

1. is also known as Vitamin C.

A. Ethanoic acid

B. Ascorbic acid

C. Lactic acid

D. Vinegar

2. When silver nitrate solution is added to a solution of chloride containing a few drops of potassium chromate, is precipitated initially

A. White silver chromate

B. Red silver chromate

C. White silver chloride

D. Red silver chloride

3. In estimation of the available chlorine in calcium hypochlorite, indicator is used

A. Freshly prepared methyl orange

B. Freshly prepared dilute

C. Freshly prepared chloride

D. Freshly prepared starch

4. EDTA can be represented by the symbol

A. HY

B. HY_4

C. 4HY

D. H_4Y

5. To solution containing some unknown amount of Al^{3+} cations 50.00 mL of 0.05000 M EDTA solution was added. After 30 minutes excess EDTA was titrated with 0.04875 M Zn^{2+} solution. What was the amount of Al^{3+} if 17.58 mL of titrant was used?

A. 0.643 mmole

B. 1.643 mmole

C. 2.643 mmole

D. 3.643 mmole

6. The metal complexes of Eriochrome Black T are generally in colour

A. A. Red

B. Orange

C. Blue

D. Black

7. What colour of Eriochrome Black T predominates in the pH range 7 to 11?

A. Red

B. Orange

C. Blue

D. Black

8. Which of the following is the full name for the complexing agent, EDTA

A. Ethylenediamminetriacetic acid

B. Ethyl-2-enediamminetetraacetic acid

C. Ethylenediamminetetraacetic acid

D. Ethylenediamidetetraacetic acid

9. Which of the following statements are true?

A. Dilute mineral acids react with bleaching powder to release chlorine

B. Dilute mineral acids react with bleaching powder to release iodine

C. Dilute mineral acids do not react with bleaching powder

D. None of the above are true

10. Which of the following is an example of a ligand?

A. Ethyl-2-enediamminetetraacetic acid

B. Ethylenediamminetetraacetic acid

C. Ethylenediamidetetraacetic acid

D. Ethylenediamminetriacetic acid

11. Which of the following statements concerning hypochlorite ions are incorrect?

A. They are the main ingredients of bleach

B. They have oxidizing power

C. They turn moist blue litmus paper red

D. They react with hydrochloric acid to give chlorine gas

12. Which of the following concerning Mohr's method are correct?

1. It is used to determine the chloride ion concentration of a water sample by precipitation titration against a silver nitrate solution

2. The indicator used in this method is a chromate ion

3. It should be carried out in pH 6.5 – 9

A. (1) and (2) only

B. (1) and (3) only

C. (2) and (3) only

D. (1), (2) and (3)

13. A 500cm^3 solution of potassium chloride was prepared by dissolving potassium chloride in distilled water. 25cm^3 of the solution was titrated with 0.300M silver nitrate solution. 28.9cm^3 of silver nitrate solution was required to reach the end point in the titration. What is the number of moles of potassium chloride present in the 500cm^3 solution?

A. 0.009mol

B. 0.029mol

C. 0.173mol

D. 8.670mol

14. Which of the following is a suitable pH for Mohr's method?

A. $\text{pH} < 2$

B. $\text{pH} = 3 - 6.5$

C. $\text{pH} = 6.5 - 9$

D. pH >10

15. Which of the following statements concerning Vitamin C is not true?

A. It is the same as Ascorbic acid

B. It is a mild oxidizing agent

C. It is the same as Oxalic acid both B and C but choose **B**

D. It is a mild reducing agent

16. In Iodometric determination of Vitamin C, is used

A. EDTA indicator

B. Iodine indicator

C. Starch indicator

D. Eriochrome Black-T indicator

17. In the determination of Ascorbic acid with iodometry, why was the titration allowed to proceed to a certain point, before the indicator was added?

