (B) Carbohydrates
(C) Amino acids (D) Proteins

**5.** Which of the following is a carbohydrate
(A) Leucine (B) Albumin
(C) Inulin (D) Maltase

**6.** General formula for carbohydrates is
(A) $C_nH_{2n}O_{2n+2}$ (B) $C_x(H_2O)_{2x}$
(C) $C_x(H_2O)_y$ (D) None of these

**7.** Benedict solution provides
(A) $Ag^+$ (B) $Li^+$
(C) $Cu^{+2}$ (D) $Ba^{+2}$

**8.** Glucose gives silver mirror with Tollen's reagent. It shows the presence of
(A) An acidic group
(B) An alcoholic group
(C) A ketonic group
(D) An aldehydic group

**9.** A certain compound gives negative test with ninhydrin and positive test with Benedict's solution. The compound is
(A) A protein (B) A monosaccharide
(C) A lipid (D) An amino acid

**10.** An organic compound answers Molisch's test as well as Benedict's test. But it does not answer Scliwanoff's test. Most probably, it is
(A) Sucrose (B) Protein
(C) Fructose (D) Maltose

**11.** Glucose forms many derivatives. The derivative which will help to prove the furanose structure is
(A) Acetyl (B) Benzoyl
(C) Osazone (D) Isopropylidene

**12.** Glucose and fructose form
(A) Same osazone
(B) Same acid on oxidation
(C) Same alcohol when reduced
(D) Different osazone

**13.** On heating with conc. $H_2SO_4$, sucrose gives
(A) *CO* and $CO_2$ (B) *CO* and $SO_2$
(C) CO, $CO_2$ and $SO_2$ (D) None of these

**14.** The letter '*D*' in carbohydrates represents
(A) Its direct synthesis (B) Its dextrorotation
(C) Its mutarotation (D) Its configuration

**15.** Starch can be used as an indicator for the detection of traces of
(A) Glucose in aqueous solution
(B) Protein in blood
(C) Iodine in aqueous solution
(D) Urea in blood

**16.** It is best to carry out reactions with sugars in neutral or acid medium and not in alkaline medium. This is because in alkaline medium sugars undergo one of the following changes
(A) Racemisation (B) Decomposition
(C) Inversion (D) None of these

**17.** Which one of the following compounds is found abundantly in nature
(A) Fructose (B) Starch
(C) Glucose (D) Cellulose

**18.** The substance that forms the plant cell walls is or Which carbohydrates is an essential constituents of plant cells
(A) Cellulose (B) Sucrose
(C) Vitamins (D) Starch

**19.** Sugar can be tested in urine by
(A) Molisch test (B) Dunstan's test
(C) Benedict's test (D) Legal's test

**20.** When sucrose is heated with conc. $HNO_3$ the product is
(A) Sucrose nitrate (B) Formic acid
(C) Oxalic acid (D) Citric acid

**21.** A carbohydrate that cannot be hydrolysed to simpler forms is called
(A) Disaccharide (B) Monosaccharide
(C) Polysaccharide (D) Trisaccharide

**22.** If monosaccharide contains an aldehyde group, it is known as
(A) Epimer (B) Osones
(C) Osazone (D) Aldose

**23.** If a monosaccharide contains a ketogroup, it is known as
(A) Ketose (B) Osones
(C) Epimer (D) Osazone

**24.** The aqueous solution of a carbohydrate gives dark blue colour with iodine. It is
(A) Glucose (B) Fructose
(C) Sucrose (D) Starch

**25.** Which of the following carbohydrates is a disaccharide
(A) Glucose (B) Fructose
(C) Raffinose (D) Maltose

**26.** Optical activity is shown by
(A) Glucose (B) Fructose
(C) Sucrose (D) All of these

**27.** Which is a reducing sugar
(A) Glucose (B) Fructose
(C) Galactose (D) All of these

**28.** The ultimate product of oxidation of most of hydrogen and carbon in foodstuffs are
(A) $H_2O$ alone (B) $CO_2$ alone
(C) $H_2O$ and $CO_2$ (D) None of these

**29.** Osazone formation involves only 2 carbon atoms of glucose because of
(A) Chelation (B) Oxidation
(C) Reduction (D) Hydrolysis

**30.** Glucose will show mutarotation when solvent is
(A) Acidic (B) Basic
(C) Neutral (D) Amphoteric

**31.** Which is used in motion picture films
(A) Cellulose acetate (B) Glucose acetate
(C) Starch acetate (D) Sucrose acetate

