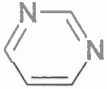


Circle the letter corresponding to the best answer for each of the following:

- Which of the following trace metals is not known to be required by all forms of life?
a) Cu b) Cr c) Zn d) Co e) Mn
- Which of the following amino acids contributes the most to the UV absorption of proteins.
a) Phe b) His c) Lys d) Trp e) Arg
- What is the wavelength of maximum absorption in the UV for simple proteins?
a) 240 nm b) 260 nm c) 280 nm d) 320 nm e) 340 nm
- Which of the following supramolecular complexes is involved in information storage?
a) ribosomes d) multienzyme complexes
b) chromosomes e) membranes
c) actinomyosin
- The covalent linkages between the monomeric units in polynucleotides are?
a) β -glycosidic d) hydrogen bonds
b) phosphodiesters e) thioesters
c) amides
- The ring structure below is a component of?

a) nucleotides d) lipids
b) amino acids e) none of the above
c) sugars
- Which of the following organelles is the site of protein maturation?
a) ribosome d) mitochondrion
b) endoplasmic reticulum e) peroxisome
c) lysosome

15. Which of the following is involved in buffering in the cytosol of cells?
- a) H_2PO_4^-
 - b) HCO_3^-
 - c) HSO_4^-
 - d) CO_3^{2-}
 - e) PO_4^{3-}
16. The name of the ring in the side-chain of the amino acid histidine is?
- a) imidazole
 - b) indole
 - c) isoalloxazine
 - d) purine
 - e) pyrimidine
17. Which of the following amino acids does not rotate the plane of the plane-polarized light?
- a) valine
 - b) proline
 - c) lysine
 - d) glycine
 - e) all of the above are optically active
18. Which of the following is not true of water?
- a) high heat capacity
 - b) high heat of vaporization
 - c) low heat of fusion
 - d) maximum density at 4 °C
 - e) all of the above are true of water
19. Which of the following is true of thermodynamically spontaneous processes?
- a) negative enthalpy change
 - b) positive enthalpy change
 - c) negative entropy change
 - d) negative free energy change
 - e) positive entropy change
20. Which of the following techniques would be most useful in determining the amino acid composition of a mixture obtained by hydrolysis of a protein?
- a) affinity chromatography
 - b) thin layer chromatography
 - c) cation exchange chromatography
 - d) paper chromatography
 - e) dialysis

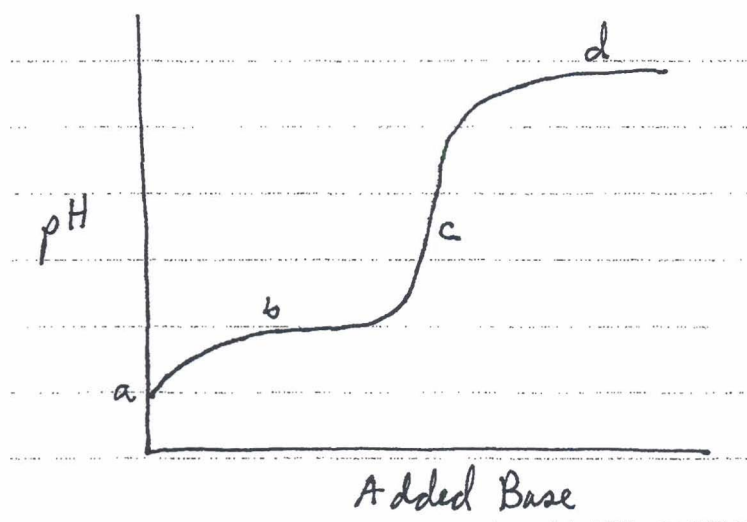
Sodium dodecylsulfate (SDS), $\text{CH}_3-(\text{CH}_2)_{11}-\text{O}-\text{SO}_3^-$, is widely used to denature proteins prior to polyacrylamide gel electrophoresis. In aqueous solution, SDS is likely to form?

- a) monolayers
- b) bilayers
- c) micelles
- d) liposomes
- e) polysulfates

22. If a solution of muconasic acid at pH 4 contains 1×10^{-4} M undissociated acid and 1×10^{-5} M muconasate, what is the pKa of muconasic acid?

- a) 3
- b) 4
- c) 5
- d) 7
- e) 13

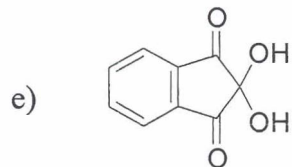
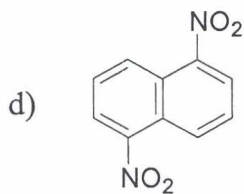
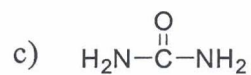
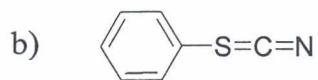
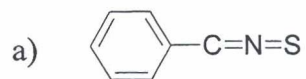
23. Consider the following titration curve for an amino acid:



Which of the lettered-points on the curve represents an equivalence point?

- a) a
- b) b
- c) c
- d) d
- e) more than one of the above

24. Which of the following is used to make a colored (purple) derivative of amino acids?



Complete the following questions as directed:

25. Using complete structures, draw the reactants and products in the reaction of tryptophan with dansylchloride.

26. Draw the complete structure of the peptide Pro-Ile-Arg-Cys at pH 3.5..

a)

b) What is the approximate pH_I of the above peptide? pH_I _____

27. Describe, in a general way, the structure of an oligomeric glycoprotein (i.e. list as many structural features as possible) and probable functions (give an example if possible).