

**T.Y.B.Sc. Sem. – V**  
**Examination Mission 2020**  
**(Sample Questions)**

# Analytical Chemistry.

1. Oxidation reduction occurs between---
  - a. Acid and base
  - b. Oxidizing agent and reducing agent
  - c. Ligand and complex
  - d. precipitating reagent and ionic solution
2. The transition potential of Diphenyl amine at 25°C is-----
  - a. 0.45 V
  - b. 0.90 V
  - c. 0.76 V
  - d. 0.50 V
3.  $\text{Fe}^{+++} \rightarrow \text{Fe}^{++} + \text{Electron}$ . In this reaction Fe undergoes -----
  - a. Precipitation
  - b. Reduction
  - c. Ionization
  - d. Oxidation
5. EDTA is-----
  - a. Monodentate ligand
  - b. Bidentate ligand
  - c. Tridentate ligand
  - d. Hexadentate ligand
6. In EDTA titrations  $K'_{MY}$  is called a-----
  - a. Formation constant
  - b. Acid Constant
  - c. Conditional stability constant
  - d. Equilibrium constant

7. What is the necessity to increase the selectivity of EDTA?
- It is unreactive
  - It is neutral ligand
  - It is highly reactive
  - It forms complexes with almost all the metal ions.
8. In complexometric titration, at the end point ----- is observed.
- Precipitate
  - Water and salt
  - Soluble complex
  - Exchange of ions.
9. An indicator used to detect end point in complexometric titration is called as-----
- Redox indicator
  - Adsorption indicator
  - Metal ion indicator
  - Acid base indicator
10. Complexometric titrations are used to detect concentration of-----
- EDTA is commonly represented as-----
  - $H_4Y$
  - $D_4Y$
  - $B_4Y$
  - $A_4Y$
11. The process in which metal ions are prevented to participate in a chemical reaction without physical separation is known as-----
- De-masking
  - Masking
  - pH control
  - Kinetic masking
12. Which of the following is an effective masking agent?
- $F^-$  ions
  - $Cl^-$  ions
  - $Br^-$  ions
  - $CN^-$  ions

13. Direct determination of metal ion concentration by adding EDTA is called as----

- a. Direct titration
- b. Back Titration
- c. Acid base titration
- d. Substitution titration

14. In back titration, which of the following is used to back titrate excess EDTA?

- a.  $\text{MgSO}_4$
- b. NaCl
- c. HCl
- d.  $\text{CuSO}_4$

15. In EDTA titrations, metal ion indicator complex should be weaker than-----

- a. EDTA
- b. Erichrome Black T
- c. Metal-EDTA complex

16. The structure of Erichrome Black T can be abbreviated as----

- a.  $\text{H}^4\text{Y}$
- b.  $\text{H}^3\text{D}$
- c.  $\text{D}^3\text{Y}$
- d.  $\text{H}^4\text{D}$

17. Most of the EDTA titrations are performed at pH----by adding buffer.

- a. 7
- b. 5
- c. 8
- d. 10

18. Murexide is ----

- a. Redox indicator
- b. Adsorption indicator
- c. Metal ion indicator
- d. Acid base indicator

19. Colour change of the solution in EDTA titration using murexide indicator is—

- a. Pink to colourless
- b. Red to blue violet
- c. Wine red to blue

20. In Flame photometry, Sodium emits two distinct lines of----

- a. 589 and 589.6 nm
- b. 215 nm
- c. 807nm
- d. 530 nm

21. Atomic absorption spectrum consist of-----

- a. blue lines
- b. Bright lines against dark background
- c. Red lines
- d. Dark lines against bright background.

22. In atomic absorption spectroscopy, excitation of atoms is due to----

- a. Hollow cathode lamp
- b. Visible light
- c. I.R. light
- d. Flame temperature.

23. Flame emission spectroscopy is the study of-----

- a. Emission
- b. Reflection
- c. Absorption
- d. Scattering

24. Which of the following burner is used in Flame photometry?

- a. Bunsen burner
- b. Gas burner
- c. Petromax burner
- d. Total consumption burner.

25. Which of the following burner is used in Flame photometry?

- a. Bunsen burner
- b. Gas burner
- c. Petromax burner
- d. Laminar flow or Pre-mix burner.

26. Which of the following burners gives better emission intensity?

- a. Bunsen burner
- b. Total consumption burner
- c. Petromax burner
- d. Laminar flow or Pre-mix burner.

