

BIOMOLECULES**Single Correct Answer Type**

- Fructose is prepared commercially by...a polysaccharide which occurs in dahlia tubers and Jerusalem arthichokes.
a) Inulin b) Cellulose c) Lactose d) None of these
- The presence or absence of hydroxyl group on which carbon atom of sugar differentiates RNA and DNA?
a) 1st b) 2nd c) 3rd d) 4th
- A substance forms Zwitter ion. It can functional groups
a) —NH₂, —COOH b) —NH₂, —SO₃H c) Both (a) and (b) d) None of these
- Which is not a reducing sugar?
a) Glucose b) Fructose c) Mannose d) Sucrose
- Cofactors (non-proteinic prosthetic groups) used to bond conjugated proteins are:
a) Carbohydrates b) Phosphoric acid c) Iron pigments d) All are correct
- Simple proteins bonded with a non-proteinic prosthetic group (acting as cofactor) are called:
a) Simple proteins b) Conjugated proteins c) Proteonic proteins d) None of these
- Galactose is converted into glucose in
a) Mouth b) Stomach c) Liver d) Intenstine
- Iodine test is shown by
a) Glucose b) Starch c) Glycogen d) Polypeptide
- On heating with conc. H₂SO₄ sucrose gives:
a) CO and CO₂ b) CO and SO₂ c) CO, CO₂ and SO₂ d) None of these
- Waxes are esters of
a) Glycerol b) Long chain alcohols
c) Glycerol and fatty acid d) Long chain alcohols and long chain acids
- An enzyme is formed by chemically bonding together
a) Lipases b) Amino acids
c) Carbohydrates d) Vitamins of B complex group
- Protein can be most easily removed by:
a) Alkanes b) Alkenes c) Alkynes d) Benzene
- The energy change produced by the combustion of foods is called the 'calorific value'. The best calorific value is given by:
a) Proteins b) Fats c) Carbohydrates d) Vitamins
- Glucose forms many derivatives. The derivative which will help to prove the furanose structure is:
a) Osazone b) Benzoyl c) Acetyl d) Isopropylidene
- Formation of amylene oxide ring in glucose is an indication that ring in glucose is at:
a) C₁ and C₅ b) C₂ and C₅ c) C₃ and C₆ d) C₂ and C₄
- Which is false
a) Glucose is a disaccharide b) Starch is a polysaccharide
c) Glucose and fructose are not anomers d) Invert sugar consists of glucose and fructose
- Adenosine is an example of:
a) Nucleotide b) Nucleoside c) Purine base d) Pyrimidine base
- Calciferol is



- a) Vitamin b) Antibiotic c) Hormone d) Antipyretic
19. The compound, which give a positive ninhydrin test and a negative Benedict's solution test, is
 a) A monosaccharide b) A disaccharide c) A lipid d) A protein
20. Oxygen, necessary for life on earth was formed in atmosphere as a result of:
 a) Eradication of ozone
 b) Photosynthesis
 c) Electric discharge on water
 d) None of the above
21. RNA contains
 a) Ribose sugar and thymine b) Ribose sugar and uracil
 c) Deoxyribose sugar and uracil d) Deoxyribose sugar and thymine
22. Consider the following reagents
 I. Br₂ water II. Tollen's reagent
 III. Fehling's solution
 Which can be used to make distinction between an aldose and a ketose?
 a) I, II and III b) II and III c) I only d) II only
23. Glucose gives silver mirror with ammoniacal silver nitrate because it has
 a) Aldehyde group b) Ester group
 c) Ketone group d) Alcoholic silver nitrate
24. The number of milligram of KOH required to neutralise 1 g of the oil or fat is called:
 a) Saponification value b) Iodine value c) Acetyl value d) Acid value
25. Which of the following vitamins is present in cod-liver oil?
 a) A b) B₁₂ c) B₁ d) C
26. Cellophane is made from:
 a) Cellulose b) Phenol c) Gum d) Petroleum
27. The store house for all biological information is:
 a) RNA b) *m*-RNA c) DNA d) None of these
28. In DNA, the complementary bases are,
 a) Adenine and thymine; guanine and cytosine
 b) Uracil and adenine; cytosine and guanine
 c) Adenine and guanine; thymine and cytosine
 d) Adenine and thymine; guanine and uracil
29. The two forms of D-glucopyranose obtained from the solution of D-glucose are called
 a) Isomer b) Anomer c) Epimer d) Enantiomer
30. The enzyme pepsin hydrolyses
 a) Proteins to amino acids b) Fats to fatty acids
 c) Glucose to ethyl alcohol d) Polysaccharides to monosaccharides
31. Lactose on hydrolysis yields:
 a) Two glucose molecules
 b) Two galactose molecules
 c) A galactose and fructose molecule
 d) A galactose and a glucose molecule
32. Which is not characteristic of soap?
 a) They are colourless when pure
 b) They are lighter than water
 c) They are immiscible with organic solvents
 d) They form emulsions with water

33. The helical structure of protein is stabilized by
a) Dipeptide bonds b) Hydrogen bonds c) Ether bonds d) Peptide bonds
34. Which of the following statement (s) is/are true?
(i) All amino acids contain one chiral centre
(ii) Some amino acids contain one, while some contain more chiral centre or even no chiral centre
(iii) All amino acids in protein have L-configuration
(iv) All amino acids found in proteins have 1° amino group
a) (ii), (iii) and (iv) b) (ii) and (iii) c) (i), (iii) and (iv) d) (i) and (iv)
35. The organic compounds of high physiological importance which are essential in small amounts for the well being of all human beings are:
a) Proteins b) Vitamins c) Mineral salts d) Enzymes
36. The structure of RNA molecule consists of:
a) Double helix b) Single helix c) Single strand d) Branched chain
37. Glucose gives many reactions of aldehyde because:
a) It is hydrolysed to acetaldehyde
b) It is a polyhydroxy ketone
c) It is a cyclic aldehyde
d) It is a hemiacetal in equilibrium with its aldehyde form in solution
38. Which of the following exists as Zwitter ion?
a) *p*-aminophenol b) Salicylic acid
c) Sulphanilic acid d) Ethanolamine
39. Which of the following is a protein?
a) Pepsin b) Adrenaline c) ATP d) Glutamine
40. Glucose and cane sugar can be distinguished by:
a) Fehling's solution b) Baeyer's reagent c) Molisch test d) Iodine solution
41. Which of the following carbohydrates is synthesized by nature on the largest scale?
a) Glucose b) Fructose c) Lactose d) Cellulose
42. Which molecule possess the general formula of carbohydrates, but is not a carbohydrate?
a) Glyceraldehyde b) Arabinose c) Acetic acid d) All of these
43. Progesterone is secreted by
a) Thyroid b) Ovaries c) Adrenal d) Testes
44. Hexoses and pentoses are
a) Disaccharides b) Monosaccharides c) Polysaccharides d) Oligosaccharides
45. The ultimate products of oxidation of most of hydrogen and carbon in food-stuffs are:
a) H₂O alone b) CO₂ alone c) H₂O and CO₂ d) None of these
46. Initiation of polypeptide chain is through
a) Lysine b) Glycine c) Lencine d) Methionine
47. Fats, on alkaline hydrolysis, gives
a) Oils b) Soaps c) Detergents d) Glycol+ acid
48. The α -amino acid which doesn't give purple colour in the ninhydrin test is
a) Proline b) Glycine c) Lysine d) Aspartic acid
49. Which of the following is an example of conjugated protein?
a) Albumin b) Globulin c) Glutelin d) Glycoprotein
50. Hydrolysis of oils and fats gives glycerol and long chain fatty acids containing:
a) Even number of carbon atoms
b) Odd number of carbon atoms
c) Both (a) and (b)
d) None of the above

