T.Y.B.Sc. Analytical Chemistry (Sample question set)

Semester VI-Oct-2020

1. Resolution is the----

   a. Retardation factor
   b. Resolving power of the column
   c. Relative retention
   d. Mobile phase

2. Rs= 2[t_{R1}-t_{R2}]/[W_1+W_2] is the equation for----

   a. Retardation factor
   b. Relative retention
   c. Relative retention
   d. Resolution

3. S=[r_{R1}]/[t_{R2}] is the equation for----

   a. Retardation factor
   b. Relative retention
   c. Separation factor
   d. Resolution

4. Hight Equivalent To Theoretical Plate (HETP) is the measure of----

   a. Efficiency of separation of the column
   b. Velocity of the mobile phase
   c. Volume of the mobile phase
   d. Separation constant.

5. Electron Capture Detector consist of-----

   a. Alpha emitting Source
   b. Beta emitting source
   c. Gamma emitting source
   d. X ray emitting source.

6. Which of the following is the Beta emitting source in Electron capture detector?

   a. Cobalt 63
   b. Radium
   c. Ni 63
   d. Uranium

7. Working of Thermal Conductivity Detector is based on-----

   a. Emission of Beta particles
   b. Temperature of the flame
   c. Nature of mobile phase
   d. Differences in the thermal conductivity of the components

8. Lane Eynon method of analysis of milk is based on reducing property of-----in the milk.

a. Lactose
b. Fructose
c. Galactose
d. Maltose

9. % of Lactose in the milk can be calculated by the equation---

a. % lactose in the milk= 2 × V1/V2
b. % lactose in the milk= 5 × V1/V2
c. % lactose in the milk= 1 × V1/V2
d. % lactose in the milk= 9 × V1/V2

10. Which of the following is used as adulterant in milk?

a. Urea
b. Sugar
c. Starch
d. all of these

11. Honey has ----- and due to this microorganism cannot survive in it.

a. Low moisture content and high osmotic pressure
b. High moisture content and high osmotic pressure
c. High moisture content and low osmotic pressure
d. Low moisture content and low osmotic pressure

12. Honey contains about------% sugar.

a. 75 %
b. 83 %
c. 50 %
d. 25 %

13. Honey can be adulterated by----

a. Formalin
b. Urea
c. Jaggery/sugar
d. Hydrogen peroxide

14. Maximum amount of caffeine in tea plant is in----

a. Bud and first two leaves
b. Only bud
c. Bud and stem
d. Bud and roots

15. Reducing sugar in honey can be estimated by-----

a. Lowenthal's method
b. Cole's ferricyanide method
c. Lane Eynon method
d. Bailey Andrew method

16. Analysis of milk for lactose can be done by---

a. Lowenthal's method
b. Cole's ferricyanide method
c. Lane Eynon method
d. Bailey Andrew method

17. In tea, ------polyphenolic compounds are present.

a. 30000
b. b.25000
c. 3000
d. 2500

18. Which of the following is major flavanol in tea?

a. Catechin
b. Epicatechin
c. Epicatechin gallate
d. All of these.

19. Which of the following gives mindful alertness with improvement in memory and learning tasks in tea drinker?

a. Pigments
b. Minerals
c. Polyphenols
d. L-Theanine with caffeine.

20. ------ protects tea plant from insects and other animals.

a. Methyl xanthine
b. Minerals
c. Pigments
d. Amino acids.

21. Which of the following are types of tea?

a. Black tea
b. Green tea
c. Oolong tea
d. All of these.

22. Adulteration of iron feelings in tea powder can be detected by----

a. Magnet
b. HCl
c. NaOH
d. HNO_3

23. Analysis of tannin in tea involves-----

a. Lowenthal's method
b. Cole's ferricyanide method
c. Lane Eynon method
d. Bailey Andrew method

24. In *C. arabica* caffeine contents varies from-------percentage.

a. 1.0-1.2
b. 1.5-2.5
c. 1.4-1.6
d. 2.0.-2.5

25. In *C. robusta,* caffeine contents vary from-------percentage.

a. 1.0-1.2
b. 1.5-2.5
c. 1.4-1.6
d. 2.0.-2.5

26. In *C. liberica,* caffeine contents vary from-------percentage.

a. 1.0-1.2
b. 1.5-2.5
c. 1.4-1.6
d. 2.0.-2.5

27. Analysis of coffee for caffeine involves------

a. Lowenthal's method
b. Cole's ferricyanide method
c. Lane Eynon method
d. Bailey Andrew method

