

Amino acids and Protein

MCQ's

1. How many standard α -amino acids those found in nearly all animal proteins are there?
→ a) 20
2. What is the name of the simplest amino acid, $\text{NH}_2\text{-CH}_2\text{COOH}$?
→ b) glycine
3. What substituents are found on the alpha carbon of the amino acid alanine?
→ d) 1 hydrogen : 1 NH_2 group : 1 CH_3 group : 1 COOH group
4. What organic functional group forms the peptide bond of proteins?
→ b) amide.
5. The isoelectric point of an amino acid is
→ c) pH at which no net migration occurs during electrophoresis
6. Electrophoresis is useful for separating a mixture of amino acids that have substantially different?
→ b) isoelectric point.
7. What maintains the primary structure of a protein?
→ b) covalent bonds
8. Which forces usually maintain the secondary structure of a protein? → c) hydrogen bonds.

9. The α -helix is an example of what level of protein structures?
→ b) Secondary.
10. A zwitterion is
→ c) a compound that can ionize both as a base and an acid.
11. A zwitter ion has which of the following properties
→ d) no net charge / a high m.p / soluble in H₂O
12. An aqueous solution of glycine is neutral because of the formation of
→ b) zwitter ion.
13. Which one of the following compounds form zwitterions?
→ b) Amino acids
14. The pH at which the amino acids shows no tendency to migrate when placed in an electric field is known as its:
→ a) Isoelectric point
15. The isoelectric point of a protein is
→ b) the pH at which a protein in solution has an equal number of positive & negative charges
16. Glycine is
→ a) NH₂CH₂COOH

17. Glycine is a unique amino acid because it
→ P. a) has no chiral carbon
18. Proteins are
→ P. a) Polyamides
19. The five elements present in most naturally occurring proteins are
→ P. c) N, S, C, H & O
20. Which of the following is the main structural feature of proteins?
→ P. a) peptide linkage
21. The linear arrangement of amino acid in proteins is called
→ P. a) primary structure
22. The primary structure of a protein refers to:
→ P. b) the amino acid sequence in the polypeptide chain.
23. α -Helix is a common form of
→ P. c) Secondary structure
24. Upon hydrolysis protein give
→ P. a) Amino acid.
25. Complete hydrolysis of protein produces
→ P. c) A mixture of amino acids.
26. In gel electrophoresis; what fragments will move most quickly through a gel?
→ P. b) small fragments

Carbohydrates

Stereochemistry - II

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Date _____
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FIB.

1. Carbohydrates are made up of carbon, hydrogen & oxygen
2. The most common monomer of carbohydrate is glucose
3. Monosaccharides are Aldoses & Ketoses
4. The minimum number of carbon in a monosaccharide is 2 3
5. Two monosaccharides are joined by glycosidic bond.
6. Carbohydrates occur naturally in the D form.
7. In Haworth projection representation of a carbohydrate can a hemiketal or hemiacetate be observed
8. A straight chain hexose sugar forms pyranose type of ring.

MCQ's .

- 1. Monosaccharides are classified according to
- a) the no. of carbon atoms in the molecule, whether they contain an aldehyde or a ketone group, their configuration relationship to glyceraldehyde

2. Which is monosaccharide?
→ c) Galactose

3. Which is a disaccharide
→ b) Maltose

4. What of the following is not a monosaccharide?
→ c) Sucrose

5. The designation D or L before the name of a monosaccharide.
→ c) indicates the position of the OH group on the carbon next to the primary alcohol group.