d) Globulins

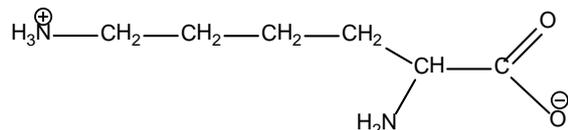
51. Which enzyme hydrolyses triglyceride to fatty acids and glycerol?

- a) Amylase b) Maltase c) Lipase d) Pepsin

52. In human body enzymes hydrolyse protein into:

- a) A ketonic acid like $\text{CH}_3\text{COCO}_2\text{H}$
 b) A hydroxyl acid like $\text{CH}_3\text{CHOHCO}_2\text{H}$
 c) Dicarboxylic acid like $\text{HOOC}-\text{CO}_2\text{H}$
 d) Amino acid like $\text{CH}_2\text{NH}_2\text{CO}_2\text{H}$

53. The total number of basic groups in the following form of lysine is



- a) 1 b) 2 c) 3 d) 4

54. Which amino acid have more than one stereogenic centre?

- a) Aspartic acid b) Lysine c) Arginine d) Histidine

55. Detergents are better cleansing agent than soaps because:

- a) They wash clothes better
 b) Absorb the hardness of water
 c) They are less affected by hard water
 d) They are less soapy

56. At pH=4, glycine exists as

- a) $\text{H}_3\text{N}^{\oplus}-\text{CH}_2-\text{COO}^-$ b) $\text{H}_3\text{N}^{\oplus}-\text{CH}_2-\text{COOH}$ c) $\text{H}_2\text{N}-\text{CH}_2-\text{COOH}$ d) $\text{H}_2\text{N}-\text{CH}_2-\text{COO}^-$

57. Which functional group participates in disulphide bond formation in proteins?

- a) Thiolacetone b) Thiol c) Thioether d) Thioester

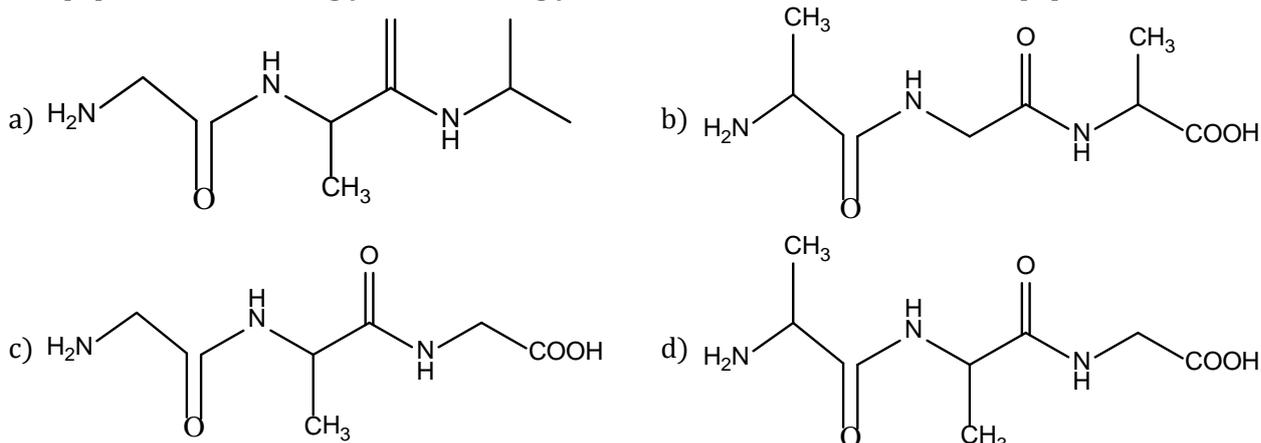
58. In aqueous solution, amino acids mostly exist as

- a) $\text{NH}_2-\text{CHR}-\text{COOH}$ b) $\text{NH}_2-\text{CHR}-\text{COO}^-$
 c) $\text{N}^{\oplus}\text{H}_3-\text{CHR}-\text{COOH}$ d) $\text{N}^{\oplus}\text{H}_3-\text{CHR}-\text{COO}^-$

59. What is not true for carbohydrates?

- a) General formula is $\text{C}_n\text{H}_{2n}\text{O}_n$ b) Glucose is the most common monomer of carbohydrates
 c) Fructose is the sweetest of all sugars d) Do not conjugate with lipids

