BIOLOGY

Worksheet-8

STEP

A PROJECT BY PUNJAB GROUP

Worksheet-8
(Biological Molecules)

Q.1 **The most abundant organic compounds to be found in the cells are:**

A) Proteins C) Nucleic acids

B) Lipids D) Carbohydrates

Q.2 **All _____ are proteins and in this way they control the whole metabolism of the cell.**

A) Hormones

B) Antibodies

C) Enzymes

D) Immunoglobulins

Q.3 **The organic biomolecules that exhibit maximum physiological diversity in living being are:**

A) Lipids C) Nucleic acids

B) Proteins D) Carbohydrates

Q.4 **Some proteins work as carriers and transport specific substances for example:**

A) Immunoglobulins C) Albumins

B) Enzymes D) Hemoglobin

Q.5 **The protein that prevent the loss of blood from the body after injury is:**

A) Albumin C) Globulin

B) Fibrin D) Keratin

Q.6 **These are polymers of amino acids:**

A) Hormones C) Hemoglobin

B) Enzymes D) Proteins

Q.7 **Amino acids mostly contain following elements:**

A) Carbon, nitrogen, oxygen, hydrogen

B) Carbon, nitrogen, sulphur, oxygen, hydrogen

C) Carbon, sulphur, oxygen, hydrogen

D) Carbon, nitrogen, sulphur, oxygen

Q.8 **All the amino acids invariably have following components, EXCEPT:**

A) NH_2 C) COOH

B) H D) CH_3

Q.9 **All the amino acids have an amino group and a carboxyl group attached to the same carbon atom, also known as:**

A) Central carbon C) Alpha carbon

B) Major carbon D) Beta carbon

Q.10 **Amino acids mainly differ due to the type or nature of:**

A) Carboxyl group C) Amino group

B) R-group D) Methyl group

Q.11 **The _____ group of one amino acid may react with the _____ group of another releasing a molecule of water to form a dipeptide.**

A) Functional, Amino

B) Amino, Amino

C) Carboxyl, Carboxyl

D) Carboxyl, Amino

Q.12 **If R-group is a hydrogen atom, the amino acid will be:**

A) Alanine C) Leucine

B) Glycine D) Tyrosine

Q.13 **Peptide bond is a:**

A) C-O bond C) C-C bond

B) C-N bond D) C-O-P bond

Q.14 **A dipeptide have an/a _____ group at one end and a _____ group at the other end of molecule.**

A) Amino, Carboxyl

B) Amino, Functional

C) Functional, Carboxyl

D) Amino, Amino

Q.15 A dipeptide glycylalanine consists of:

A) Glycine and glycine

B) Glycine and alanine

C) Alanine and alanine

D) Glycine and valine

Q.16 Each protein has specific properties which are determined by the:

A) Number of amino acids

B) Specific sequence of the amino acids

C) Shape of the amino acids

D) Number and specific sequence of amino acids

Q.17 Proteins have _____ levels of organization.

A) Two C) Four

B) Three D) Five

Q.18 F. Sanger was the first scientist who determined the _____ structure of a protein molecule.

A) Primary C) Tertiary

B) Secondary D) Quaternary

Q.19 One chain of insulin consists of _____ amino acids and the other has _____ amino acids.

A) 21, 30 C) 31, 20

B) 20, 31 D) 22, 29

Q.20 Both chains of insulin are held together by:

A) Peptide bonds C) Disulphide bonds

B) Hydrogen bonds D) Glycosidic bonds

Q.21 The primary structure of proteins is stabilized by:

A) Disulphide bonds

B) Hydrogen bonds

C) Hydrophobic interaction

D) Peptide bonds

Q.22 Hemoglobin is composed of:

A) Two alpha chains

B) Two beta chains

C) Two alpha and two beta chains

D) Four alpha chains

Q.23 Each alpha chain of hemoglobin consists of:

A) 151 amino acids C) 141 amino acids

B) 146 amino acids D) 156 amino acids

Q.24 Each beta chain of hemoglobin consists of:

A) 146 amino acids C) 141 amino acids

B) 156 amino acids D) 151 amino acids

Q.25 Number of amino acids incorporated in beta chains of a molecule of hemoglobin is:

A) 280 C) 292

B) 282 D) 290

Q.26 Number of peptide bonds involved in stabilization of primary structure of a molecule of hemoglobin is:

A) 574 C) 572

B) 570 D) 573

Q.27 Number of peptide bonds involved in maintenance of primary structure of shorter chain of insulin is:

A) 30 C) 20

B) 21 D) 19

Q.28 The size of a protein molecule at primary level is determined by:

A) Number of amino acids

B) Type of amino acids

C) Number and type of amino acids

D) Number and sequence of amino acids

Q.29 Proteins in the human body are composed of unique and specific arrangement of:

A) 25 types of amino acids

B) 20 types of amino acids

C) Over 20 types of amino acids

D) Less than 20 types of amino acids

Q.30 Due to unique and specific arrangement of same amino acids more than _____ different proteins are found in human body:

A) 10,000 C) 10,0000

B) 1000 D) 100

Q.31 For proper functioning, a protein should have its amino acids in:

A) A random arrangement

B) A specific medium

C) A specific arrangement

D) Ascending order

Q.32 The example of physiological ill effect of changing the amino acid sequence of a protein is:

A) Uremia C) Goiter

B) Hypoglycemia D) Sickle cell anemia

Q.33 If one amino acid out of 574 amino acids is replaced by another in a hemoglobin molecule it will lose following properties, EXCEPT:

A) Shape

B) Functional capacity

C) Oxygen carrying capacity

D) Quaternary level

Q.34 Hypoxia which may lead to death is the ultimate consequence of a change occurred initially at _____ level of hemoglobin structure:

A) Quaternary C) Secondary

B) Tartary D) Primary

Q.35 The polypeptide chains in a protein molecule usually do not _____.