6. The principal sugar in blood is
→ b) Glucose

7. The principal Glucose cannot be classified as
→ b) an oligosaccharide

8. Which of the following statements is false about glucose?
→ b) it is a hemiacetal

9. Which of the following statements is false about a D-glucose?
→ d) it is the purest form of table sugar

10. α -D-Glucose is different from β -D-Glucose
→ a) in the configuration at C-1

11. α -D-Glucopyranose is a(n):
→ a) hemiacetal
12. The number of a symmetric carbon atoms in the α -D-glucopyranose molecule is
→ d) 5
13. Which of the following statements is false about an aldohexose?
→ d) Fructose is an aldohexose
14. All of the following monosaccharide give the same osazone group
→ a) Galactose
15. Mutarotation is a term related to
→ a) interconversion of anomers
16. The mutarotation of glucose is characterised by,
→ c) the presence of an intramolecular bridge structure
17. Which of the following statement is false about glyceraldehyde
→ d) It shows mutarotation
18. Common table sugar is
→ b) Sucrose
19. Which of the following carbohydrate is sweet than sucrose?
→ b) Fructose

- 20 Which of the following statements is false about sucrose?
- P c) It reduces Fehling's solution
- 21 The sugar that yield only glucose on hydrolysis is
- P c) Maltose
- 22 Which of the following compound reduces Tollen's reagents?
- P a) Glucose
- 23 Which class of compounds is referred to as aldoses?
- P a) polyhydroxy aldehydes.
- 24 Which of the following is a ketose?
- P b) Fructose
- 25 To what class of monosaccharides does glyceraldehyde belong?
- P c) aldotriose
- 26 In solution, glucose exists almost entirely as
- P a) a 6-membered hemiacetal ring
- 27 In solution, fructose exists as a
- P c) single furanose ring
- 28 The α & β forms of glucopyranose are
- P d) stereoisomers, diastereomers, anomery

29. Which of the following are anomers?

- P c) β -D-gluco pyranose & α -D-glucopyranose

30 D-glucose & L-glucose are

- P c) enantiomers

31 What conclusion can be drawn from the observation that two aldopentoses give the same osazone?

- P b) The two aldopentoses are epimers

32. What does a positive Tollen's test indicate?

- P a) A carbohydrate can exist as an open chain aldose or ketose

33 Which reagent converts sugars to osazones?

- P c)

34. What oxidation can be carried out with bromine water?

- P d) Oxidation of an aldose to an aldonic acid

35.

In the chain lengthening Kiliani-Fischer synthesis, what is the source of the new carbon atom?

- P a) HCN

36. What is the product obtained when the Kiliani-Fischer synthesis, what is the source of the new carbon atom?
→ P d) D-Threose & D-erythrose

37. Which of the following is a polysaccharide
→ P d) cellulose

38. In which of the following disaccharides does the glycosidic link joins two anomeric carbons, one from each ring?
→ P c) sucrose

Spectroscopy II

FIB.

1. Bands due to bending vibrations appear in the finger-point region
2. Magnetic anisotropy brings about shielding of acetylenic proton.
3. Intense absorption peak around 1700cm^{-1} indicates presence of $\text{---}\overset{\text{SH}}{\underset{\text{SH}}{\text{S}}}\text{---}$ group.

MCQ.

1. What does IR spectroscopy allows us to determine
→ b) the kinds of bonds in a compound
2. Which of the following solvent IS the best
the use when taking an IR spectra
→ a) CCl_4
3. Which area of the IR spectrum is called
'fingerprint region'?
→ d) $1400 - 600\text{cm}^{-1}$
4. Which area of IR spectrum is called the
'functional group region'?
→ d) $4000 - 1000\text{cm}^{-1}$
5. Where is IR spectrum does a carbon-carbon
triple bond shows a stretching vibration?
→ c) 2100cm^{-1}

6. An absorption band at 1600 cm^{-1} indicated that a compound contains which of the following groups
→ b) $\text{C}=\text{C}$
7. Which of the following absorption bands could be used to distinguish between dimethylamine & trimethylamine?
→ d) $3500 - 3300\text{ cm}^{-1}$
8. Where in an IR spectrum would you find an absorption band due to carbon-oxygen double bonds.
→ d) $3500 - 3300\text{ cm}^{-1}$ $1780 - 1650\text{ cm}^{-1}$
9. A strong peak between $1700 - 1760\text{ cm}^{-1}$ in an infrared spectrum most likely indicates
→ d) the presence of a carbonyl compound.
10. Which class of compounds below shows a strong IR absorption near 1700 cm^{-1} ?
→ d) Aldehyde
11. Where in the infrared spectrum would you find a strong absorption band representing the stretching frequency of the C=O group of simple aldehydes & ketones?
→ d) near 1710 cm^{-1}

12. Which carboxylic acid derivative often shows two strong absorptions in the carbonyl region of the IR?

→ P d) anhydride

13. What type of radiation is used in nuclear magnetic resonance spectroscopy?

→ P c) radiowaves.