60. A tripeptide is written as glycine-alanine-glycine. The correct structure of the tripeptide is



61. An achiral amino acid

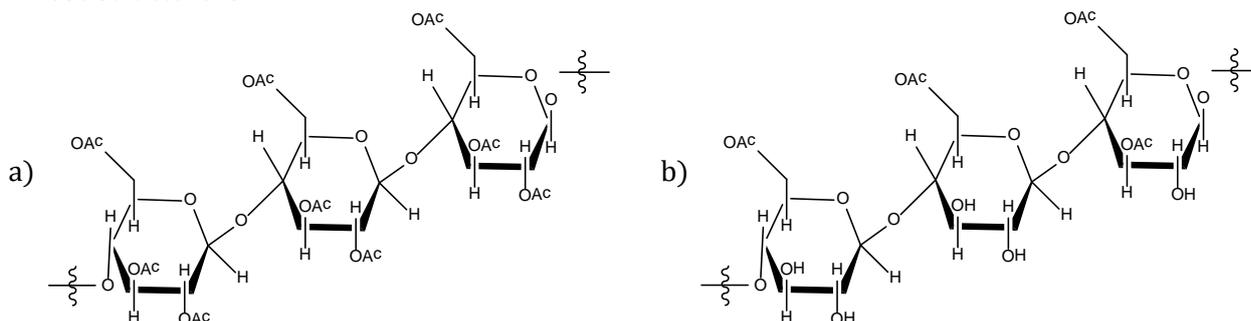
- a) Alanine b) Valine c) Leucine d) Glycine
62. Which of the following has an imino ($>NH$) group instead of amino group ($-NH_2$)?
 a) Proline b) Isosleucine c) Tryptophan d) Serine
63. Detergents are usually made from products obtained by cracking of petroleum like:
 a) Chloroalkanes
 b) Sulphur compounds of benzene
 c) H_2S
 d) Polyethylene derivatives
64. Which of the following are all disaccharides?
 a) Maltose, sucrose, lactose
 b) Maltose, lactose, glucose
 c) Glycogen, lactose, sucrose
 d) Starch, maltose, lactose
65. Soap molecule has two parts, a polar part and a non-polar part. When soap is added to water:
 a) Both parts dissolve in water
 b) Non-polar part dissolves in water
 c) Polar part dissolves in water
 d) Both parts remain undissolved in water and form a hydrocarbon layer
66. Milk sugar is (a disaccharide) :
 a) Sucrose b) Lactose c) Fructose d) Glucose
67. To become a carbohydrate, a compound must contain atleast:
 a) 6 carbons b) 3 carbons c) 4 carbons d) 2 carbons
68. Which of the following contains the highest percentage of protein?
 a) Groundnut b) Cow's milk c) Egg d) Wheat
69. Which of the following statements about enzymes is incorrect?
 a) The catalytic action of an enzyme is not specific
 b) An enzymatic reaction is highly sensitive to temperature
 c) The catalytic action of enzymes is due to their capacity to lower the energy of activation of a particular reaction
 d) None of the above
70. The hormone used as an oral contraceptive is:
 a) Aldosterone b) Cortisone c) Progesterone d) Testosterone
71. Which one is the correct representation of peptide bond?
 a) $H-C(=O)-N-$
 b) $-C(=O)-N-$
 c) $H-C(OH)-N-$
 d) None of these
72. In an amino acid, the carboxyl group ionizes at $pK_{a_1} = 2.34$ and ammonium ion at $pK_{a_2} = 9.6$. The isoelectric point of the amino acid is at pH
 a) 5.97 b) 2.34 c) 9.60 d) 6.97
73. Antibodies are:
 a) Carbohydrates b) proteins c) phospholipids d) lipids
74. Glucose on oxidation gives the acid containing the C-chiral atoms equal to
 a) 2 b) 3 c) 4 d) 5
75. Glucose when treated with CH_3OH in presence of dry HCl gas, gives α - and β -methylglucosides because it contains

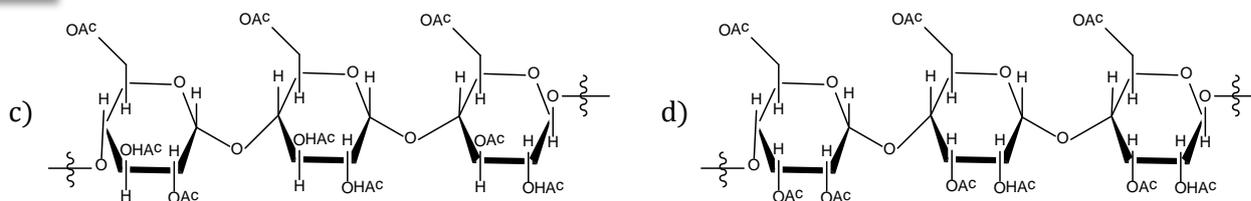


- a) An aldehydic group b) a $-\text{CH}_2\text{OH}$ group c) A ring structure d) Five $-\text{OH}$ group
76. All monosaccharides Tollen's reagent.
 a) Oxidises
 b) Condense with
 c) Reduces
 d) Add to
77. A certain compound gives negative test with ninhydrin and positive test with Benedict's solution. The compound is
 a) A protein b) A monosaccharide c) A lipid d) An amino acid
78. Protein which acts as hormone is:
 a) Casein b) Oxytocin c) Trypsin d) Keratin
79. Kwashiorkor is caused by the deficiency of:
 a) Vitamins b) hormones c) Amino acids d) Essential amino acids
80. Soaps do not form froths easily from hard water because:
 a) Of formation of insoluble salts
 b) Of formation of complex salts
 c) Of lower solubility of soaps in hard water
 d) None of the above
81. Fibrous proteins are present in:
 a) Wool b) Silk c) Nails d) All of these
82. An organic compound answers Molisch's test as well as Benedict's test. But it doesn't answer Sclivanoff's test. Most probably, it is
 a) Sucrose b) Protein c) Fructose d) Maltose
83. Which of the following is not a pyrimidine base?
 a) Thymine b) Guanine c) Cytosine d) Uracil
84. Hydrolysis of sucrose with dilute aqueous sulphuric acid yields
 a) 1 : 1D-(+)-glucose; D-(-)-fructose b) 1 : 2D-(+)-glucose; D-(-)-fructose
 c) 1 : 1D-(-)-glucose; D-(+)-fructose d) 1 : 2D-(-)-glucose ; D-(+)-fructose
85. When fat is heated with NaOH the substances formed are:
 a) Oil and Na_2CO_3
 b) Soap and glycerol
 c) Soap and oil
 d) Soapless detergent and water
86. When glucose reacts with bromine water the main product is
 a) Acetic acid b) Saccharic acid c) Glyceraldehydes d) Gluconic acid
87. An example of disaccharide made up of two units of the same monosaccharides is:
 a) maltose b) Maltose c) Sucrose d) Lactose
88. Increased blood pressure may be caused by excess secretion of:
 a) Thyroxin b) Testosterone c) Estradiol d) Adrenaline
89. Which of the following compounds, when heated at 483 K turns to caramel?
 a) Glucose b) Sucrose c) Fructose d) Lactose
90. Which amino acid has pyhenyl $-\text{OH}$ group?
 a) Lysine b) Arginine c) Proline d) Tyrosine
91. Which of the following body parts is not composed of structural proteins?
 a) Muscle b) Nails c) Bones d) Skin and bone matrix
92. Polypeptides having, molecular weights, above 10000 are known as
 a) Amino acids b) Hormones c) Proteins d) Terminal amino acids