27. -----are used to convert liquid sample into aerosols,

- a. Sprayers
- b. Burners
- c. Monochromators.
- d. Nebulizers.

28. Premix burners introduces -----% solution in the flame.

- a. 5 %
- b. 10 %
- c. 90%
- d. 80 %

29.----- is used as a detector in Flame photometry.

- a. Photo emissive cell
- b. Barrier layer cell
- c. Photo multiplier tube
- d. Sample cell

30. The atomic absorption spectroscopy is the study of ----

- a. Emission
- b. Reflection
- c. Absorption
- d. Scattering

31. In atomic absorption spectroscopy, source of radiation is-----

- a. U.V. lamp
- b. I.R. Lamp
- c. Mercury lamp
- d. Hollow Cathode lamp.

32. Hollow cathode lamp consists of -----

- a. Hollow cathode cup
- b. I.R. lamp
- b. U.V. Lamp
- d. Visible lamp

33. ----- is filled inside the hollow cathode lamp.

- a. Hydrogen gas
- b. Nitrogen gas
- c. Oxygen gas
- d. Inert gas

34. A series of standard solutions in flame photometry ranges from---

- a. 1ppm to 10 ppm
- b. 10 ppm to 15 ppm
- c. 10ppm to 20ppm
- d. 20ppm to 25ppm

35. In flame photometry, concentration of the unknown solution can be determined using---

- a. Titration
- b. Gravimetry
- c. Calibraion curve method
- d. Potentiometer.

36. Fluorescence takes place in---

- a.  $10^{-4}$  to  $10^{-8}$  sec.
- b. Less than  $10^{-4}$  sec.
- c.  $10^{-10}$  to  $10^{-8}$  sec.
- d.  $10^{-10}$  to  $10^{-15}$  sec.

37. Source of radiation in fluorimetry is-----
- a. Mercury vapor lamp
  - b. U.V. Lamp
  - c. I.R. lamp
  - d. Visible lamp
38. In fluorimetry primary filters are used to pass-----
- a. Visible radiations
  - b. U.V. radiations
  - c. I.R. radiations
  - d. Xray radiations.
39. In fluorimetry secondary filters are used to pass-----
- a. Visible radiations
  - b. U.V. radiations
  - c. I.R. radiations
  - d. Xray radiations.
40. In phosphorimetry, radiation source is---
- a. Xenon arc lamp
  - b. U.V. Lamp
  - c. I.R. lamp
  - d. Visible lamp
41. In phosphorimetry, sample cell placed in ---
- a. Conical flask
  - b. Round bottom flask
  - c. Dewar flask
  - d. Distillation flask
42. In Dewar flask, liquid nitrogen is stored at----
- a. 50°C
  - b. 100°C
  - c. 150°C
  - d. -196°C

43. Solvent extraction based on -----.
- Nernst distribution law
  - Beer-Lambert's law
  - Nernst equation
  - Law of Mass action
44. Distribution of solute between two liquids is governed by-----
- Ohm's law
  - beer's law
  - Nernst's distribution law.
  - Avogadro's law
45. Solvent extraction is also called as----
- liquid-liquid extraction
  - solid-liquid extraction
  - liquid-gas extraction
  - gas-as extraction.
46.  $D=C_o/C_aq$  is known as---
- Retardation actor
  - Distribution ratio
  - Separation factor
  - Standard factor
47. solvent extraction is -----phase system.
- 1
  - 3
  - 5
  - 2
48. In extraction by solvation, separation takes place by---
- Formation of chelate
  - Formation of ion pair
  - Solvation
  - Using pair of extractants.
49. In extraction by chelation, separation takes place by---
- Formation of chelate
  - Formation of ion pair
  - Solvation
  - Using pair of extractants.
50. In ion pair extraction, separation takes place by---
- Formation of chelate
  - Formation of ion pair
  - Solvation
  - Using pair of extractants.
51. In synergic extraction, separation takes place by---
- Formation of chelate
  - Formation of ion pair
  - Solvation
  - Using pair of extractants.
52. Solid phase extraction is-----system.
- Two
  - Three
  - One