14. Which molecule is used as the internal reference compound in porous NMR spectroscopy?

→ P c) TMS

15. In what region of the NMR spectrum would you find the signal for the acidic hydrogen of a carboxylic acid?

→ P a) 10 - 12 ppm

16. How many signals would you expect to see in the proton NMR spectrum of butane?

→ P a) 10 - 12 ppm

17. Which of the following compounds would have the signal for its methylene hydrogen farthest downfield?

→ P a) ethyl fluoride

18. How many signals does 2,2,4-trimethyl pentane have in its proton NMR spectrum?

→ P .

19. How many signals does 2, 2, 2-trimethylbutane have?
20. The proton NMR spectrum of methyl propyl Ketone has
- d) 4 signals, a singlet, 2 triplet and a multiplet
21. Which is the correct order of increasing wave number of the stretching vibration of (1) C-H (alkane), (2) O-H (alcohol), (3) C=O (ketone), and (4) O=C (Alkyne).
→ c) (3) < (4) < (1) < (2)
22. How many signals does the aldehyde $(\text{CH}_3)_2\text{CCH}_2\text{CHO}$ have in ^1H NMR and ^{13}C NMR spectra?
→ b) three ^1H signals and four ^{13}C signals
23. Which of hydrogen a-d in the following molecule gives a triplet signal in a normal ^1H -NMR spectrum?
→ c) hydrogen c
24. Which hydrogen of 1-chloropent-2-ene shows the largest chemical (downfield) shift in its NMR spectrum?
→ b) the H on either (2 or C3)
25. Which carbon of (a)-(d) of hex-3-en-2-one shows the largest (most downfield) chemical shift in the NMR spectrum?
→ b) C2

26. Which of the following statements regarding IR spectroscopy is wrong?

- P. a) infrared radiation is higher in energy than UV radiation

27. Which of the following statement is wrong.

- a) NMR signals towards the left of the spectral chart correspond to larger chemical shifts.

28. Which is the correct order of increasing wave numbers of the stretching vibrations of (1) C-H (alkane), (2) C-H (alkene), (3) C-H (alkyne) and (4) C-H (arene)?

- C) Water is a good solvent for recording IR spectra of water-soluble compounds.

30. How many signals does the unsaturated ketone $(\text{CH}_3)_2\text{C}(\text{NC}_2\text{H}_5)\text{Cl}(\text{O})\text{CH}=\text{CH}_2$ have as ^1H NMR & ^{13}C NMR spectra?

- b) six ^1H signals and six ^{13}C signals.

31. Which of the following statements in the context of ^1H NMR spectroscopy is true?

- a) Aromatic C-H chemical shift (δ) values are greater than simple alkenes C-H chemical shift values because of the aromatic ring current.

21. Which

32. Which of (a)-(d) indicates the multiplicities for hydrogen in C₁, C₂ & C₃ of butanone attributable to spin-spin coupling in its NMR spectrum

→ c) H₅ on C₁ : singlet, H₃ on C₃ : quartet, H₂ on C₂ : triplet

34. Which of (a)-(d) indicates the correct order of carbon chemical shifts of the four carbons of the following compound.

→ a) CMe < C₃ < C₂ < C₁

Nucleic Acids.

FIB.

1. RNA on hydrolysis gives Ribose sugar.
2. The α -Helix is held in a coiled conformation partially because of Hydrogen bonding.
3. The double helical structure of DNA is held together by Ribose, phosphate.
4. Nucleoside is a pyrimidine or purine base Covalently bonded to a sugar.