93. Vitamin C is:
a) Alcohol b) Amide c) Amine d) Lactose
94. Proteins give:
a) A violet colour with alkaline CuSO_4 solution
b) Form a purple colour on boiling with dilute ninhydrin solution
c) Yellow colour on boiling with HNO_3
d) All of the above
95. The end product of protein digestion is:
a) Amino acid b) Glucose c) Glycerol d) Oxalic acid
96. The metal present in vitamin B_{12} is
a) Iron b) Manganese c) Cobalt d) Mercury
97. An essential constituent of plant is:
a) Cellulose b) Glucose c) Sugar d) Raffinose
98. Pyranose structure of glucose is:
a) Hexagonal b) Pentagonal c) Linear d) Tetrahedral
99. Direct conversion of starch into glucose may be carried out by:
a) Fermentation with diastase
b) Fermentation with zymase
c) Heating it with dil. HCl
d) Fermentation with maltase
100. Which one is the complimentary base in RNA strand to the adenine base in DNA during protein synthesis?
a) Adenine b) Guanine c) Uracil d) Cytosine
101. A soap can be obtained by the saponification of:
a) Liquid paraffin b) Coconut oil c) Lemongrass oil d) Sandal wood
102. Enzyme trypsin converts:
a) Amino acids into proteins
b) Glucose into glycogens
c) Starch into sugar
d) Proteins into amino acids
103. Milk changes after digestion into
a) Cellulose b) Fructose c) Glucose d) Lactose
104. Sucrose molecule is made up of
a) A gluco pyranose and a fructo pyranose b) A gluco pyranose and a fructo furanose
c) A gluco furanose and a fructo pyranose d) A gluco furanose and a fructo furanose
105. Which of the following biomolecules acts as specific catalysts in biological reaction?
a) Carbohydrates b) Lipids c) Vitamins d) Enzymes
106. Which one of the following hormones contains iodine?
a) Adrenalin b) Testosterone c) Thyroxine d) Insulin
107. 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) A co-enzyme b) A hormone c) An enzyme d) An antibiotic
108. Ring structure of glucose is due to formation of hemiacetal and ring formation between:
a) C_1 and C_5 b) C_1 and C_4 c) C_1 and C_3 d) C_3 and C_4
109. Which of the following gives reddish brown precipitate with dilute solution of resorcinol in dilute HCl?
a) Glucose b) Fructose c) Lactose d) Maltose
110. The disease 'diabetes mellitus' is caused by the deficiency of:
a) Iodine

- b) Insulin
c) Phenyl alanine hydroxylase
d) lysine
111. The enzyme which facilitates internal rearrangement in 3-phosphoglyceric acid to form 2-phosphoglyceric acid is
a) Aldolase
b) Triose phosphate isomerase
c) Phosphoglycerate mutase
d) Pyruvate kinase
112. Which one is a fibrous protein?
a) Globulin
b) Collagen
c) Hordein
d) Glutin
113. Colour of osazone of glucose is
a) Red
b) Brown
c) Yellow
d) Orange
114. Rancidity of oils and fats is due to:
a) Partial hydrolysis by the action of atmospheric moisture and oxidation of fatty acids to foul smelling products
b) Absorption of foul smelling ingredients from the air
c) Fermentation caused by microorganisms
d) Slow decomposition of fatty acids
115. Proteins are composed of:
a) Nucleotides
b) Nucleosides
c) Dipeptides
d) Amino acids
116. Which of the following is an amphoteric acid?
a) Glycine
b) Salicylic acid
c) Benzoic acid
d) Citric acid
117. A compound which catalyses a chemical reaction in a living organism is called a/an:
a) Carbohydrate
b) Enzyme
c) Lipid
d) Vitamin
118. Aqueous solution of soap is:
a) Acidic
b) Basic
c) Neutral
d) Amphoteric
119. Structurally a biodegradable detergent should contain a:
a) Normal alkyl chain
b) Branched alkyl chain
c) Hexyl side chain
d) Cyclohexyl side chain
120. Dalda is prepared from oils by
a) Oxidation
b) Reduction
c) Hydrolysis
d) Distillation
121. The substance constituting more than 80% of cell contents is:
a) Protein
b) Mineral
c) Fat
d) Water
122. The polysaccharide used in the manufacture of paper is:
a) Cellulose
b) Starch
c) Glucose
d) Sucrose
123. A source of oleic acid is:
a) Animal fat
b) Corn oil
c) Linseed oil
d) None of these
124. Cellulose upon acetylation with excess acetic anhydride/ H_2SO_4 (catalytic) gives cellulose triacetate whose structure is





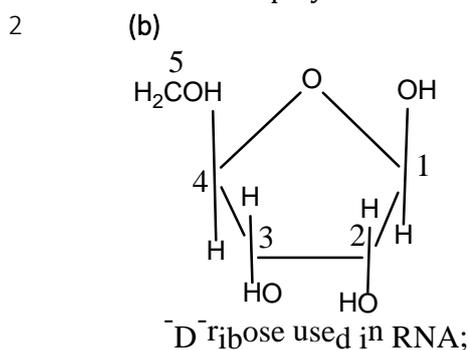
125. The pyrimidine bases presents in DNA are
 a) Cytosine and adenine b) Cytosine and guanine c) Cytosine and thymine d) Cytosine and uracil
126. Carbohydrates containing more than 10 simple units of sugar are called:
 a) Monosaccharides b) Disaccharides c) Trisaccharides d) Polysaccharides
127. A glyceride is:
 a) A compound of glycerol with a metal
 b) A molecular compound of glycerol with a metal salt
 c) An ether formed by glycerol
 d) An ester of glycerol with fatty acids
128. Which is a protein?
 a) Gelatin b) Casein c) Plasma protein d) All of these
129. How glucose is related with fructose?
 a) Functional group isomerism b) Rotamers
 c) Position isomerism d) Geometrical isomerism
130. Hardening of fat (lipid) is due to
 a) Hydrogenation b) Dehydrogenation
 c) Halogenation d) Dehydrohalogenation
131. Raw linseed oil is present in a paint as:
 a) Drier b) Vehicle c) Lacquer d) Thinner
132. α – and β – glucose differ in the orientation of -OH group around
 a) C₁ b) C₂ c) C₃ d) C₄