A) Remain stable C) Acquire coiling

B) Lie flat D) Acquire folding

Q.36 The example of structural protein is:

A) Hemoglobin C) Antibodies

B) Albumin D) Collagen

Q.37 One of the common secondary structure of protein is:

A) α-helix C) γ helix

B) β-helix D) P_i helix

Q.38 It is a very uniform geometric structure with 3.6 amino acids in each turn of the helix:

A) α-helix C) α-pleated sheet

B) β-helix D) β-pleated sheet

Q.39 The helical structure of secondary protein is kept by the formation of _____ among amino acid molecules in successive turns of the spiral:

A) Ionic bond C) Hydrogen bond

B) Peptide bond D) Disulphide bond

Q.40 It is formed by folding back of the polypeptide chain:

A) α-helix C) α-pleated sheet

B) β-helix D) β-pleated sheet

Q.41 Usually a polypeptide chain bends and folds upon itself forming globular shape to acquire:

A) Primary configuration

B) Secondary configuration

C) Tertiary configuration

D) Quaternary configuration

Q.42 This structural level of proteins is maintained by ionic, hydrogen and disulphide bonds:

A) Primary structure

B) Secondary structure

C) Tertiary structure

D) Quaternary structure

Q.43 Stabilization of tertiary structure of proteins involve _____ chemical bonds.

A) One C) Three

B) Two D) Four

Q.44 The most stable tertiary configuration is due to:

A) Ionic bonds

B) Hydrogen bonds

C) Disulphide bonds

D) Hydrophobic interaction

Q.45 Pick up the highly complex protein:

A) Primary protein

B) Secondary protein

C) Tertiary protein

D) Quaternary protein

Q.46 Polypeptide tertiary chains are aggregated and held together to give rise to:

A) Primary structure

B) Secondary structure

C) Tertiary structure

D) Quaternary structure

Q.47 Quaternary structure is maintained by:

A) Ionic bonds

B) Hydrophobic interaction

C) Hydrogen bonds

D) Ionic bonds, Hydrogen bonds and Hydrophobic interaction

Q.48 Hemoglobin, the oxygen carrying protein of red blood cells exhibits:

A) Primary structure

B) Secondary structure

C) Tertiary structure

D) Quaternary structure

Q.49 It involves all the four structural levels of proteins:

A) Insulin

B) α-helix

C) Alpha chain of hemoglobin

D) Hemoglobin molecule

Q.50 Pick up the fibrous protein:

A) Keratin C) Enzyme

B) Hemoglobin D) Antibodies

Q.51 Pick up the globular protein:

A) Keratin C) Collagen

B) Fibrin D) Hemoglobin

Q.52 Pick up the globular protein:

A) Actin

B) Myosin

C) Hormonal proteins

D) Collagen

Q.53 In a DNA duplex, ten base pairs cover the length of 34A^o, what will be distance in between two consecutive base pairs:

A) 3.4 A^o C) 0.34 A^o

B) 34 A^o D) 340 A^o

Q.54 The amount of DNA is fixed for a particular species, as it depends upon the:

A) Number of individuals

B) Number of chromosomes

C) Number of cells

D) Number of genes

Q.55 The amount of DNA in _____ is one half to that of _____:

A) Somatic cells, germ cells

B) Gametocytes, Somatic cells

C) Germ cells, Somatic cells

D) Somatic cells, Gametocytes

Q.56 If kidney cells of carp fish have 3.3 picograms DNA per nucleus, the amount of DNA in sperm cell of carp fish will be:

A) 1.3 picograms C) 1.6 picograms

B) 2.3 picograms D) 2.4 picograms

Q.57 In the chromosomes of the bacterium *E. coli*, each of the paired strand of DNA contains about:

A) 5 million bases C) 0.5 million bases

B) 5 billion bases D) 50 million bases

Q.58 The *E. coli* genome consists of base pairs:

A) 4,639,221 C) 4,629,221

B) 4,639,222 D) 4,638,221

Q.59 Like DNA _____ is a polymer of ribonucleotides.

A) ATP C) FAD

B) NAD D) RNA

Q.60 _____ is synthesized by _____ in a process known as transcription.

A) RNA, DNA C) DNA, DNA

B) RNA, RNA D) DNA, RNA

Q.61 RNAs are synthesized in the _____ and then are moved out in the _____ to perform their specific functions.

A) Cytoplasm, Nucleus

B) Nucleus, Cytoplasm

C) Nucleus, Nucleus

D) Cytoplasm, Cytoplasm

Q.62 As the name indicates, it takes the genetic message from the nucleus to the ribosomes, in the cytoplasm to form the particular proteins:

A) Ribosomal RNA C) Transfer RNA

B) Messenger RNA D) DNA

Q.63 Transfer RNA comprises about _____ % of the cellular RNA.