5. Which pyrimidine base contains an amino group at carbon 4.
→ Cytosine
6. The glycosidic bonds in DNA and RNA connect the sugar to the base
7. Nucleic acids can be analyzed experimentally by their absorption of UV light
8. A nucleotide consists of a sugar, base & a phosphate
9. A purine with an amino group (-NH₂) on the sixth carbon is adenine
10. Which of the following is found on RNA but not DNA? → Uracil
11. Which of the following is a purine?
→ Thymine
12. DNA is found in the nucleus
13. The double helical structure of DNA is held together by hydrogen bonding
14. The α-helix is a common form of secondary structure
15. The linear arrangement of nucleotides units in nucleic acids is called primary structure

Polymers.

FIB:

1. Inert substances which are added to the polymer to increase the bulk of the polymer. are called filler.
2. By condensation of monomer monoethylene glycol & Dimethyl terephthalate polymer obtained is PET
3. Ziegler-Natta catalyst is used for the polymerisation of alkene
4. The stereoisomers in which the side chains are arranged alternately on either side of the polymeric back bone is called syndiotactic.
5. The substances which are added to the polymers to arrest its degradation are called stabilizers
6. Terylene belongs to polymer class of polymers.
7. Teflon is prepared by the polymerization of a) Tetrafluoroethylene
8. Bakelite is obtained from phenol and a) phen formaldehyde

9. Nylon - 6, 6 is obtained from:-

→ a) Adipic acid & hexamethylene diamine

10. Neoprene is a polymer of the following monomer.

→ a) Chloroprene

11. Which of the following is a thermosetting polymer?

→ a) Bakelite

12. Which of the following is an example of condensation polymers?

→ a) Nylon - 6, 6

13. Which of the following polymers contains Nitrogen

→ c) Nylon

14. Adipic acid reacts with hexamethylene diamine to form b) Nylon - 6, 6.

15. Natural rubber is polymer of b) Isoprene

16. The monomer for Buna-S are 1, 3 - butadiene and c) Styrene

17. Which of the following statements is not true
→ c) Natural rubber is a polymer of 1, 3 - butadiene

18. Which polymers occur naturally?
→ P b) starch & cellulose
19. What substances is made up of monomers, joined together in long chains.
→ P ~~b~~ c) protein.
20. The word 'polymers' meant for material made from
→ P ~~b~~ c) Multiple entities.
21. One of characteristic properties of polymer material
→ P c) High elongation.
22. Polymers are c) organic in nature.
23. In general, strongest polymer group is
b) Thermosets
24. These polymers consists of coil-like polymer chain: b) Elastomers
25. Strong covalent bonds exists between polymer chains in b) Thermosets
26. Following is the unique to polymeric materials
→ P b) Viscoelasticity.
27. Elastic deformation in polymers is due to
→ P ~~b~~ a) Slight adjustment of molecular chains

28. Which one of the following is not a condensation polymer?
→ ~~a) b) Dacron~~
29. Which of the following statements is false?
→ ~~b) d) Nylon 66 is an example of elastomer~~
30. Of the following which one is classified as polyester polymer?
→ ~~b) a) Rubber Viscoelasticity~~
31. Elastic deformation in polymers is due to
~~a) Dacron Slight adjustment of molecular chain~~
32. Which one of the following is not a condensation polymer?
→
33. Which of the following is a co-polymer.
→ ~~d) $[NH(CH_2)_4NHCO(CH_2)_4CO]_n$~~
34. Which of the following is a fully fluorinated polymer.
→ ~~b) Teflon~~
35. Which of the following is a polyamide
→ ~~b) Nylon-66~~