: ANSWER KEY :

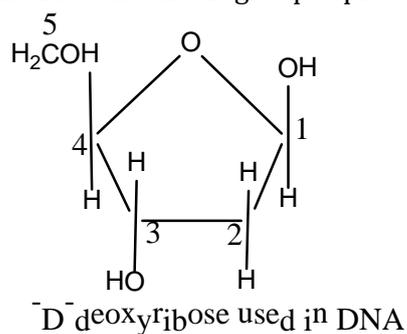
1)	d	2)	b	3)	c	4)	d	5)	d	6)	b	7)	c	8)	b
9)	d	10)	d	11)	b	12)	d	13)	b	14)	d	15)	a	16)	a
17)	b	18)	a	19)	d	20)	b	21)	b	22)	c	23)	a	24)	a
25)	a	26)	a	27)	c	28)	a	29)	b	30)	a	31)	d	32)	c
33)	b	34)	b	35)	b	36)	b	37)	d	38)	c	39)	a	40)	a
41)	d	42)	c	43)	b	44)	b	45)	c	46)	d	47)	b	48)	a
49)	d	50)	c	51)	c	52)	d	53)	b	54)	c	55)	c	56)	d
57)	b	58)	d	59)	b	60)	c	61)	d	62)	a	63)	b	64)	a
65)	c	66)	b	67)	b	68)	a	69)	a	70)	c	71)	b	72)	a
73)	b	74)	c	75)	c	76)	c	77)	b	78)	b	79)	c	80)	a
81)	d	82)	d	83)	b	84)	a	85)	b	86)	d	87)	a	88)	d
89)	b	90)	d	91)	b	92)	c	93)	a	94)	d	95)	a	96)	c
97)	a	98)	a	99)	c	100)	d	101)	b	102)	d	103)	c	104)	b
105)	d	106)	c	107)	b	108)	a	109)	b	110)	b	111)	c	112)	b
113)	c	114)	a	115)	d	116)	a	117)	b	118)	b	119)	a	120)	b
121)	d	122)	a	123)	b	124)	a	125)	c	126)	d	127)	d	128)	d
129)	a	130)	a	131)	b	132)	a								

: HINTS AND SOLUTIONS :

- 1 (d)
Insulin is a polysaccharide made up of fructose units.

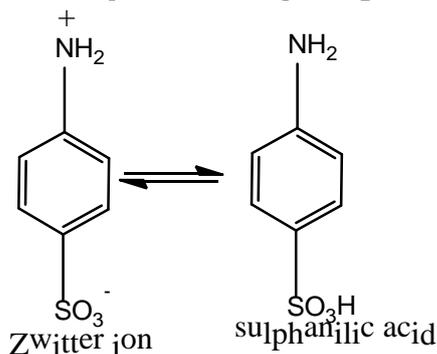


At 2nd carbon-OH group is present



At 2nd carbon-OH group is missing.

- 3 (c)
The compounds having -NH₂ and -COOH or -NH₂ and -SO₃H groups exist as Zwitter ion *e.g.*,



- 4 (d)
The sugars which doesn't reduce Tollen's reagent, Fehling solution and Benedict solution are known non-reducing sugars. Sucrose is a non-reducing sugar.

- 5 (d)
All are conjugated proteins.
Conjugated proteins are composed of simple proteins and non-protein material. The non-protein material is called **prosthetic group** or **cofactor**. These proteins on hydrolysis yield amino acids and non-protein material. Examples are: much in saliva (Prosthetic group, carbohydrate), casein in milk (Prosthetic group, phosphoric acid), hemoglobin in blood (Prosthetic group, iron pigment).

- 6 (b)
All are conjugated proteins.
Conjugated proteins are composed of simple proteins and non-protein material. The non-protein material is called **prosthetic group** or **cofactor**. These proteins on hydrolysis yield amino acids and

non-protein material. Examples are: much in saliva (Prosthetic group, carbohydrate), casein in milk (Prosthetic group, phosphoric acid), hemoglobin in blood (Prosthetic group, iron pigment).

8 (b)

Starch + iodine \rightarrow blue colour

$\xrightarrow{\Delta}$ blue colour disappears

$\xrightarrow{\text{Cool}}$ blue colour reappears

So, iodine test is given by starch.

10 (d)

Waxes are the esters of higher fatty acids with higher monohydric alcohols such as mericyl and cetyl alcohols.

12 (d)

Proteins are soluble in benzene.

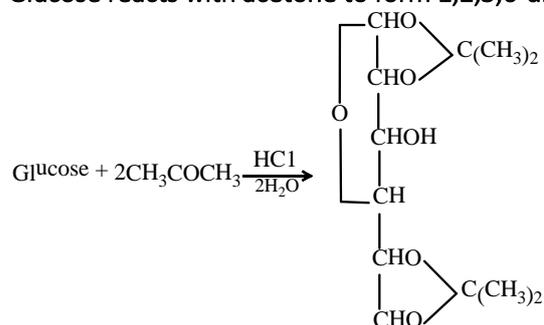
13 (b)

The calorific value is the energy released by combustion of 1 g of a substance. The order is:

Fat > Carbohydrate > Protein.

14 (d)

Glucose reacts with acetone to form 1,2,5,6-di-isopropylidene glucose.



This proves furanose structure.

16 (a)

Glucose is a monosaccharide. The chemical composition of glucose is $\text{C}_6\text{H}_{12}\text{O}_6$.

17 (b)

A nucleoside made up of sugar ribose + base adenine is called adenosine.

18 (a)

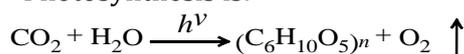
Calciferol is the chemical name of vitamin D.

19 (d)

Only proteins give positive ninhydrin test. They give blue colour with ninhydrin.

20 (b)

Photosynthesis is:

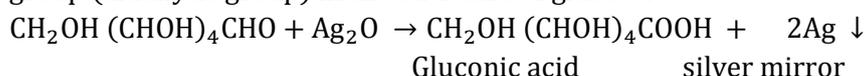


21 (b)

RNA contains ribose sugar and uracil.

23 (a)

Glucose gives silver mirror with ammoniacal silver nitrate because of presence of -CHO group (aldehyde group) in the structure of glucose.



24 (a)

It is definition of saponification value, used in analysis of fats and oils.

25 (a)

Vitamin A is present in milk, butter, kidney, egg yolk, liver, fish oil, etc.