A) 3 to 4 C) 80

B) 5 to 6 D) 10 to 20

Q.64 It transfers amino acid molecules to the site where peptide chains are being sythesized:

A) tRNA C) rRNA

B) mRNA D) ScRNA

Q.65 It may be upto 80% of the total RNA:

A) tRNA C) rRNA

B) mRNA D) snRNA

Q.66 It acts as a machinery for synthesis of proteins:

A) Golgi Apparatus C) Mitochondria

B) Ribosomal RNA D) DNA of a gene

Q.67 DNA was discovered by:

A) A French chemist

B) A Germen chemist

C) An English chemist

D) A Spanish chemist

Q.68 Who discovered DNA?

A) Frederick Miescher

C) Frederick Sanger

B) Frederick Griffith

D) Frederick Aldrich

Q.69 Nucleic acids were first isolated from:

A) Human pus cells

B) Fish sperm cells

C) Human pus cells and fish sperm cells

D) Human sperm cells and fish pus cells

Q.70 Nucleic acids were named so due to:

A) Their isolation from nuclei

B) Their isolation from pus cells

C) Their acidic nature

D) Their isolation from nucleus and acidic nature

Q.71 Mostly occurs in the nuclei of the cells but in lesser amount outside the nucleus as well:

A) RNA C) Nucleic acids

B) Proteins D) DNA

Q.72 It is mostly present in the nucleolus, in the ribosomes in the cytosol and in smaller amounts in other parts of the cell as well:

A) DNA C) Proteins

B) RNA D) Nucleic acids

Q.73 They are polymers of units called nucleotides:

A) Amino acids C) Fatty acids

B) Nucleosides D) Nucleic acids

Q.74 Each nucleotide is made up of:

A) One sub unit C) Three sub units

B) Two sub units D) Four sub units

Q.75 The pentose of DNA is:

A) Ribose C) Deoxyribulose

B) Ribulose D) Deoxyribose

Q.76 The pentose of RNA is:

A) Ribose C) Deoxyribulose

B) Ribulose D) Deoxyribose

Q.77 Single ringed nitrogenous bases are:

A) Purine C) Adenine

B) Pyrimides D) Guanine

Q.78 Pick up the smaller nitrogenous base:

A) Purines C) Cytosine

B) Adenine D) Guanine

Q.79 Purines include:

A) Adenine and cytosine

B) Adenine and thymine

C) Adenine and guanine

D) Adenine and uracil

Q.80 Pyrimidines found in RNA are:

A) Cytosine and thymine

B) Cytosine and uracil

C) Cytosine and adenine

D) Cytosine and guanine

Q.81 In a typical nucleotide the nitrogenous base is attached to carbon at:

A) Position 01 of pentose sugar

B) Position 05 of pentose sugar

C) Position 03 of pentose sugar

D) Position 02 of pentose sugar

Q.82 The compound formed by combination of a base and a pentose sugar is called:

A) Nucleoside C) Nucleic acid

B) Nucleotide D) Nuclein

Q.83 It is an important nucleotide used as an energy currency by the cell:

A) FAD C) ATP

B) NAD D) AMP

Q.84 It controls the properties and potential activities of the cell:

A) DNA C) ATP

B) RNA D) AMP

Q.85 It is the heredity material:

A) RNA C) Proteins

B) DNA D) ATP

Q.86 DNA is made up of _____ different types of nucleotides.

A) Three C) Five

B) Four D) Six

Q.87 Pick up the example of a dinucleotide:

A) ATP C) GTP

B) ADP D) NAD

Q.88 Ribose plus nitrogenous base plus phosphoric acid is equal to:

A) Deoxyribonucleotide

B) Deoxyribonucleoside

C) Ribonucleotide

D) Ribonucleoside

Q.89 Pick up the set of nucleotides not included in the list of deoxyribonucleotide:

A) AMP, ADP, ATP

B) UMP, UDP, UTP

C) CMP, CDP, CTP

D) TMP, TDP, TTP

Q.90 Pick up the list carrying four nucleosides of DNA:

A) Adenosine, Guanosine, Cytidine, Thymidine

B) Adenosine, Guanosine, Thymidine, uridine

C) Adenosine, Uridine, Thymidine, Cytidine

D) Uridine, Guanosine, Thymidine, Cytidine

Q.91 Data about ratios of different bases present in DNA molecules was provided by:

A) Maurice Wilkins

B) Erwin Chargaff

C) Watson and Crick

D) Rosalind and Franklin

Q.92 The data presented by Erwin Chargaff suggested that:

A) Adenine and guanine are equal

B) Guanine and thymine are equal

C) Adenine and cytosine are equal

D) Adenine and thymine are equal and so are cytosine and guanine

Q.93 They built a scale model of DNA:

A) James D. Watson and Francis Crick

B) Maurice Wilkins and Rosalind Franklin

C) Maurice Wilkins and Rosalind Franklin

D) P.A Leneve and T.H Morgan

ANSWER KEY (Worksheet-8)							
1	A	26	B	51	D	76	A
2	C	27	C	52	C	77	B
3	B	28	C	53	A	78	C
4	D	29	B	54	B	79	C
5	B	30	A	55	A	80	B
6	D	31	C	56	C	81	A
7	A	32	D	57	A	82	A
8	D	33	D	58	A	83	C
9	C	34	D	59	D	84	A
10	B	35	B	60	A	85	B
11	D	36	D	61	B	86	B
12	B	37	A	62	B	87	D
13	B	38	A	63	D	88	C
14	A	39	C	64	A	89	B
15	B	40	D	65	C	90	A
16	B	41	C	66	B	91	B
17	C	42	C	67	B	92	D
18	A	43	C	68	A	93	A
19	A	44	D	69	C		
20	C	45	D	70	D		
21	D	46	D	71	D		
22	C	47	D	72	B		
23	C	48	D	73	D		
24	A	49	D	74	C		
25	C	50	A	75	D		

EXPLANATION

Q.1 Answer is "Proteins"

Explanation: Proteins being a major structural organic biomolecule at any level of biological organization constitutes more than 50% of the dry weight of organic biomass and maintain the basic fabric of the structure of cells, tissues and organs. Moreover, there are numerous functional proteins as well.