- 38 Nylon is a not a d) Homo polymer.
- 39 Which of the following is a chain growth polymer?
→ b) Polystyrene
- 40 Nylon threads are made up of d) polyamide esters
- 41 Which of the following monomers gives the polymer neoprene on polymerization?
→ c) $\text{CH}_2 = \underset{\text{C}_1}{\text{C}} - \underset{\text{C}_1}{\text{CH}} = \text{CH}_2$
- 42 Polymer formation from monomers starts by
← a) condensation reaction between monomers
- 43 Which of the following statement is not ✓?
→ d) The monomer of natural rubber is butadiene
- 44 The plastic household crockery is prepared, using
d) melamine & vinyl acetate
- 45 Three dimensional molecules with cross links are formed in the case of a
b) Thermosetting plastic
- 46 Which is not polymer?
→ a) Sucrose
- 47 Which of the following has ester linkage
→ d) PVC

48. Which of the following is an addition polymer?

- P c) High density polythene.

49. Which type of polymer is 'cellulose diacetate fibre'?

- P c) Synthetic

50. Which of the following is not a polymer?

- D d) Petroleum

MTF

1. Buna - N - Acrylonitrile and butadiene diamine & adipic acid
2. Nylon - 66 - its Hexamethylene diamine & ethylene glycol
3. Dacron - Terephthalic acid & ethylene glycol
4. Glyptal plastic - Phthalic acid & ethylene glycol
5. Addition polymer - PTFE
6. Condensation polymer - Terylene
7. Natural biomedical polymer - Collagen
8. Filler - Jute
9. Plasticizer - BHT
10. Stabilizer - Diphenylamine

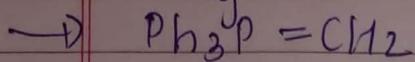
Catalysts and Reagents.

1. ~~Hydrogenation of but-2-yne using Lindlar's catalyst gives predominantly cis-but-2-ene~~
 2. Which statements about a catalyst is incorrect?
→ The presence of a catalyst speeds up a reaction.
 3. In the hydrogenation of alkenes using Wilkinson's catalyst, the active catalyst for the forward reaction $\text{RhCl}(\text{PPh}_3)_2$ for $(\text{RhCl}(\text{PPh}_3)_2(\text{solvent}))$. The first step in the catalytic cycle is Oxidative addition of H_2 .
 4. Which of the following metals is used as a catalyst in the catalytic hydrogenation of both alkenes & alkynes?
→ Palladium.
 5. A catalyst is a substance which hastens the attainment of equilibrium.
 6. The name catalysis was given by Berzelius.
 7. The name catalyst.
 7. Substance which alter the velocity of reaction themselves remaining chemically and quantitatively unchanged after reaction are known as Catalysts.
- MTF
1. SeO_2 - Oxidation of active methyl group
 2. Lindlar's catalyst - Alkyne to cis-alkene
 3. mCPBA - Epoxidation

8. The substance which decreases the rate of a chemical reaction is called Poison
9. The temperature at which the catalytic activity of the catalyst is maximum is called Optimum temperature
10. Which of the following is a homogenous catalyst
→ Wilkinson catalyst.
11. Which of the catalysts listed are used in the homogenous catalytic hydrogenation of Ni; Pt; & Wilkinson
12. In conducting a catalytic hydrogenation of an alkene. Which catalyst is likely soluble in the reaction medium
Wilkinson.
13. SeO_2 selectively oxidise α -position
14. NaBH_4 will not reduce Benzoic acid
15. Complete reduction of benzonitrile with Raney nickel gives Benzyl amine

Molecular rearrangement

1. Which of the following is a Wittig reagents



2. What is the Wittig reaction most useful for?

\rightarrow synthesis of alkenes.

3. In Beckmann rearrangement, the group which is anti to $-\text{OR}$ group of oxime migrates.

4. In Hofmann rearrangement the product primary amine contains one carbon atom less than the starting amide.

5. Pinacol rearrangement takes place in presence of acid catalyst.

6. The product of Pinacol rearrangement is a rearranged Ketone.

7. The reaction of Ketoxime with acid is called Beckmann rearrangement.

8. The reaction of a α -haloketone with alkoxide to give rearranged ester is known as Favorskii rearrangement.

9. The product of Wittig reaction is alkene.