A. The indicator is very sticky

B. The indicator is very slow in action

C. The indicator can form complex species with iodine

D. The indicator and iodine are not miscible

18. In the determination of chloride using Mohr's method, a red precipitate indicates the formation of?

A. Silver nitrate

B. Silver chloride

C. Silver chromate

D. Silver iodide

19. In the iodometric determination of Ascorbic acid, back titration is done with

A. EDTA

B. Thiosulphate

C. Mohr's reagent

D. Starch

20. Which of the following statements about Mohr's method is incorrect?

A. The pH of the reaction mixture should not be too high to prevent the formation of undesirable precipitates

B. The pH of the reaction mixture should not be too low to prevent the conversion of chromate ions to dichromate ions

C. This method is used to determine the concentration of chloride ions in a water sample

D. A bluish-green precipitate can be observed at the end of the titration

21. Which of the following statements concerning the apparatus routinely used for titration is incorrect?

A. Pipette is used to transfer a fixed amount of a solution accurately

B. Measuring cylinder is used to deliver variable volumes of a solution accurately

C. Electronic balance is used for fast and accurate weighing

D. Volumetric flask is used to make up a certain solution to a specific volume accurately

22. What is the molarity of a 500cm³ solution containing 2.65g of sodium carbonate?

A. 0.025M

B. 0.050M

C. 0.075M

D. 1.000M

23. Which of the following substances does not form precipitates with silver ions?

A. Hydrochloric acid

B. Sulphuric acid

C. Potassium nitrate

D. Sodium bromide

24. Which of the following substances is odourless?

- A. Ammonia solution
- B. Hydrogen sulphide
- C. Sulphur dioxide
- D. Carbon dioxide

25. Which of the following gases gives a characteristic smell?

- A. Hydrogen
- B. Oxygen
- C. Sulphur dioxide
- D. Carbon dioxide

26. Which of the following correctly places the ligands in their order in the spectrochemical series?

- A. $\text{Br}^- < \text{Cl}^- < \text{NH}_3 < \text{H}_2\text{O}$
- B. $\text{I}^- < \text{Br}^- < \text{H}_2\text{O} < [\text{OH}]^-$
- C. $\text{F}^- < \text{Cl}^- < \text{H}_2\text{O} < \text{NH}_3$
- D. $\text{I}^- < \text{Cl}^- < \text{H}_2\text{O} < \text{en}$

27. Which of the following correctly places the metal centres in their order in the spectrochemical series?

- A. $\text{Mn(II)} < \text{Fe(III)} < \text{Rh(III)}$
- B. $\text{Co(III)} < \text{Co(II)} < \text{Rh(III)}$
- C. $\text{Pt(IV)} < \text{Pd(II)} < \text{Ni(II)}$
- D. $\text{Pd(II)} < \text{Ni(II)} < \text{Pt(IV)}$

28. Which metal complex ion is expected to be subject to a Jahn-Teller distortion?

- A. $[\text{Cr}(\text{OH}_2)_6]^{3+}$
- B. $[\text{Cr}(\text{NH}_3)_6]^{2+}$
- C. $[\text{Cr}(\text{CN})_6]^{3-}$
- D. $[\text{Cr}(\text{bpy})_3]^{2+}$

29. The CFSE for a high-spin d_4 octahedral complex is:

- A. $-0.6\Delta_{\text{oct}}$
- B. $-1.8\Delta_{\text{oct}}$
- C. $-1.6\Delta_{\text{oct}} + P$

D. $-1.2\Delta_{\text{oct}}$

30. For which of the following configurations for an octahedral, first row d-block metal ion do you expect there to be an orbital contribution to the magnetic moment?

- A. t_2g^2
- B. t_2g^3
- C. $t_2g^6eg^1$
- D. $t_2g^6eg^2$

31. Which of the following relationships between absorbance and % Transmittance is correct ?

- A. $A = 2 \log 100 / \%T$
- B. $A = 2 - \log \%T$
- C. $A = \log 1 / \%T$
- D. $A = 1 - 2\log \%T$

32. In the equation, $A = ebc$, what quantity is represented by "e" ?

- A. Absorbitivity
- B. Molar absorbitivity
- C. Path length
- D. Electric field

33. Why is it generally preferable to use absorbance as a measure of absorption rather than % Transmittance?

- A. Because %T cannot be measured as accurately as absorbance
- B. Because %T is dependant on the power of the incident radiation
- C. Because absorbance is proportional to the concentration of the analyte, whereas %T is not.
- D. Because %T values cannot be trusted.