**32.** Glucose reacts with acetic anhydride to form
(A) Mono-acetate (B) Tetra-acetate
(C) Penta-acetate (D) Hexa-acetate

**33.** Which of the following does not show any reducing test of aldehyde
(A) Sucrose (B) Fructose
(C) Maltose (D) Lactose

**34.** When amylases catalyse the hydrolysis of starch, the final product obtained is chiefly
(A) Cellobiose (B) Glucose
(C) Maltose (D) Sucrose

**35.** Galactose is converted into glucose in
(A) Mouth (B) Stomach
(C) Liver (D) Intestine

**36.** Which among the following is the simplest
(A) Glucose (B) Cellulose
(C) Starch (D) None of these

**37.** Indigestible carbohydrate, which is also a constituent of our diet, is
(A) Cellulose (B) Galactose
(C) Maltose (D) Starch

**38.** Starch is converted into maltose by the
(A) Maltase (B) Invertase
(C) Zymase (D) Diastase

**39.** The disaccharide present in milk is
(A) Maltose (B) Lactose
(C) Sucrose (D) Cellobiose

**40.** Carbohydrates are used by body mainly
(A) For obtaining vitamins
(B) As source of energy
(C) For all its developmental needs
(D) For building muscles

**41.** The safest and the most common alternative of sugar is
(A) Glucose (B) Aspartame
(C) Saccharin (D) Cyclodextrin

**42.** The specific rotation of equilibrium mixture of $\alpha$-*D*-glucose and $\beta$-*D*-glucose, is
(A) $+19^o$ (B) $+112^o$
(C) $+52^o$ (D) $+100^o$

**43.** The charring of sugar, when treated with conc. $H_2SO_4$, is due to
(A) Oxidation (B) Reduction
(C) Dehydration (D) Hydrolysis

**44.** Which among the following is the simplest sugar
(A) Glucose (B) Cellulose
(B) Starch (D) Glycogen

**45.** Glucose and mannose are
(A) Epimers (B) Anomers
(C) Ketohexoses (D) Disaccharides

**46.** On hydrolysis, which produces only glucose
(A) Galactose (B) Maltose
(C) Sucrose (D) None

**47.** Pick out the one which does not belong to the family
(A) Pepsin (B) Cellulose
(C) Ptyalin (D) Lipase

**48.** Which of the following is the sweetest sugar
(A) Glucose (B) Fructose
(C) Lactose (D) Sucrose

**49.** Oxidation of glucose is one of the most important reactions in a living cell. What is the number of ATP molecules generated in cells from one molecule of glucose
(A) 38 (B) 12
(C) 18 (D) 28

**50.** Glucose has difference from fructose in that it
(A) Does not undergo hydrolysis
(B) Gives silver mirror with Tollen's reagent
(C) Monosaccharide
(D) None of these

## Proteins, Amino Acids and Enzymes

**51.** Insulin is
(A) An amino acid (B) Protein
(C) A carbohydrate (D) A lipid

**52.** Peptides are
(A) Esters (B) Salts
(C) Amides (D) Ketones

**53.** The proteins which are insoluble in water are
(A) Fibrous proteins (B) Globular proteins
(C) Both (A) and (B) (D) None of these

**54.** Irreversible precipitation of proteins is called
(A) Denaturation (B) Hydrolysis
(C) Rearrangement (D) Electrophoresis

**55.** The proteins with a prosthetic group are called
(A) Pseudo proteins (B) Complex proteins
(C) Conjugated proteins (D) Polypeptides

**56.** The prosthetic group of haemoglobin is
(A) Porphin (B) Haem
(C) Globin (D) Globulin

**57.** When collagen is boiled with water, it forms
(A) Precipitate (B) Solution
(C) Gelatin (D) Complex collagen

**58.** Which of the following is not essential amino acid
(A) Valine (B) Lysine
(C) Histidine (D) Glycine

**59.** Amino acids are
(A) Liquids
(B) Volatile solids
(C) Non-volatile crystalline compounds
(D) Mixture of amines and acids

**60.** Isoelectric point is a
(A) Specific temperature
(B) Suitable concentration of amino acid
(C) Hydrogen ion concentration that does not allow migration of amino acid under electric field
(D) Melting point of an amino acid under the influence of electric field