Q.2 Answer is "Enzymes"

Explanation: Enzymes being biological catalysts catalyze the metabolic processes in living beings. Without enzymes metabolism will proceed so slowly that life will cease.

Q.3 Answer is "Proteins"

Explanation: Proteins perform variety of functions in living being. No other biomolecule perform such diverse roles as played by proteins.

Q.4 Answer is "Hemoglobin"

Explanation: Hemoglobin is a carrier or transport protein which carries the respiratory gases i.e. O_2 and CO_2.

Q.5 Answer is "Fibrin"

Explanation: Fibrin is an insoluble plasma protein which seals the ruptured blood vessels after injury and prevents the loss of blood.

Q.6 Answer is "Proteins"

Explanation: Proteins are synthesized by condensation of amino acid monomers in variable sequence and variable number. Thus amino acid are monomers of proteins and proteins are polymers of amino acids.

Q.7 Answer is "Carbon, Nitrogen, Oxygen and Hydrogen"

Explanation: Most of the proteins are polymer of twenty amino acids. Out of these twenty amino acids only cysteine and methionine contain sulphur along with carbon, nitrogen, oxygen and hydrogen.

Q.8 Answer is "CH_3"

Explanation: Amino acids differ from each other with respect to R group only, rest of the components are constant. CH_3 represents R group for alanine.

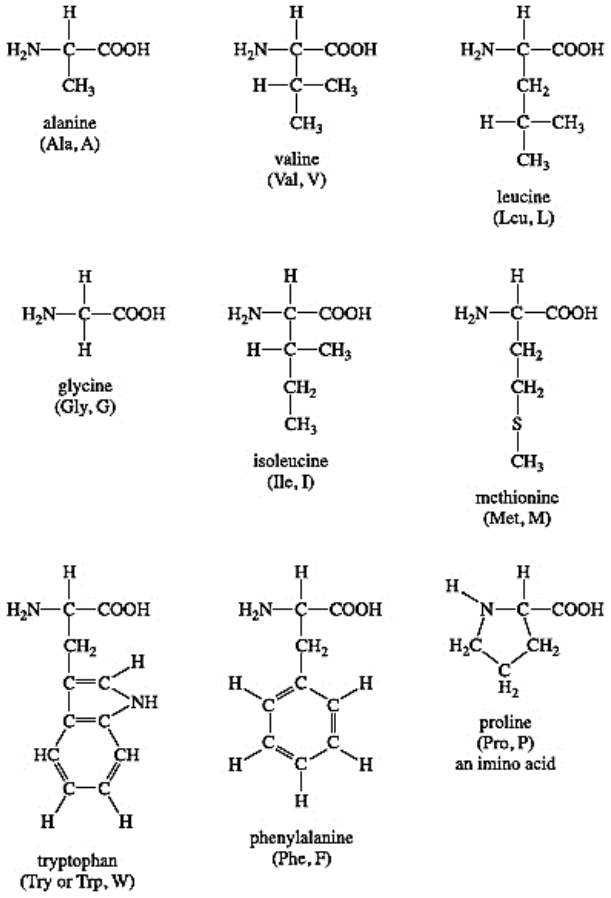
Q.9 Answer is "Alpha carbon"

Explanation: It is called alpha carbon due to the attachment of functional group to it.

Q.10 Answer is "R group"

Explanation: Amino acids differ from each other on the basis of R group or side

chain, rest of the components are constant e.g. when 'R' is hydrogen it will be glycine and if 'R' is methyl it will be alanine.



Q.11 Answer is "Carboxyl, Amino"

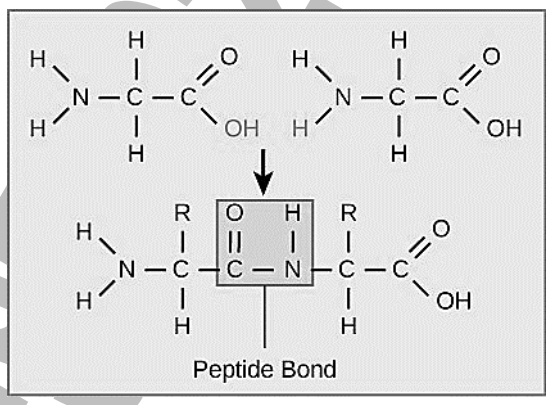
Explanation: The hydroxyl (OH) of carboxylic acid of one amino acid combines with the hydrogen (H) of amino group of second amino acid to produce a water molecule. As a result the carbon atom of carboxylic acid of first amino acid makes a bond with the nitrogen atom of amino group of next amino acid. This C – N bond is peptide bond.

Q.12 Answer is "Glycine"

Explanation: Glycine being the simplest amino acid of nature have hydrogen as 'R' group.