26 (a)

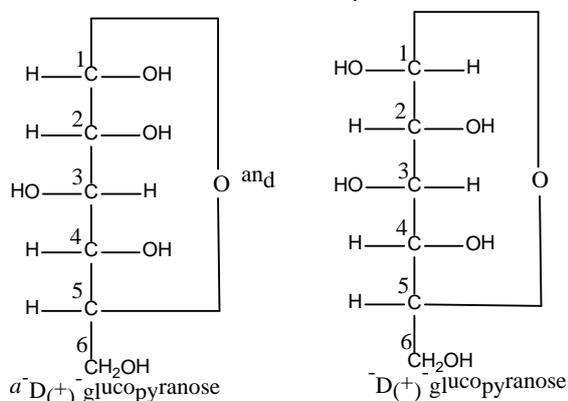
Cellophane is a semipermeable membrane made from cellulose fibre.

27 (c)

DNA is called the master molecule since, it plays key role in life process.

29 (b)

Two forms of D-glucopyranose are α - D - (+) -glucopyranose and β - D - (+) -glucopyranose. These are anomers (a pair of stereoisomers which differ in configuration only around first-carbon atom are called anomers).



30 (a)

Pepsin hydrolysis proteins into amino acids as

proteins $\xrightarrow{\text{Pepsin}}$ amino acids.

31 (d)

Lactose is disaccharide having galactose and glucose units.

32 (c)

They are also soluble in organic solvents.

33 (b)

The helical structure of protein is stabilized by hydrogen bonds between amide group of the same peptide chain. These bonds are formed by -NH- group of one unit and oxygen of carbonyl group of the third unit.

34 (b)

Although D-alanine is a constituent of a bacterial cell walls, it is not found in proteins

35 (b)

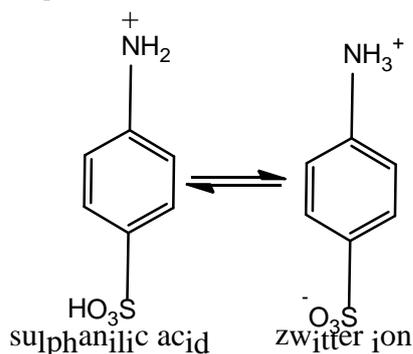
These are vitamins.

36 (b)

RNA has single helix strand.

38 (c)

Sulphalilic acid exists as Zwitter ion.



It exists as a dipolar ion, which has acidic and basic groups in the same molecule.

40 (a)

Glucose is reducing sugar.

41 (d)

All plant cells contain cellulose.

42 (c)

General formula of acetic acid $C_2(H_2O)_2$ but it is not a carbohydrate.

43 (b)

Progesterone is secreted by Ovaries.

44 (b)

Those sugar which contain 2, 3, 5, 6 carbon atom are known as monosaccharides. Hence, hexoses and pentoses are monosaccharides.

45 (c)

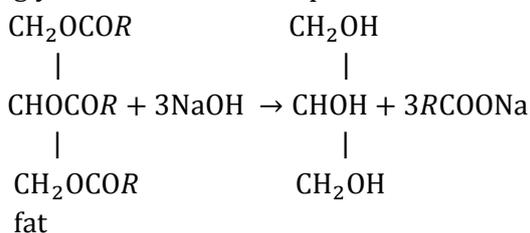
Because food-stuffs mainly contains compounds of C, H and O.

46 (d)

The first codon of *m*-RNA will be always AUG. This codon specifies the amino-acid methionine. So, the first amino-acid in a polypeptide chain will be always methionine

47 (b)

Fats are esters of higher fatty acids with glycerol, hence on alkaline hydrolysis, they give back glycerol and sodium or potassium salt of acid (this is called soap).



48 (a)

Ninhydrin test is highly specific for primary amines. Proline being a secondary amine gives a yellow orange colour with ninhydrin whereas all other α –amino acids give a blue-purple colour with ninhydrin.

49 (d)

It is an example of conjugated protein (conjugated proteins hydrolysis give α –amino acids and a non-protein portion. This non-protein portion is called the prosthetic group).

50 (c)

Fats and oils contain even or odd carbon fatty acid derivative of glycerol.

51 (c)

Lipase hydrolyses triglycerides to fatty acids and glycerol.

53 (b)

Lysine contains two basic groups.

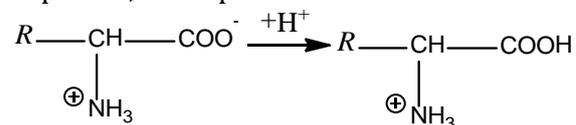
e.g., NH_2

55 (c)

A characteristic of detergent.

56 (d)

At pH = 4, an amphoteric Zwitter ion structure changes into cation when an acid is added to it.

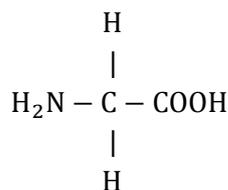


57 (b)

Disulphide bond may be reduced to thiol by means of reagents, *i.e.*, NaBH_4 , which shows the presence of thiol group in disulphide bond formation.

61 (d)

Glycine is an achiral amino acid while all other amino acids are chiral.



Glycine

63 (b)

These usually contain $-\text{SO}_3\text{H}$ gp. or SO_4 gp.

64 (a)

Maltose (2 glucose units), Sucrose (glucose and fructose units), Lactose (glucose and galactose units).

65 (c)

Water is polar solvent and thus, dissolves polar part.

66 (b)

Lactose is disaccharide. The two monosaccharide units are glucose and galactose.

67 (b)

Monosaccharides of 3 to 9 carbon atom are known.

68 (a)

It is a fact.

69 (a)

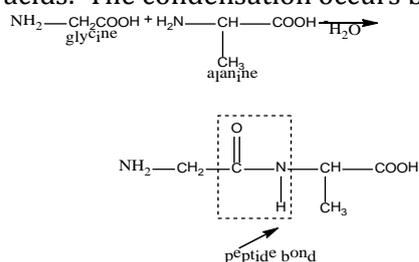
Enzymes catalytic action is highly specific; one enzyme catalyses one reaction only.

70 (c)

It is $\text{C}_{21}\text{H}_{30}\text{O}_2$, a white crystalline steroid hormone responsible for preparing the reproductive organs of mammals for pregnancy and for protecting embryo.

75 (b)

Peptides are compounds formed by the condensation of two or more same or different α -amino acids. The condensation occurs between amino acids with the elimination of water



72 (a)

$$\text{pH (at isoelectric point)} = \frac{2.34 + 9.6}{2} = 5.97$$

73 (b)

Antibodies are the proteins produced in response to the presence of foreign substances in the blood or tissues.