**61.** Which of the following foodstuffs contains nitrogen
(A) Carbohydrates (B) Fats
(C) Proteins (D) None of these

**62.** *pH* in stomach is approximately
(A) 7 (B) 2.0
(C) 6.5 (D) 10

**63.** The helical structure of proteins is established by
(A) Peptide bonds
(B) Dipeptide bond
(C) Hydrogen bond
(D) Vander Waal's forces

**64.** Natural silk is a
(A) Polyester (B) Polyamide
(C) Polyacid (D) Polysaccharide

**65.** Protein contains
(A) C, H, O and *N* (B) Only *C* and *H*
(C) Cl, H and O (D) All of these

**66.** The end product of protein digestion is
(A) Amino acid (B) Glucose
(C) Glycerol (D) Oxalic acid

**67.** Protein can be most easily removed from
(A) Alkanes (B) Alkenes
(C) Alkynes (D) Benzene

**68.** Which of the following contains the highest percentage of protein
(A) Groundnut (B) Cow's milk
(C) Egg (D) Wheat

**69.** The enzyme ptylin used for the digestion of food is present in
(A) Saliva (B) Blood
(C) Intestines (D) Adrenal glands

**70.** Which one of the following is an amino acid
(A) $CH_3CONH_2$ (B) $CH_3CONHCH_3$
(C) $CH_3NHCHO$ (D) $NH_2CH_2.COOH$

**71.** Read the following statements carefully
(a) Albumin is a simple protein
(b) The amino acid alanine contains an acidic side chain
(c) Insulin is a hormone
(d) Muscles contain the protein keratin Point out the wrong statements in the above set of statements
(A) a, b (B) c, d
(C) a, c (D) b, d

**72.** Enzymes in the living systems
(A) Provide energy
(B) Provide immunity
(C) Transport oxygen
(D) Catalyse biological processes

**73.** Which of the following statements about proteins is not true
(A) Amino acid residues join together to make a protein molecule
(B) Proteins are polymers with formula $(C_6H_{10}O_5)_n$
(C) Eggs are rich in protein
(D) Pulses are good source of proteins

**74.** Enzymes
(A) Accelerate biochemical reactions
(B) Have optimum activity at body temperature
(C) Consist of amino acids
(D) Have all these properties

**75.** The functional group which is found in amino acid is
(A) $-COOH$ group (B) $-NH_2$ group
(C) $-CH_3$ group (D) Both (A) and (B)

**76.** Amino acids are produced on hydrolysis of
(A) Nucleic acid (B) Carbohydrates
(C) Fats (D) Proteins

**77.** Enzymes belong to which class of compounds
(A) Polysaccharides
(B) Polypeptides
(C) Polynitrogen heterocyclic compounds
(D) Hydrocarbons

**78.** By the action of enzymes, the rate of biochemical reaction
(A) Decreases (B) Increases
(C) Does not change (D) Either (A) or (C)

**79.** Metal present in blood is
(A) *Al* (B) *Mg*
(C) *Cu* (D) *Fe*

**80.** Which compound can exist in a dipolar (zwitter ion) state
(A) $C_6H_5CH_2CH(N=CH_2)COOH$
(B) $(CH_3)_2CH.CH(NH_2)COOH$
(C) $C_6H_5CONHCH_2COOH$
(D) $HOOC.CH_2CH_2COCOOH$

**81.** The 10% energy transfer law of food chain was given by
(A) Stanley (B) Weismann
(C) Lindemann (D) Tansley

**82.** Which of the following is a conjugated protein
(A) Glycoprotein (B) Phosphoprotein
(C) Chromoprotein (D) All of these

**83.** The number of essential amino acids in man is
(A) 8 (B) 10
(C) 18 (D) 20

**84.** Pick out wrong combination
(A) $Fe^{+2} \rightarrow$ Haemoglobin
(B) $Mg^{2+} \rightarrow$ Photosynthesis
(C) $Se^{2+} \rightarrow$ Kreb Cycle
(D) $CO^{+2} \rightarrow$ Vitamin B-12

**85.** The decomposition of complex organic compounds into simpler compound with the help of enzyme is known as
(A) Catabolism (B) Anabolism
(C) Fermentation (D) Metabolism

**86.** A biological catalyst is essentially
(A) A carbohydrates (B) An amino acids
(C) A nitrogen molecule (D) Fats

**87.** The test used for identifying peptide linkage in proteins is
(A) Borsche's test (B) Molisch's test
(C) Ninhydrin test (D) Biuret test