34. The maximum oxidation state of vanadium is:

- A. +5
- B. +4
- C. +2
- D. +8

35. The correct IUPAC name of $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ is

- A. Diamminedichloridoplatinum (II)
- B. Diamminedichloridoplatinum (IV)
- C. Diamminedichloridoplatinum (0)
- D. Dichloridodiammineplatinum (IV)

36. Which of the following species is not expected to be a ligand?

- A. NO
- B. NH_4^+
- C. $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- D. CO

37. IUPAC name of $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NO}_2)]$ is

- A. Platinum diaminechloronitrite
- B. Chloronitrito-N-ammineplatinum (II)
- C. Diamminechloridonitrito-N-platinum (II)
- D. Diamminechloronitrito-N-platinate (II)

38. Mohr's salt is a

- A. Single salt
- B. Double salt
- C. Complex salt
- D. Chelate

39. Potassium ferrocyanide is

- A. Sigma compound
- B. Pi compound
- C. Double salt
- D. Complex salt

40. Ethylene diamine is

- A. Unidentate ligand
- B. Bidentate ligand
- C. Polydentate ligand
- D. Chelating ligand

41. Copper complex of ethylene

- A. Unidentate ligand
- B. Tridentate ligand
- C. Polydentate ligand

D. Chelate

42.. In potassium ferroaynide, the coordination number of iron is

A. Two

B. Four

C. Six

D. Eight

43. The coordination number of Ag in potassium argentocyanide is

A. One

B. Two

C. Three

D. Four

44. The oxication number of Cu in $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ is

A. One

B. Two

C. Three

D. Four

45. Potassium hexacyanoferrate (II) is

A. Anionic complex

B. Cationic complex

C. Neutral complex

D. None of these

46. Diammine silver (I) chloride is

A. Anionic complex

B. Cationic complex

C. Neutral complex

D. Chelating complex

47. The neutral complex is .

- A. $\text{K}[\text{Ag}(\text{CN})_2]$
- B. $[\text{Ag}(\text{NH}_3)_2] \text{Cl}$
- C. $\text{Ni}(\text{CO})_4$
- D. $[\text{Co}(\text{Cl}_6)]^{3-}$

48. Fractional Crystallization is carried out to separate such mixtures.

- A. Organic solids mixed with inorganic solids
- B. Organic solids highly soluble in water
- C. Organic solids having great difference in their solubilities in suitable solvents
- D. Organic solids having small difference in their solubilities in suitable solvents

49. All are polar solvents except

- A. water
- B. hexane
- C. propanone
- D. methanol

50. Which is the best description of a carbonyl group?

- A. a carbon atom joined to an oxygen atom by a double bond
- B. a nitrogen and a hydrogen bonded to a carbon atom
- C. a sulfur and a hydrogen bonded to a carbon atom
- D. an oxygen double-bonded to a carbon and a hydroxyl group
- E. a carbon and hydrogen atom

51. What is the name of the functional group shown in Figure 4.4?

- A. carbonyl
- B. carboxyl
- C. methyl
- D. acetyl
- E. dehydroxyl

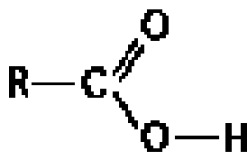


Figure 4.4

52. Which of the following contains nitrogen in addition to carbon, oxygen, and hydrogen?

- A. a hydrocarbon such as benzene
- B. an alcohol such as ethanol
- C. a monosaccharide such as starch
- D. a steroid such as testosterone
- E. an amino acid such as glycine

53. Which of the following is a false statement concerning amino groups?

- A. They are nonpolar.
- B. They contain nitrogen.
- C. They are found in amino acids.
- D) They are components of urea.

54. Which two functional groups are always found in amino acids?

- A. carboxyl and amine
- B. carbonyl and carboxyl
- C. ketone and amine
- D. alcohol and aldehyde
- E. amine and sulfhydryl

55. All are solvents except

- A. benzene
- B. heptane
- C. phenanthrene
- D. water

56. The type of intermolecular force in CH_3OCH_3

- A. ion–ion
- B. dipole–dipole
- C. hydrogen bonding
- D. dispersion forces

57. Which functional groups can act as acids?

- A. ketone and amino
- B. amine and sulfhydryl
- C. carboxyl and phosphate
- D. alcohol and aldehyde
- E. carbonyl and carboxyl