53. Solid phase extraction has the advantage of use of----
- Less volume of solvent
  - Separation funnel
  - Capillary
  - Chromatoplate
54. Solid phase extraction is -----type of chromatography.
- Liquid-Liquid
  - Solid-Liquid
  - Solid-Solid
  - Gas-liquid.
55. Solid phase extraction -----separating chambers.
- 100-200
  - 200-300
  - 300-400
  - 400-500
56. Solid phase extraction, super critical extraction and solid phase microextraction are the type of -----
- Partition Chromatography
  - HPIC
  - HPTLC
  - Solvent extraction.
57. Flame emission spectroscopy curve is plotted by---
- Emission intensity versus concentration
  - Absorbance versus concentration
  - Emf versus concentration
  - pH versus concentration.
58. Ambient sampling collects
- Atmospheric air
  - Gases flowing through pipelines
  - Liquid samples
  - Industrial gases stored in closed container
59. Concentric tube thief is used for
- Sampling of compact solid
  - Sampling of flowing liquid
  - Sampling of free flowing solid
  - Sampling of static liquid
60. Which of the following statement is true?
- The static method is useful when only small amount of material is available for sampling and sample is drawn and analysed regardless of its moisture contact
  - The Dynamic method is useful when only small amount of material is available for sampling and gas reaches equilibrium with walls of container with respect to moisture.
  - Static method is not applicable for gaseous sampling
  - Dynamic method is not applicable for gaseous sampling.

61. Which of the following is true?
- Bulk ratio of sample should be as small as possible and size to weight ratio as small as possible
  - Bulk ratio of sample should be as large as possible and size to weight ratio as small as possible
  - Bulk ratio of sample should be as large as possible and size to weight ratio should also be large
  - Bulk ratio and size to weight ratio is not applicable during sampling.
61. Which of the following is not an example of Heterogeneous liquid
- Two immiscible liquids separating into two layers
  - Emulsion or unstable suspensions
  - Sampling of liquids containing partially crystalline solid
  - Free flowing liquid
62. Which of the following is not an example of sampling devices for ambient sampling includes?
- Sample tubes of glass or metals
  - Sandwich size bags of 9ft<sup>3</sup> capacity
  - Pumps used with activated carbon
  - Multiple tube sampler
63. The most concentrated solution among the following is
- 1.0 M H<sub>2</sub>SO<sub>4</sub>
  - 2.5 N H<sub>2</sub>SO<sub>4</sub>
  - 2.0 % (W/V) H<sub>2</sub>SO<sub>4</sub>
  - 2.5 M H<sub>2</sub>SO<sub>4</sub>
64. How much amount of sodium hydroxide is required in gram to prepare 1200 ml of 2.0 M solution?
- 69 gm
  - 96 gm
  - 9.6 gm
  - 6.9 gm
65. Number of moles of the solute for a definite mass of the solvent
- Molarity
  - Normality
  - Molality
  - Mole fraction
66. The sum of mole fraction of solute and solvent is
- Less than one
  - More than one
  - one
  - two
67. Which of the following is correct?
- $N_1V_1 = N_2V_2$
  - $N_1/V_1 = N_2/V_2$
  - $N_1 = N_2V_2 / V_1 \times 100$
  - $N_1/V_1 = N_2/V_2 \times 1000$
68. In case of redox titrations
- Equivalent weight = Molar mass/ Acidity
  - Equivalent weight = Molar mass/ Basicity
  - Equivalent weight = Molar mass/ Valency
  - Equivalent weight = Molar mass/ Number of electrons lost or gained

69. Reliability is
- Performance of product or service for the stipulated time period
  - Supplementing the basic function of the product or service
  - Measure of product life
  - It is subjective parameter
70. Which of the following statement is not true?
- Quality control deals with finished goods and does not take into account the process that leads to finished good.
  - Quality assurance is assurance given by manufacturer or service provider that the goods produced or service offer is always of good quality
  - Quality assurance deals with the quality of the finished good and does not take into account the process that lead to finished goods.
  - For quality assurance all the processes involved in the sequence leading to the finished goods will have to be considered.
71. Which of the following is true?
- The Total Quality Management is with respect to quality control
  - The Total Quality Management is with respect to quality assurance
  - Both quality control and quality assurance leads to The Total Quality Management.
  - Only option 2 is true.
72. Which of the following statement is true about AR grade chemicals?
- They have stringent limits of metallic impurities
  - These are chemicals of lowest purity
  - It will contain trace impurities but they are restricted to lowest possible limit for high precision.
  - They have absorption blank in wavelength region of interest.
73. Which of following is not spectroscopic grade salt?
- KBr
  - $\text{Fe}(\text{OH})_3$
  - NaCl
  - CsI
74. Reference material accompanied by a certificate which provides value of specified property, its associated uncertainty is called as
- SRM
  - CRM
  - RM
  - GR
75. Which of the following is used for calibration of a measurement system device?
- SRM
  - CRM
  - RM
  - GR
76. Which of the following statement is false about reference material (RM)?
- It may be used to test the validity of a measurement.
  - It can also be used to assign a value to measurement.
  - It can be used for validation of a method.
  - It can be used for calibration of measuring devices.