**88.** Which of the following is not a function of proteins
(A) Nails formation
(B) Skin formation
(C) Muscle formation
(D) Providing energy for metabolism

**89.** The helical structure of proteins is stabilized by
(A) Peptide bonds
(B) Dipeptide bond
(C) Hydrogen bond
(D) Vander Waal's forces

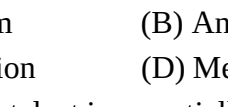
**90.** The optically inactive amino acid is
(A) Lysine (B) Glycine
(C) Arginine (D) Alanine

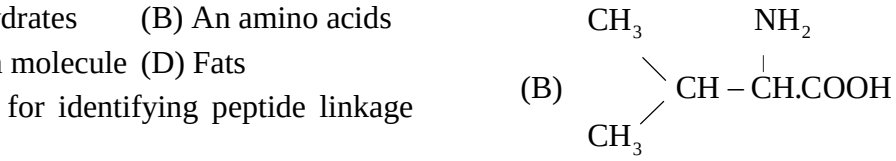
**91.** Which of the following could act as a propellant or rockets
(A) Liquid hydrogen + liquid nitrogen
(B) Liquid oxygen + liquid argon
(C) Liquid hydrogen + liquid oxygen
(D) Liquid nitrogen +liquid oxygen

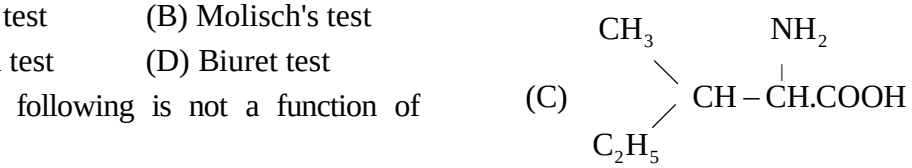
**92.** Which amino acid has aromatic ring
(A) Alamine (B) Glycine
(C) Tyrosine (D) Lysine

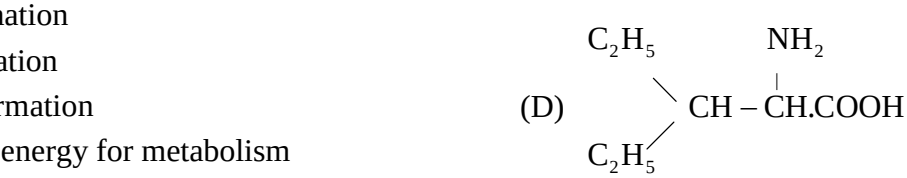
**93.** Which part of the protein molecule is responsible for function and activity of the proteins
(A) Secondary structure (B) Peptide bond
(C) Primary structure (D) Binding sites

**94.** The Structural formula of an amino acid, isoleucine is

(A) 

(B) 

(C) 

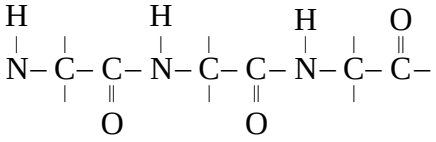
(D) 

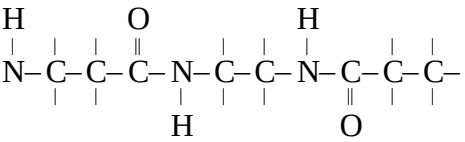
**95.** The process by which synthesis of protein takes place based on the genetic information present in *m*-RNA is called
(A) Translation
(B) Transcription
(C) Replication
(D) Messenger hypothesis

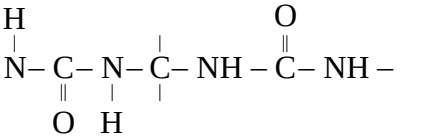
**96.** Which of the following is used in our body as a fuel for muscles and nerves and to build and repair body tissues?
(A) Cane sugar (B) Fructose
(C) Proteins (D) Glucose

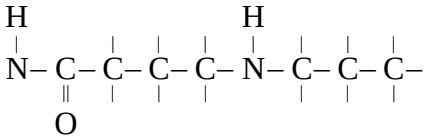
**97.** Which enzyme convert glucose into alcohol
(A) Invertase (B) Zymase
(C) Maltase (D) Diastase

**98.** Which one of the following structures represents the peptide chain

(A) 

(B) 

(C) 

(D) 