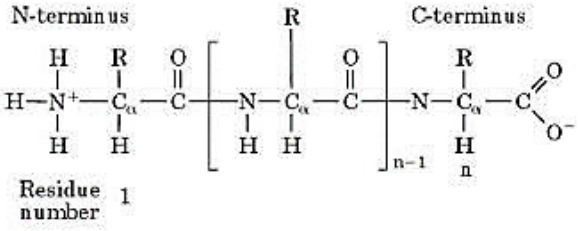
Q.13 Answer is "C – N bond"

Explanation: Peptide bond is a bond between the carbon atom of carboxyl group of one amino acid and nitrogen of amino group of second amino acid.



Q.14 Answer is "Amino, Carboxyl"

Explanation: No matter, how long the peptide chain is, it will have two reactive ends i.e amino (-NH) at one end and carboxylic acid (-COOH) at other end.



Q.15 Answer is "Glycine and alanine"

Explanation: As the name glycylalanine indicates, it is formed by condensation of glycine and alanine amino acids by removal of a water molecule.

Q.16 Answer is "Number and specific sequence of amino acids"

Explanation: At primary structural level any change in the number and sequence of amino acids changes shape and properties of protein as well. Sickle cell hemoglobin is its best example where only glutamic acid have been replaced by valine and as a

consequence its O_2 carrying capacity is affected.

Q.17 Answer is "Four"

Explanation: Primary, secondary, tertiary and quaternary proteins are four different structural levels of proteins.

Q.18 Answer is "Primary"

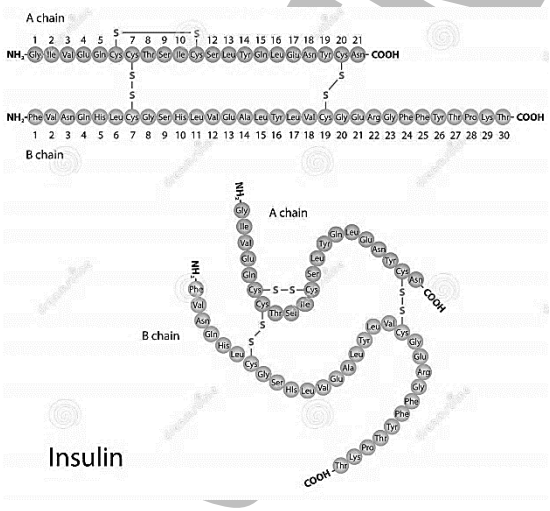
Explanation: F. Sanger told us that insulin protein consists of 51 amino acids in two chains i.e. a chain of 21 amino acids attached by means of disulphide bonds with a chain of 30 amino acids. Such straight chains of amino acids represent the primary structure of insulin protein. It was the first ever instance of the determination of number and sequence of amino acids in a protein. However a finished molecule of insulin stands at quaternary level.

Q.19 Answer is "21, 30"

Explanation: Short chain of insulin consists of 21 amino acids whereas long chain consists of 30 amino acids.

Q.20 Answer is "Disulphide bonds"

Explanation: Disulphide bonds hold together the two chains of amino acids.



Q.21 Answer is "Peptide bonds"

Explanation: Primary protein is formed by a linear arrangement of amino acids held together by peptide bonds. Thus the number and sequence of amino acids will matter for a particular type of primary protein.

Q.22 Answer is "Two alpha and two beta chains"

Explanation: Hemoglobin a carrier protein of our blood is made up of 574 amino acids in four chains of tertiary proteins. Two alpha chains consist of 141 amino acids each, whereas two beta chains consist of 146 amino acids each. A hemoglobin molecule ultimately stands at quaternary level of protein structure, involving primary, secondary and tertiary levels in it.

Q.23 Answer is "141 amino acids"

Explanation: Each alpha chain of hemoglobin consists of 141 amino acids.

Q.24 Answer is "146"

Explanation: Each alpha chain of hemoglobin consists of 146 amino acids.

Q.25 Answer is "292"

Explanation: It is 146 x 2 = 292 amino acids.

Q.26 Answer is "570"

Explanation: Number of peptide bond in a polypeptide chain is always one less than the total number of amino acids in that chain. In this way each alpha chain will be stabilized by 140 peptide bonds and each beta chain by 145 peptide bonds. Doubling the both numbers (140x2=280, 145x2=290) and adding them up (280+290=570), we get 570.

Q.27 Answer is "20"

Explanation: Shorter chain of insulin consists of 21 amino acids, thus having 20 peptide bonds.

Q.28 Answer is "Number and type of amino acids"

Explanation: Number of monomers always decides the size of polymer. As the various amino acids have different size that is why the type of amino acid will also contribute in determining the size of primary protein.

Q.29 Answer is "20 types of amino acids"

Explanation: Human proteins which are more than 10,000 types are synthesized by same 20 amino acids by changing their number and sequence.

Q.30 Answer is "10,000"

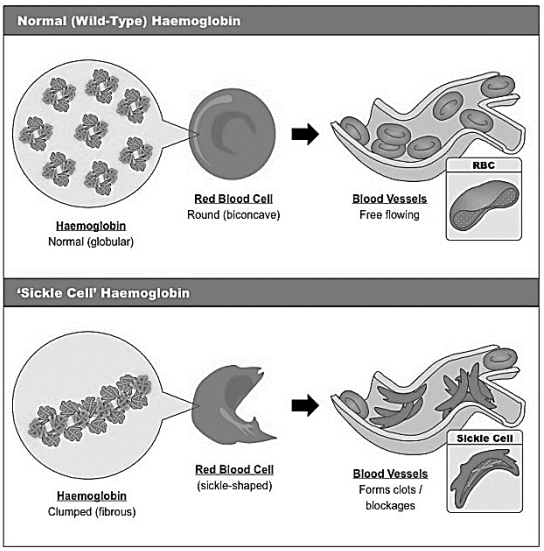
Explanation: In human body all the proteins are synthesized from same twenty amino acids however their diversity depends upon number and sequence of amino acids in each protein. More then 10,000 types of proteins have been discovered from human bodies so far.