77 (b)

Ninhydrin test is given by proteins (or amino acids). Benedict test is positive for aldehydes and monosaccharides. (Benedict's solution is Cu (II) sulphate complexed with citrate anion. Aldehydes and monosaccharides reduced it to red coloured (Cu_2O).

The compound is not protein because it gives negative ninhydrin test.

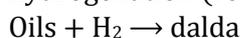
The compound is monosaccharide because it gives positive Benedict test.

- Nails are made up of simple proteins.
- 93 (a)
It contains –OH gp.
- 94 (d)
The first is biuret test; the second is ninhydrin test and the third is xanthoproteic test; all are test of proteins.
- 95 (a)
Follow text.
- 97 (a)
Cell wall of plant cells is made up of cellulose.
- 99 (c)
Starch $\xrightarrow{\text{Dil.HCl}}$ $\text{C}_6\text{H}_{12}\text{O}_6$
- 100 (d)
Follow synthesis of proteins in nucleic acid.
- 101 (b)
Only coconut oil is glyceride.
- 102 (d)
Proteins $\xrightarrow{\text{Trysin}}$ Amino acids.
- 103 (c)
Lactose present in milk change after digestion into glucose and galactose.
- 104 (b)
Sucrose molecule is made up of a glucose pyranose and a fructo furanose.
- 106 (c)
It is $\text{C}_{15}\text{H}_{11}\text{I}_4\text{NO}_4$, an iodine containing amino acid hormone produced in thyroid glands, used in thyroid deficiency.
- 107 (b)
Insulin is proteinaceous hormone. It is secreted by pancreas and controls the metabolism of glucose and maintains glucose level in the blood
- 108 (a)
Glucose has six membered pyranose ring.
- 109 (b)
Salvinoff test for fructose.
- 110 (b)
The deficiency of insulin disturbs conversion of glucose to glycogen.
- 111 (c)
The internal rearrangement of 3-phosphoglyceric acid into 2-phosphoglyceric acid takes place in the presence of enzyme phosphoglycero mutase
- 113 (c)
Glucosazone is yellow in colour.
- 114 (a)
It is a reason for the given fact. Butter is butyric acid ester which on hydrolysis, oxidation converts to butyric acid and thus, acquires bad smell. The process is called rancidification.
- 115 (d)
Amino acids \rightarrow Dipeptides \rightarrow Polypeptides
- 116 (a)
Glycine ($\text{NH}_2\text{CH}_2\text{COOH}$) is an amphoteric acid as it contains both acidic and basic groups.
- 117 (b)
Enzymes are biocatalysts.
- 119 (a)

Synthetic detergents are the chemical compounds synthesized in laboratory and possess properties like soaps. These are also surface active agents and possess cleansing capacity like soaps. These are generally sodium or potassium salts of long chain alkyl benzene sulphonic acids, or long chain alkyl sulphate.

120 (b)

Oils (liquid glycerides) react with hydrogen in the presence of metal catalyst (like nickel) to give saturated glycerides (semi-solid glycerides) *i.e.*, fats. Thus, vegetable ghee (dalda) is obtained by the hydrogenation (reduction) of oils.



121 (d)

It is a fact.

122 (a)

Cellulose is commonly used in manufacture of paper.

123 (b)

Corn oil contains glycerides of oleic acid.

124 (a)

Cellulose is a straight chain polysaccharide composed of D-glucose units which are joined by β –glycosidic linkages between C-1 of one glucose and C-4 of the next glucose. In one unit only three hydroxyl groups are free to form acetate, that's why called cellulose triacetate.

125 (c)

In DNA, cytosine and thymine are pyrimidine bases.

126 (d)

Follow text

127 (d)

Lipids are of two types: oils and fats; oils are glycerides or esters of unsaturated fatty acids while fats are glycerides of saturated fatty acids.

128 (d)

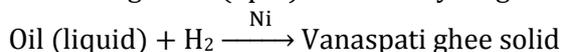
All these are proteins.

129 (a)

Glucose is aldohexose and fructose is ketohexose.

130 (a)

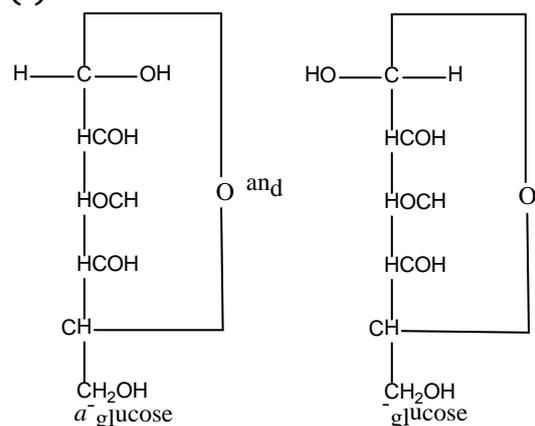
Hardening of fat (lipid) is due to hydrogenation.



131 (b)

Liquid part of paint is called vehicle or carrier.

132 (a)



These both the forms of glucose differ in the orientation of – OH group around C₁.

Assertion - Reasoning Type

This section contain(s) 10 questions numbered 1 to 10. Each question contains STATEMENT 1 (Assertion) and STATEMENT 2 (Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct.

- a) Statement 1 is True, Statement 2 is True; Statement 2 is correct explanation for Statement 1
- b) Statement 1 is True, Statement 2 is True; Statement 2 is **not** correct explanation for Statement 1
- c) Statement 1 is True, Statement 2 is False
- d) Statement 1 is False, Statement 2 is True

- 1 **Statement 1:** ATP molecules are energy rich molecules
Statement 2: ATP consists of a purine base adenine, pentose sugar ribose and a string of three phosphate groups
- 2 **Statement 1:** Sequence of bases in DNA is TGAACCCTT and sequence of bases in *m*-RNA is CATTAACC
Statement 2: In DNA, nitrogenous bases have hydrogen bonds
- 3 **Statement 1:** α -amino acids exist as dipolar ions or zwitter ions.
Statement 2: α -amino acids are the building blocks of proteins.
- 4 **Statement 1:** Disruption of the natural structure of a protein is called denaturation.
Statement 2: The change in colour and appearance of egg during cooking is due to denaturation.
- 5 **Statement 1:** DNA undergoes replication.
Statement 2: DNA contains cytosine and thymine as pyrimidine base.
- 6 **Statement 1:** Vitamin B₅ is also called as pyridoxin
Statement 2: Deficiency of vitamin B₅ causes dermatitis and dementia
- 7 **Statement 1:** Glucose is used in silvering of mirrors
Statement 2: Glucose is less acidic than a monohydric alcohol
- 8 **Statement 1:** Sucrose is a disaccharide.
Statement 2: Sucrose is dextrorotatory.
- 9 **Statement 1:** Glycine exists as Zwitter ion but *o*- and *p*-amino benzoic acid do not
Statement 2: Due to the presence of $-\text{NH}_2$ and $-\text{COOH}$ group within the same molecule, they neutralise each other and hence α amino acids exist as dipolar ions or Zwitter ions
- 10 **Statement 1:** Glucose and fructose are reducing sugars.
Statement 2: Glucose and fructose contain a free aldehydic and ketonic group adjacent to a $> \text{CHOH}$ group respectively.