**99.** The correct statement in respect of protein haemoglobin is that it

(A) Acts as an oxygen carrier in the blood

(B) Forms antibodies and offers resistance to diseases

(C) Functions as a catalyst for biological reactions

(D) Maintains blood sugar level

**100.** Identify the correct statement regarding enzymes

(A) Enzymes are specific biological catalysts that cannot be poisoned

(B) Enzymes are normally heterogeneous catalysts that are very specific in their action

(C) Enzymes are specific biological catalysts that can normally function at very high temperature ($T \sim 1000K$)

(D) Enzymes are specific biological catalysts that possess well-defined active sites

## Fats and Lipids

**101.** Tripalmitin is

(A) A protein (B) An enzyme

(C) A lipid (D) A carbohydrate

**102.** On hydrolysis, all lipids yield

(A) Monocarboxylic acids

(B) Monohydric alcohols

(C) Monohaloalkanes

(D) Enzymes

**103.** Which of the following is not a lipid

(A) Oils (B) Fats

(C) Waxes (D) Proteins

**104.** The '*acid value*' of an oil or fat is measured in terms of weight of

(A) $NH_4OH$ (B) *NaOH*

(C) *KOH* (D) $CH_3COOH$

**105.** The '*saponification value*' of an oil or fat is measured in terms of

(A) $NH_4OH$ (B) *NaOH*

(C) *KOH* (D) $C_6H_5OH$

**106.** The '*iodine value*' of an oil indicates

(A) Its boiling point

(B) Inflammability

(C) Unsaturation present in acid contents

(D) Solubility of salt in oils

**107.** Hardening of oils is caused by

(A) $H_2$ (B) $N_2$

(C) $O_2$ (D) $CO_2$

**108.** Which of the following is obtained when an oil is hydrolysed with alkali

(A) Fat (B) Wax

(C) Soap (D) Vitamin

**109.** Which of the following indicates the number of free $-OH$ groups in an oil or fat

(A) Iodine value

(B) Acid value

(C) Acetyl value

(D) Saponification value

**110.** Which of the following is not glyceride

(A) Lipids (simple) (B) Phospholipids

(C) Sphingolipids (D) All

**111.** Which is not a macromolecule

(A) *DNA* (B) Starch

(C) Palmitate (D) Insulin

**112.** A distinctive and characteristic functional group of fats is
(A) An ester group
(B) A peptide group
(C) A ketonic group
(D) An alcoholic group

**113.** The waxes are long chain compounds of fatty acids, which belong to the class of
(A) Esters (B) Ethers
(C) Alcohols (D) Acetic acid

**114.** Hydrolytic reaction of fats, with caustic soda, is known as
(A) Acetylation (B) Carboxylation
(C) Saponification (D) Esterification

**115.** Fat consists of
(A) Monohydroxy carboxylic acid
(B) Monohydroxy aliphatic carboxylic acid
(C) Monohydroxy aliphatic, saturated carboxylic acid
(D) Dihydroxy aliphatic carboxylic acid

**116.** The alcohol obtained by the hydrolysis of oils and fats is
(A) Glycol (B) Glycerol
(C) Propanol (D) Pentanol

**117.** Iodine value is related to
(A) Fats and oils (B) Alcohols
(C) Esters (D) Hydrocarbons

**118.** Phospholipids are esters of glycerol with
(A) Three phosphate groups
(B) Three carboxylic acid residues
(C) Two carboxylic acid residues and one phosphate group
(D) One carboxylic acid residue and two phosphate groups

**119.** Oils and fats are jointly called
(A) Lipids (B) Soaps
(C) Proteins (D) Polymer

**120.**

$$\begin{array}{l} CH_2OOCR' \\ | \\ CHOOCR'' \\ | \\ CH_2OOCR''' \end{array} \xrightarrow[\text{Hydrolysis}]{\text{Enzyme}} \begin{array}{l} CH_2OH \\ | \\ CHOH \\ | \\ CH_2OH \end{array} + \begin{array}{l} R'COOH \\ + \\ R''COOH \\ + \\ R'''COOH \end{array}$$

The enzyme used in the above reaction is
(A) Amylase (B) Lactase
(C) Lipase (D) Invertase

## Vitamin, Harmone and Nucleic acid

**121.** A nucleotide consists of
(A) Base and sugar
(B) Base and phosphate
(C) Sugar and phosphate
(D) Base, sugar and phosphate