Q.31 Answer is "A specific arrangement"

Explanation: At primary level a protein retains it specific configuration and function by specific arrangement of its amino acids. Sickle cell hemoglobin is best example in this regard.

Q.32 Answer is "Sickle cell anemia"

Explanation: Hemoglobin stops carrying oxygen if one amino acid (glutamic acids) in beta chain is replaced by the other (valine).



Q.33 Answer is "Quaternary level"

Explanation: By changing sequence of amino acids in a quaternary protein the structure and function of proteins is changed but it will remain a new protein of quaternary level.

Q.34 Answer is "Primary"

Explanation: Any change in hemoglobin at primary level changes the overall configuration of hemoglobin and as a result it stops functioning properly.

Q.35 Answer is "Lie flat"

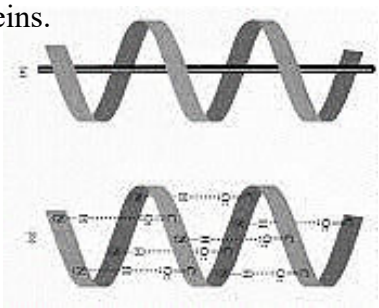
Explanation: Most of the primary proteins are folded, refolded and aggregated to acquire secondary, tertiary and quaternary structural levels, respectively.

Q.36 Answer is "Collagen"

Explanation: Collagen makes the basic framework of bones and cartilage. Thus it is a structural protein. Rest of the three proteins are functional.

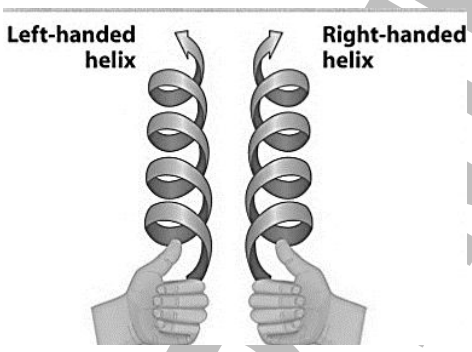
Q.37 Answer is "$\alpha-helix$"

Explanation: The most common secondary structures in proteins are alpha helices and beta pleated sheets. Particularly the α-helix is part of many important structural and functional proteins.



Q.38 Answer is "$\alpha-helix$"

Explanation: Alpha helix is also called a classic Pauling–Corey–Branson α-helix. The 3.6_{13} is also used for this type of helix denoting the average number of residues per helical turn, with 13 atoms being involved in the ring formed by the hydrogen bond.

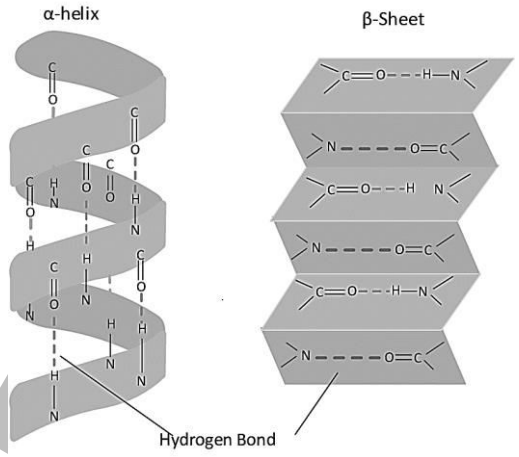


Q.39 Answer is "Hydrogen bonds"

Explanation: The coils and folds of secondary structure are stabilized by hydrogen bonds between consecutive folds or turns /coils.

Q.40 Answer is "$\beta-pleated\ sheet$"

Explanation: The example of folded secondary protein is $\beta-pleated\ sheet$ which is formed by folding back of polypeptide chain.



Q.41 Answer is "Tertiary configuration"

Explanation: A globular three-dimensional structure formed by a single polypeptide chain will be a tertiary protein, because quaternary protein is also globular but it requires more than one polypeptide chains.

Q.42 Answer is "Tertiary structure"

Explanation: Ionic, hydrogen and disulphide bonds are involved in stabilization of tertiary structure of proteins.

Structural level	Bond/s involved in stabilization
Primary structure	Peptide bond
Secondary structure	Hydrogen bond
Tertiary structure	Ionic, hydrogen and disulphide bond
Quaternary structure	Hydrogen interaction, hydrogen and ionic bonds

Q.43 Answer is "Three"

Explanation: Tertiary structure of proteins is maintained by ionic, hydrogen and disulphide bonds.

Q.44 Answer is "Hydrophobic interaction"

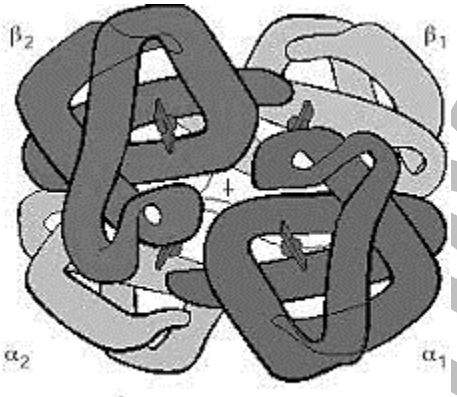
Explanation: Hydrophobic amino acids are buried inside while the hydrophilic amino acids are on the surface of the molecule until the aqueous medium remains intact.