28. Water soluble Borates, Carbonates and Zinc Oxide in Lipstick can be estimated by---

a. Lowenthal's method
b. Ash analysis.
c. Lane Eynon method
d. Bailey Andrew method

29.------ is the substance that is applied to the body to prevent body odour caused by the breakdown of perspiration by bacteria.

a. Face powder
b. lipstick
c. Deodorants and anti-perspirants
d. Tannin

30. -----exert antibacterial action on the bacteria which breakdown sweat and prevent body odour.

a. Lipstick
b. Face powder
c. Antiperspirants
d. Deodorants

31. Pasteurization of milk is carried out at----

a. 63 ^{o}C and 72 ^{o}C
b. 110 ^{o}C and 180 ^{o}C
c. 60 ^{o}C and 130 ^{o}C
d. 50 ^{o}C and 60 ^{o}C

32. Vinegar contain approximately-------% acetic acid.

a. 33
b. 15
c. 10
d. 5

33. Raw honey contains the enzyme------

a. Glucose oxidase
b. Tannin
c. Caffeine
d. Alkaline phosphate

34. Which of the following is adulterant in coffee?

a. Cereal/starch
b. Scorched Persimmon stones
c. Chicory
d. All of these

35. Radicidation uses ------radiations for food preservation.

a. 30-40 KGy
b. 2.5- 10 KGy
c. 0.75- 2.5 KGy
d. 40-50 KGy

36. The ability of the face powder to stick(cling) to the face is known as----

a. Slip
b. Absorbency
c. Adhesiveness
d. Covering power.

37. ------ is the main component of face powder and contributes------% of the total formulation.

a. Kaolin
b. Metallic stearates
c. Magnesium carbonate
d. Talc.

38. [LW2]/16t2R is the equation for----

a. Retention time
b. Retention volume
c. Separation factor
d. HETP

39. As the number of theoretical plates increases, HETP decreases and------increases.

a. Efficiency of the column
b. Retention time
c. Retardation factor
d. Retention volume

40. In Gas chromatography, separation of the components can be detected as----

a. Absorption spectra
b. Emission spectra
c. Chromatogram
d. histogram

41. ------types of columns are used in Gas Chromatography.

a. 1
b. 2
c. 3
d. 4

42. When electron capture detector is used in GC, which of the following is used as carrier gas?

a. He or H^2
b. He or N^2
c. O_2 and N^2
d. CH_4 with He or N^2 or Ar

43. Amberlite ZR-120 is the strong----

a. Cation exchange resins
b. Detector
c. Carrier gas
d. Mobile phase

44. Which of the following is an important property of Ion exchange resins/

a. It should be insoluble in water
b. It should be denser than water
c. The polymeric structure should be loose and porous.
d. All of these

45. ----------detector is used in Gas chromatography.

a. Photomultiplier tube
b. Photo emissive cell
c. Photovoltaic cell
d. Thermal conductivity detector

46. Ion exchange chromatography involves----

a. Reversible exchange of ions
b. Irreversible exchange of ions
c. Removal of ions
d. Neutralization of ions

47. -------is the functional group used in cation exchanger.

a. -OH
b. $-SO_3H$
c. $-NH_2$
d. -SH

48. Maximum temperature attain in Gas chromatography is----

a. 500^oC
b. 200^oC
c. 100^oC
d. 300^oC

49. Radurisation uses---- radiations for food preservation.

a. 30-40 KGy
b. 2.5- 10 KGy
c. 0.75- 2.5 KGy
d. 40-50 KGy

50. Sodium Benzoate in food can be determined by-----method.

a. Solvent Extraction
b. Precipitation
c. GLC
d. HPLC

51. The basis of qualitative analysis in polarography is

a. Residual Current
b. Limiting Current
c. Diffusion current
d. Migration current

52. A rotating platinum electrode is generally used in

a. Potentiometry
b. pH Metry
c. Amperometry
d. Colorimetry

53. The potential at the point on the polarographic wave where i = id/2 is termed as

a. Half wave potential
b. Full wave potential
c. Half wave current
d. Half wave diffusion current

54. DME is----------electrode in polarography

a. Small Polarisable
b. Non Polarizable
c. Ionizable
d. Large Nonpolarisable

55. Which of the following statement is true

a. The diffusion current is directly proportional to the concentration of electro active species.
b. The diffusion current is inversely proportional to the concentration of electro active species.
c. The diffusion current is independent on the concentration of electro active species.
d. The diffusion current is directly proportional to the nature of electro active species.