**122.** Which of the following is responsible for heredity character
(A) DNA (B) RNA
(C) Proteins (D) Hormones

**123.** The base adenine occurs in
(A) DNA only (B) RNA only
(C) DNA and RNA both (D) Protein

**124.** The protein which maintains blood sugar level in the human body
(A) Haemoglobin (B) Oxytocin
(C) Insulin (D) Ptyalin

**125.** Which of the following statements about the assembly of nucleotides in a molecule of deoxyribose nucleic acid (DNA) is correct
(A) A pentose of one unit connects to a pentose of another
(B) A pentose of one unit connects to the base of another
(C) A phosphate of one unit connects to a pentose of another
(D) A phosphate of one unit connects to the base of another

**126.** Vitamin *A* is present in
(A) Cod liver oil (B) Carrot
(C) Milk (D) In all of these

**127.** Ascorbic acid is a
(A) Vitamin (B) Enzyme
(C) Protein (D) Carbohydrate

**128.** The chemical name of vitamin *C* is
(A) Ascorbic acid (B) Folic acid
(C) Nicotinic acid (D) Tartaric acid

**129.** Which of the following is not a constituent of *RNA*
(A) Ribose (B) Phosphate
(C) Adenine (D) Pyridine

**130.** Which one is found in ATP ribonucleotide
(A) Guanine (B) Uracil
(C) Adenine (D) None of these

**131.** The segment of DNA which acts as the instructional manual for the synthesis of the protein is
(A) Nucleoside (B) Nucleotide
(C) Ribose (D) Gene

**132.** The double helical structure of DNA was proposed by
(A) Watson and Crick (B) Meicher
(C) Emil Fischer (D) Khorana

**133.** A segment of DNA molecule which codes or specifies for one polypeptide chain is called
(A) Phosphate group (B) Adenine
(C) Gene (D) Amino acid

**134.** In DNA, the complementary bases are
(A) Uracil and adenine; cytosine and guanine
(B) Adenine and thymine; guanine and cytosine
(C) Adenine and thymine; guanine and uracil
(D) Adenine and guanine; thymine and cytosine

**135.** The structure of DNA is
(A) Linear (B) Single helix
(C) Double helix (D) Triple helix

**136.** Vitamin $B_1$ is
(A) Riboflavin (B) Cobalamin
(C) Thiamine (D) Pyridoxine

**137.** A gene is a segment of a molecule of
(A) DNA (B) *m*-RNA
(C) *t*-RNA (D) Protein

**138.** The deficiency of vitamin-*C* causes
(A) Scurvy
(B) Rickets
(C) Pyrrohea
(D) Pernicious Anaemia

**139.** DNA contains the sugar
(A) Deoxyribose (B) Ribose
(C) *D*-Fructose (D) *D*-glucose

**140.** Which of the following is not a sex hormone
(A) Testosterone (B) Estrone
(C) Estradiol (D) Cortisone

**141.** The reason for double helical structure of DNA is operation of
(A) Vander Waal's forces
(B) Dipole-dipole interaction
(C) Hydrogen bonding
(D) Electrostatic attractions

**142.** The tripeptide harmone present in most living cells is...
(A) Glutathione (B) Glutamine
(C) Oxytocin (D) Ptyalin

**143.** The function of DNA in an organism is
(A) To assist in the synthesis of RNA molecule
(B) To store information of heredity characteristics
(C) To assist in the synthesis of proteins and polypeptides
(D) All of these

**144.** The harmone that helps in the conversion of glucose to glycogen in
(A) Adrenaline (B) Insulin
(C) Cortisone (D) Bile acids

**145.** Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following categories
(A) An enzyme (B) A harmone
(C) A co-enzyme (D) An antibiotic

**146.** Codon is present in
(A) *t*-RNA (B) *m*-RNA
(C) *r*-RNA (C) All of these

**147.** Energy is stored in our body in the form of
(A) ATP (B) ADP
(C) Fats (D) Carbohydrates

**148.** Nucleic acid is a polymer of
(A) Nucleosides (B) $\alpha$ – amino acids
(C) Nucleotides (D) Glucose

**149.** A nucleoside on hydrolysis gives
(A) A heterocyclic base and orthophosphoric acid
(B) An aldopentose, a heterocyclic base and orthophosphoric acid
(C) An aldopentose and a heterocyclic base
(D) An aldopentose and orthophosphoric acid

**150.** An alternation in the base sequence of nucleic acid molecule is called
(A) Replication (B) Mutation
(C) Duplication (D) Dislocation