Q.45 Answer is "Quaternary Protein"

Explanation: Because it involves primary secondary and tertiary levels as well.

Q.46 Answer is "Quaternary structure"

Explanation: More than one molecules of tertiary proteins are bonded to acquire a stable aggregated configuration called quaternary configuration e.g. hemoglobin.



Quaternary structure of Protein

Q.47 Answer is "Ionic bond, Hydrogen bond and hydrophobic interaction"

Explanation: These bonds are involved in stabilization of quaternary structure, as per textbook.

Q.48 Answer is "Quaternary structure"

Explanation: A hemoglobin molecule stands at quaternary level of proteins. It involves four chain of tertiary level i.e. two alpha chains and two beta chains.

Q.49 Answer is "Hemoglobin molecule"

Explanation: Hemoglobin involves all the four structural levels of proteins i.e. primary, secondary, tertiary and quaternary. Actually four chains of tertiary level are aggregated together to give rise to a hemoglobin molecule acquiring quaternary level.

Q.50 Answer is "Keratin"

Explanation: Keratin is that structural protein which is used to make our hair and nails and all structural proteins including keratin are included in fibrous category of proteins.

Q.51 Answer is "Hemoglobin"

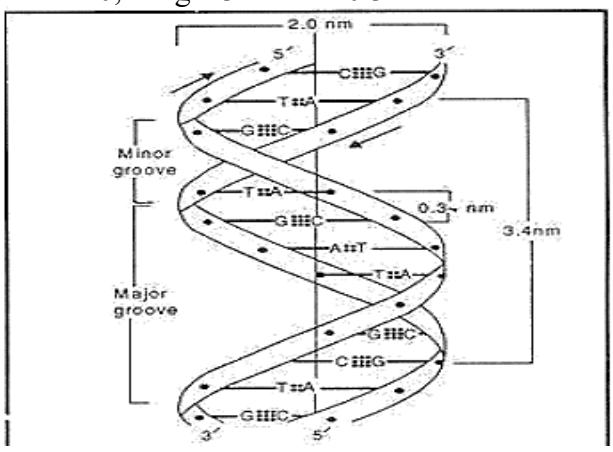
Explanation: All functional proteins are globular proteins including hemoglobin.

Q.52 Answer is "Hormonal proteins"

Explanation: Hormonal proteins being functional are globular proteins.

Q.53 Answer is "3.4 A^0"

Explanation: Dividing 34 A^0 (3.4 nm) by 10, we get 3.4 A^0 or 0.34 nm.



Q.54 Answer is "Number of chromosomes"

Explanation: Major amount of DNA is located in chromosomes and number of chromosomes varies from species to

species, thus amount of DNA will also be different from species to species. But in same species it will be same.

Q.55 Answer is "Germ cells, somatic cells"

Explanation: Germ cells (sperms and ova) are meiotic products, thus contain haploid number of chromosomes, whereas rest of the body cells are mitotic products.

Q.56 Answer is "1.6 picogram"

Explanation: As kidney cells are diploid (2n) as compared to haploid (n) sperm cells.

Q.57 Answer is "5 million bases"

Explanation: These are 5 million bases arranged in a particular linear order.

Q.58 Answer is "4,639,221"

Explanation: The E.coli genome consists of 4,639,221 base pairs which code for at least 4288 proteins.

Q.59 Answer is "RNA"

Explanation: Ribonucleic acid is a polymer of ribonucleotides.

Q.60 Answer is "RNA, DNA"

Explanation: RNA is synthesized through the process of transcription by using DNA as a template.

Q.61 Answer is "Nucleus, cytoplasm"

Explanation: Transcription occurs in nucleus by using chromosomal DNA as template, then mRNA transcript is moved on through nuclear pores to the cytoplasm where transcribed message is translated into appropriate polypeptide proteins by using all three types of RNAs.

Q.62 Answer is "Messenger RNA"

Explanation: It takes the message encoded on genes to the ribosomes in cytoplasm where it is translated into proteins.

Q.63 Answer is "10 to 20"

Explanation: It is intermediate in quantity among three types of RNAs.

Q.64 Answer is "tRNA"

Explanation: It transfers appropriate amino acids to growing polypeptide chain.

Q.65 Answer is "rRNA"

Explanation: Quantitatively rRNA is the major form of RNA in cell.

Q.66 Answer is "Ribosomal RNA"

Explanation: It is used to make peptide bonds between amino acids and as a result polypeptide chain is synthesized.

Q.67 Answer is "A German chemist"

Explanation: It was Frederick Miescher.

Q.68 Answer is "Frederick Miescher "

Explanation: A German chemist Fredrick Miescher isolated a white substance from the nucleus of human pus cell and fish sperm cell and called it as nucleic. Due to its acidic pH it was renamed as nuclein acid later on.

Q.69 Answer is "Human pus cells and fish sperm cells"

Explanation: Frederick Miesher isolated a whitish substance from the nuclei of human pus cells and fish sperm cells and called it nuclien.

Q.70 Answer is "Their isolation from nucleus and acidic nature"

Explanation: Nucleic means isolated from nucleus and acid means having acidic pH.