56. Which of the following statement is true
    a. Half wave potential is directly proportional to the concentration of electro active species.
    b. Half wave potential is inversely proportional to the concentration of electro active species.
    c. Half wave potential is independent on the concentration of electro active species.
    d. Half wave potential is directly proportional to the nature of electro active species.
57. Which of the following titration resembles that reactant is non-reducible but the titrant is reducible as an example of amperometric titration
    a. Titration of Pb^{2+} against SO_4^{2-}
    b. Titration of Mg^{2+} against oxine reagent
    c. Titration of Pb^{2+} against $K_2Cr_2O_7$
    d. None of the above
58. RPE is more preferable than DME in amperometric titration for estimation of following ions
    a. Silver ions
    b. Fe (II) ions
    c. Iodine
    d. All of the above
59. Potentiometry measures
    a. Potential difference between two electrodes
    b. Current is measured at applied voltage
    c. Either potential or current measured
    d. Residual current is measured
60. Which of the following is true for voltammetry?
    a. Voltammetry does not involve electron transfer reactions.
    b. Electrolysis occurs and definite current passes through the solution.
    c. Polarography is an example of potentiometric technique.
    d. Voltammetry does not relate to current-voltage relationship.
61. The metal ion concentration in the range----------can be determined by D.C. polarography?
    a. 10^{-2} mol/dm^3 to 10^{-5} mol/dm^3
    b. 10^{-5} mol/dm^3 to 10^{-7} mol/dm^3
    c. 10^{-9} mol/dm^3 to 10^{-11} mol/dm^3
    d. 10^{-1} mol/dm^3 to 10^{-8} mol/dm^3

62. Which of the the following is small polarizable electrode?
    a. Glass electrode
    b. Pt electrode
    c. Saturated calomel electrode
    d. Dropping mercury electrode
63. Amperometric titration is study of
    a. Current passing through the titration cell as a function of volume of titrant added
    b. Potential passing through the titration cell as a function of volume of titrant added
    c. Absorbance observed through the titration cell as a function of volume of titrant added
    d. Transmitance observed through the titration cell as a function of volume of titrant added
64. When reactant and titrant both are reducible which type of curve is obtained?
    a. S
    b. L
    c. V
    d. Both 1 and 3
65. Amperometric titration are applicable in case of
    a. Precipitation titration
    b. Redox titrations
    c. Comlexometric titrations
    d. All above
66. What is expected shape of polarographic wave?
    a. S
    b. L
    c. V
    d. Both 1 and 3
67. Which of the following is true?
    a. Limiting current= Diffusion current + Residual current
    b. Limiting current= Diffusion current + Ohmic current
    c. Limiting current= Diffusion current + Migration current
    d. Limiting current= Diffusion current + Non faradic current

68. The symbol ‘D’ of ilkovic equation represents

a. Drop time
b. Diffusion coefficient
c. Delay time
d. Delay current

69. ($m^{2/3}$ $t^{1/6}$) is also known as

a. Mass of drop
b. Time required for Hg drop
c. Capillary characteristic
d. Ilkovic term

70. Oxygen interference may cause two waves other than polarographic wave of

a. Equal height
b. Unequal height
c. Equal potential range
d. Equal current range

71. Which of the following method is used for quantitative determination of polarographic analysis?

a. Standard deviation analysis
b. Standard addition method
c. Regression analysis
d. Measurement of diffusion current against volume of titant added

72. TGA involves measurement of change in----------of a substance

a. Weight
b. Temperature
c. Enthalpy
d. Entropy

73. In Thermometric titration the property measured is------

a. Temperature changes
b. Change of weight
c. Change in density of solution
d. Change in mass

74. Thermometric titrations are generally carried out under----------conditions

a. Isothermal
b. Adiabatic
c. Isobaric
d. isotonic

75. In DTA technique which of the following factor is measured

a. Change in weight of sample is measured at different temperatures
b. Difference in temperature of sample and reference is measured as function of temperature
c. Changes in temperature are measured during course of titration
d. Change in mass is measured as function of temperature

76. In TGA technique which of the following is measured

a. Change in weight of sample is measured at different temperatures
b. Difference in temperature of sample and reference is measured as function of temperature
c. Changes in temperature are measured during course of titration
d. None of the above