Use the diagrams/molecules to answer the questions 58 - 63

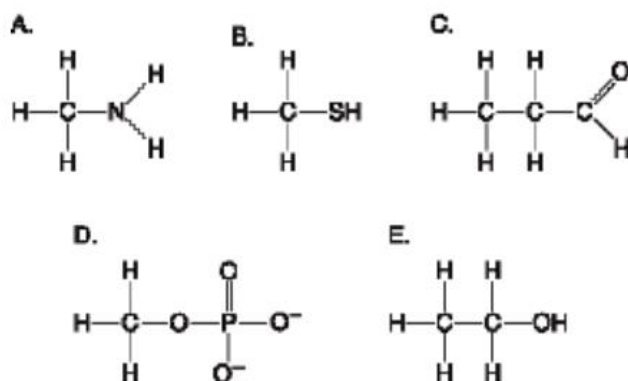


Figure 4.8

58. Which molecule contains a sulfhydryl group? **B**
59. Which molecule is an alkanol. **E**
60. Which molecule contains a functional group known as an amino group? **A**
61. Which molecule is a thiol? **B**
62. Which molecule is an organic phosphate? **D**
63. Which molecule can function as a base? **A**
64. If a compound boils at 100 degrees at 760 mm, its boiling point at 725 mm will be:

- A. lower
- B. higher
- C. the same
- D. cannot predicted

65. In a distillation of a mixture of two components, the first compound to condense into the receiving flask will be...

- A. the one with the lower melting point.
- B. The one with the higher melting point.
- C. The one with the lower boiling point.
- D. The one with the higher boiling point.

66. In general, what is the purpose of simple distillation?

- A. To purify solid materials.
- B. To separate two immiscible liquid.
- C. To separate liquids from one another.
- D. To purify dyes

67. An important part of the distillation apparatus that turns vapor to a liquid is the...

- A. Boiling round bottomed flask
- B. receiver
- C. condenser
- D. Adapter

68. The temperature at which the vapor pressure of a liquid exactly equals the atmospheric pressure is.....

- A. Boiling point
- B. melting point
- C. partial pressure
- D. distribution coefficient

69. Which physical property would be affected most by changes in the atmospheric

pressure?

- A. melting point
- B. boiling point
- C. refractive index
- D. molecular weight

70. The process of removing a substance from its aqueous solution by shaking with a suitable organic solvent is known as.

- A. Crystallization
- B. Distillation
- C. Absorption
- D. Extraction

71. The separation based on the principle of selective distribution of a mixture between two phases a stationary and a moving phase is termed as.

- A. Chromatography
- B. Sublimation
- C. Extraction
- D. Crystallization

72. If the two compounds have the same empirical formula but different molecular formula, they must have.

- A. Different percentage of composition
- B. Different molar Weight
- C. Same viscosity
- D. Same vapour density

73. All are separation methods except

- A. Mass spectrometry
- B. Chromatography
- C. Steam distillation
- D. Fractional distillation

74. A substance which decomposes below its boiling point can be best purified by

- A. Simple distillation
- B. Steam distillation
- C. Fractional distillation
- D. Distillation under reduced pressure

75. The boiling point of a compound does not depend upon

- A. Solubility of the compound in water
- B. Hydrogen bonding
- C. Size of molecules
- D. Polarity of the molecule.

76. All are chromatographic methods except

- A. Ion chromatography
- B. Gas chromatography
- C. Liquid chromatography
- D. Solid chromatography

77. A mixture of water and methanol can be separated by

- A. Vacuum distillation
- B. Steam distillation
- C. Fractional crystallization
- D. Simple distillation.

1.

The _____ sphere is enclosed in brackets in formulas for complex species, and it includes the central metal ion plus the coordinated groups.

- (a) ligand
- (b) donor
- (c) oxidation
- (d) coordination
- (e) chelating

2.

In coordination chemistry, the **donor atom** of a ligand is

- (a) a Lewis acid.
- (b) the counter ion
- (c) the central metal atom.
- (d) the atom in the ligand that shares an electron pair with the metal.
- (e) the atom in the ligand that accepts a share in an electron pair from the metal.

3.

Consider the coordination compound, $\text{Na}_2[\text{Pt}(\text{CN})_4]$. The Lewis acid is

- (a) $[\text{Pt}(\text{CN})_4]^{2-}$
- (b) Na^+
- (c) Pt
- (d) Pt^{2+}
- (e) CN^-

4.

Consider the coordination compound, $\text{K}_2[\text{Cu}(\text{CN})_4]$. A coordinate covalent bond exists between

- (a) K^+ and CN^-
- (b) Cu^{2+} and CN^-
- (c) K^+ and $[\text{Cu}(\text{CN})_4]^{2-}$
- (d) C and N in CN^-
- (e) K^+ and Cu^{2+}