Q.71 Answer is "DNA"

Explanation: Being genetic material DNA constitutes chromosomes and genes but small amount of extra chromosomal DNA exists in cytoplasm inside the chloroplast and mitochondria.

Q.72 Answer is "RNA"

Explanation: RNA being associated with protein synthesis mostly occurs in cytoplasm however it is synthesized inside the nucleus from DNA that is why it always occurs in nucleus as well.

Q.73 Answer is "Nucleic acid"

Explanation: Nucleotides are condensed to give rise to nucleic acids i.e. polymer of nucleotides.

Q.74 Answer is "Three sub units"

Explanation: Nucleotide consists of pentose sugar, nitrogenous base and phosphoric acid.

Q.75 Answer is "Deoxyribose"

Explanation: Because DNA is a polymer of deoxyribonucleotides.

Q.76 Answer is "Ribose"

Explanation: As RNA is polymer of ribonucleotides.

Q.77 Answer is "Pyrimidines"

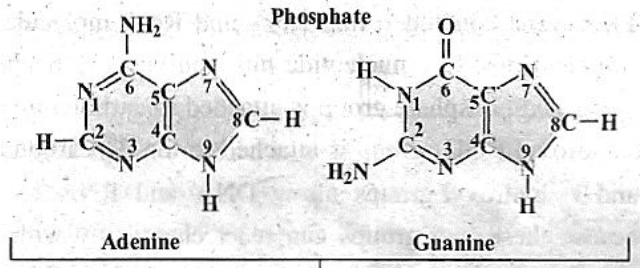
Explanation: These are smaller nitrogenous bases and have a single ring.

Q.78 Answer is "Cytosine"

Explanation: Pyrimidines being a group smaller nitrogenous bases includes cytosine, thymine and uracil. But here we have been asked about the smallest base, not group.

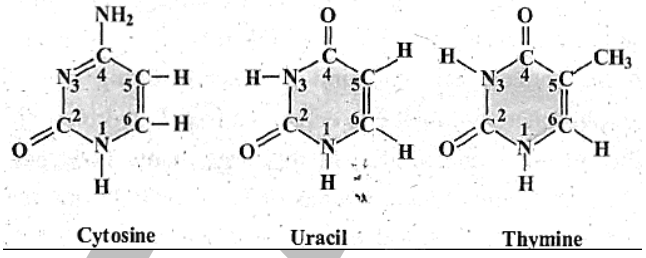
Q.79 Answer is "Adenine and guanine"

Explanation: These are larger nitrogenous bases.



Q.80 Answer is "Cytosine and Uracil"

Explanation: As thymine is replaced by uracil in RNA.



Q.81 Answer is "Position 01 of pentose sugar"

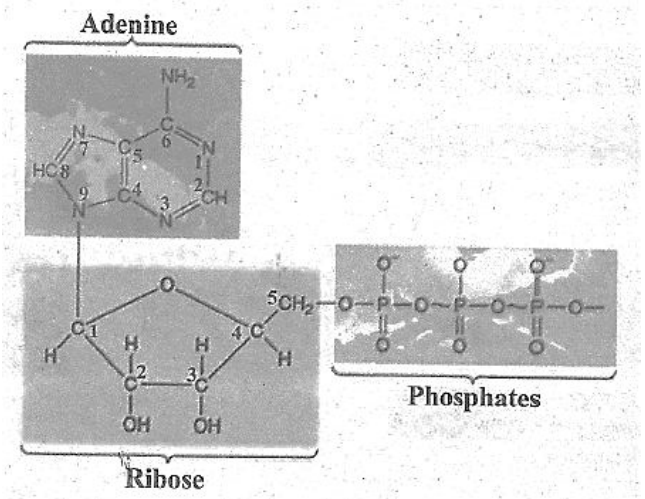
Explanation: Position of nitrogenous base is fixed in nucleotides and it is always carbon no.1 of pentose.

Q.82 Answer is "Nucleoside"

Explanation: Nucleotide minus phosphoric acid is equal to nucleoside and nucleoside plus phosphoric acid is equal to nucleotide.

Q.83 Answer is "ATP"

Explanation: Adenosine triphosphate is a nucleotide and it is used as energy currency of the cell having energy rich bonds of phosphate with phosphate.



Q.84 Answer is "DNA"

Explanation: DNA as a hereditary material controls all activities of a cell.

Q.85 Answer is "DNA"

Explanation: DNA is hereditary material.

Q.86 Answer is "Four"

Explanation: The types of nucleotides are decided by the types of nitrogenous bases used in DNA synthesis.

Q.87 Answer is "NAD"

Explanation: Nicotinamide adenine dinucleotide.

Q.88 Answer is "Ribonucleotide"

Explanation: Ribose sugar is part of ribonucleotide.

Q.89 Answer is "UMP, UDP, UTP"

Explanation: Uracil is not part of DNA.

Q.90 Answer is "Adenosine, Guanosine, Cytidine and Thymidine"

Explanation: Four nucleosides on the basis of four nitrogenous bases which are part of DNA.

Q.91 Answer is "Erwin Chargaff"

Explanation: He provided this data.

Q.92 Answer is "Adenine and thymine are equal and so are the cytosine and guanine"

Explanation: As adenine makes a base pair with thymine and vice versa, whereas cytosine makes a base pair with guanine and vice versa.

Q.93 Answer is "James D. Watson and Francis crick"

Explanation: Scale model of DNA was built by these two scientists after X-Ray photographs of DNA made by Franklin.

STEP

A PROGRAM BY PUNJAB GROUP