77. In Thermometric titrations which of the following factor is measured?

a. Change in weight of sample is measured at different temperatures
b. Difference in temperature of sample and reference is measured as function of temperature
c. Changes in temperature are measured during course of titration
d. None of the above

78. The horizontal portion(plateaus) in thermo gram represents

a. No change in mass on heating of sample
b. Weight loss due to transformation of sample
c. No change in temperature
d. Change in temperature

79. The usual temperature range used in TGA IS

a. ambient to 1000k
b. ambient to 500k
c. ambient to 1800k
d. ambient to 2300k

80. Cahn electrobalance is used in which of the following technique?

a. Thermometric titration
b. DTA
c. DSC
d. TGA

81. Heating in furnace of TGA cannot be done by using

a. Nichrome wire
b. Kanthal wire
c. IR or microwave radiations
d. UV lamp

82. Which of the following is not commonly used atmospheric control in TGA are

a. Static air
b. Dynamic air
c. Nitrogen gas
d. Chlorine gas

83. TGA technique is applicable for study of

a. Decomposition of calcium oxalate
b. Dehydration of copper sulphate
c. Qualitative estimation of metal ions
d. Determination of Mgo and Mg content in magnesium oxalate

84. Thermocouple are important part of which of the following instrumentation

a. DSC
b. DTA
c. TGA
d. Thermometric titrations

85. Which of the following statement is true

a. Thermometric titrations can be performed in aqueous solvents
b. Thermometric titrations can be performed in non-aqueous solvents
c. Thermometric titrations can be performed in aqueous as well as non-aqueous solvents
d. Not applicable to any of the above

86. Which of the following statement is false?

a. A flat plate shaped crucible are preferred because of easy diffusion of dissolved gases
b. Cylindrical and V shaped glass cups are usually used.
c. The size, geometry and material of the sample holder have an important effect on the shape of TGA curve
d. The size, geometry and material of the sample holder have no effect on the shape of TGA curve

87. Which of the following statement are true?
    a. The process of justifying that the method can be applied is known as the method validation.
    b. Method validation involves evaluation of analytical methods with respect to fitness
    c. Method validation is process that analytical method is acceptable for its intended purpose?
    d. All above statements are true
88. Minimum concentration of the analytic that can be conclusively detected by the given method is known as
    a. LOD
    b. LOQ
    c. Precision
    d. Specificity
89. Minimum concentration that produces a response which is ten times the standard deviation obtained for the blank is identified as
    a. Limit of quantification
    b. Limit of detection
    c. Working and Linear range
    d. Robustness
90. Range of concentration over which the plot of response vs concentration produces a straight line
    a. Dynamic range
    b. Specificity
    c. Robustness
    d. Precision
91. Which of the following statement is true for Dynamic range
    a. Validity of the method in the matrix
    b. Testing the method with a small change in temperature
    c. Lowest concentration of detection of species
    d. Concentration range for which linear response exists

92. Thermometric titration finds a wide range of applications in

a. Acid base titrations
b. Redox titrations
c. Precipitation titration
d. All above

93. LLOQ corresponds to

a. Lower limit of quality
b. Lower limit of quantification
c. Less limit of quality
d. Lower limit of quantification

94. Which of the following statement is true

a. In thermal analysis some physical or chemical properties are measured as a function of temperature
b. In thermal analysis some physical or chemical properties are measured as a function of heat
c. In thermal analysis some physical or chemical properties are measured as a function of time
d. In thermal analysis some physical or chemical properties are measured as a function of time and temperature

95. Kanthal wires which are used as resistance heaters consists of

a. Ni-Cr
b. Cr-Al-Fe
c. Ni-Fe
d. Al-Fe-Ni

96. Heating rate of furnace in DTA technique is

a. 10-20^{0}C per minute
b. 30-40^{0}C per minute
c. 5-10^{0}C per minute
d. 5-10^{0}C per second

97. Which of the following is true

a. TGA does not involve use of reference material
b. TGA requires reference material
c. DTA not requires reference material
d. Both TGA and DTA requires reference material

98. Exothermic and endothermic peak are obtained in

a. TGA technique
b. DTA technique
c. Thermometric titrations
d. TGA and DSC

99. Boric acid vs NaOH titration is suitable for

a. TGA Technique
b. DTA technique
c. Thermometric titration
d. Any one

100. Which of the following is used as reference material for inorganic samples?

a. Octyphthalate
b. Silicone oil
c. SiC
d. $SiCl_4$