: ANSWER KEY :

1)	b	2)	d	3)	b	4)	b	5)	b
6)	d	7)	c	8)	b	9)	b	10)	a

: HINTS AND SOLUTIONS :

- 1 (b)
ATP has four negatively charged oxygen very close to each other. So, the repulsive forces between them is high. On hydrolysis of ATP, a H_2PO_4^- ion is eliminated and the number of negatively charged oxygen atoms decreases. Thus, repulsive forces decreases and large amount of energy is set free. When ATP changes to ADP, which in turn changes into AMP energy is released at each step. This is how ATP act as a source of energy
- 2 (d)
Sequence of bases in DNA is TGAACCTT, since according to base-pairing principle, T in DNA faces A in *m*-RNA, while G faces C and A faces U. Therefore, sequence of bases in *m*-RNA is ACUUGGAA
- 3 (b)
- $$\begin{array}{ccc} \text{R} & & \text{R} \\ | & & | \\ \text{H}_2\text{N} - \text{C} - \text{COOH} & \longrightarrow & \text{H}_2\text{N}^+ - \text{C} - \text{COO}^- \\ | & & | \\ \text{H} & & \text{H} \end{array}$$
- Amino acid A zwitter ion from
- A zwitter ion is formed by transfer of a proton from a $-\text{COOH}$ groups to an $-\text{NH}_2$ group.
- 4 (b)
Due to denaturation , a protein loses its biological activity. During denaturation, the protein molecule uncoils and from a more random conformation and precipitates from the solution.
- 5 (b)
The genetic information of cell is contained in the sequence of base A, T, G and C in DNA molecule. When a cell divides, DNA molecules replicate and make exact copies of themselves so that each daughter cell will have DNA indential to that of the parent cell.
- 6 (d)
Vitamin B₅ is also called as nicotinic acid. Nicotinic acid in the form of nicotinamide is found usually in all living cells in small amounts
- 7 (c)
 K_a for glucose is 6.6×10^{-12} and K_a for $\text{C}_2\text{H}_5\text{OH}$ is 7.4×10^{-20} . Thus, glucose is more acidic than a monohydric alcohol
- 8 (b)
Carbohydrates which upon hydrolysis yield two molecules of the same or different monosaccharides are called disaccharides. For example sucrose on acid hydrolysis gives one molecule of glucose and frucotes.
- 9 (b)
In *o*- and *p*-amino benzoic acid, the lone pair of electrons on the $-\text{NH}_2$ group is donated towards the benzene ring. As such, the basic character of $-\text{NH}_2$ group and acidic character of $-\text{COOH}$ group decreases. Therefore, the weakly acidic $-\text{COOH}$ group cannot transfer a H^+ ion to the weakly basic $-\text{NH}_2$ group therefore *o*- and *p*- aminobenzoic acids do not exist as Zwitter ion
- 10 (a)
Reducing sugar contain a free aldehydic or ketonic group adjacent to a $>\text{CHOH}$ group and reduce Tollen's reagent. Schiff's reagent at Benedict's solution.

Matrix Match Type

This section contain(s) 3 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**.

1. Match the List I and List II and pick the correct matching from the codes given below

Column-I					Column- II				
(A) Thymine					(1) Pyrimidine base				
(B) Thiamine					(2) Enzyme				
(C) Insulin					(3) Cell - wall component				
(D) Pepsin					(4) Hormone				
(E) Phospholipids					(5) Vitamin B ₁				

CODES :

	A	B	C	D	E
a)	4	3	1	5	2
b)	5	3	4	1	2
c)	3	2	1	5	2
d)	2	4	1	3	2
e)	1	5	4	2	2

2. Match the vitamin of List I with deficiency disease given in List II

Column-I					Column- II				
(A) Vitamin A					(1) Scurvy				
(B) Vitamin B ₁₂					(2) Hemorrhagic condition				
(C) Vitamin C					(3) Sterility				
(D) Vitamin E					(4) Xerophthalmia				
(E) Vitamin K					(5) Pernicious anaemia				

CODES :

	A	B	C	D	E
a)	3	4	5	2	1
b)	3	4	5	1	1
c)	4	5	1	3	1
d)	3	5	4	2	1
e)	4	5	3	1	1

3. Compare vitamin List I with its deficiency disease List II

Column-I					Column- II				
(A) Vitamin-B ₁₂					(1) Sterility				
(B) Vitamin-B ₆					(2) Haemorrhagic condition				
(C) Vitamin-E					(3) Pernicious anaemic				
(D) Vitamin-K					(4) Skin disease				

CODES :

	A	B	C	D
a)	1	2	3	4
b)	2	3	4	1
c)	3	4	1	2
d)	3	4	2	1



:ANSWER KEY:

1)	d	2)	c	3)	c				
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: HINTS AND SOLUTIONS :

1 (d)

List I	List II
A. Thymine	1. Pyrimidine base
B. Thiamine	2. Vitamin B ₁
C. Insulin	3. Hormone
D. Pepsin	4. Enzyme
E. Phospholipids	5. Cell wall component

2 (c)

List I	List II
A. Vitamin A	1. Xerophthalmia
B. Vitamin B ₁₂	2. Pernicious anaemia
C. Vitamin C	3. Scurvy
D. Vitamin E	4. Sterility
E. Vitamin K	5. Hemorrhagic condition

3 (c)

Vitamin	Deficiency disease
A. Vitamin-B ₁₂	1. Pernicious anaemia
B. Vitamin-B ₆	2. Skin disease
C. Vitamin-E	3. Sterility
D. Vitamin-K	4. Haemorrhagic condition