77. Study of measurement of transmitted light is
- Nephelometry
  - Phosphometry
  - Fluorimetry
  - Turbidimetry
78. When scattering is intense due to high concentration of dispersed phase which method is more preferable?
- Nephelometry
  - Turbidimetry
  - Fluorimetry
  - Phosphometry
79. Turbidity can be expressed in terms of
- T
  - S
  - C
  - K
80. Which of the following factors do not influence particle size
- Temperature
  - pH
  - Ionic strength
  - Pressure on solution
81. Which specific type of cell is more preferable in Turbidimetry?
- Cylindrical
  - V shaped
  - Semi octagonal type of cell
  - Flat bottom cell
82. In Nephelometer intensity of scattered light is not measured at
- 140°C
  - 135°C
  - 45°C
  - 90°C
83. Which of the following are used as detectors in Turbidimetry?
- Photo-Multiplier tube
  - Photo Cell
  - Refractive index detector
  - UV-Visible detector
84. Which of the following are used as detectors in Nephelometry?
- Photo-Multiplier tube
  - Photo Cell
  - Refractive index detector
  - UV-Visible detector
85. The technique is known as high pressure liquid chromatography because it allows
- Movement of mobile liquid phase on solid stationary phase happens under pressure.
  - Movement of one liquid phase over another can occur only under pressure.
  - No need to apply pressure for moving mobile liquid phase on solid stationary phase.
  - No need to apply pressure for moving mobile liquid phase on liquid stationary phase.

86. Which of the following is not true for HPLC?
- It is extensively used for detection, identification, characterisation and estimation of the components.
  - It possesses high selectivity and sensitivity.
  - It possesses high reproducibility and applicability.
  - The technique can analyse different samples of diverse chemical nature.
87. When the mobile phase is nonpolar liquid and stationary phase is polar liquid then technique is known as
- Normal phase chromatography
  - Reverse phase chromatography
  - Stationary phase chromatography
  - Mobile phase chromatography
88. When single solvent is used for elution the technique is known as
- Gradient elution technique
  - Isocratic elution technique
  - Reverse phase technique
  - Normal phase technique
89. Which of the following is not true?
- The pumps should be able to deliver a pressure of about 6000 psi
  - It should be able to produce reproducible rates.
  - The flow of liquid should be in the form of pulse.
  - Flow of liquid ranges from 0.1 mL to 10 mL.
90. Which of the following is false about Pre-column?
- It is used to saturate the mobile phase with the stationary phase
  - It is used to remove suspended matter and impurities from mobile phase
  - It will avoid loss of stationary phase.
  - It should have different composition than that of analytical column.
91. Capillary columns provides theoretical plates in the range
- 40k to 60k
  - In the range of 100k
  - 20k to 40k
  - In the range of 200k
92. Spectrophotometers is an example of
- Refractive index detector
  - Uv-Visible detectors
  - IR detectors.
  - None of the above
93. Which of the following is true?
- HPTLC is extremely expensive as compared to TLC
  - HPTLC is extremely expensive compared to HPLC
  - HPTLC is less tedious compare to TLC
  - HPTLC is as simple and easy to operate as TLC
94. What is advantage of using aluminium sheets as solid stationary support?
- It is fragile in nature
  - They are affected by temperature
  - It can withstand high temperature and are compatible with solvent.
  - They are resistant to acid or alkali attack

95. Fluorescent measurement is applicable in which of following technique?
- IR spectroscopy
  - HPTLC
  - HPLC
  - Nephelometry
96. Which Phase carries sample?
- Stationary phase
  - Mobile phase
  - Gaseous phase
  - Solid support
97. In HPTLC the components are separated by
- Dissolution
  - Partition
  - Adsorption
  - Absorption
99. The equivalent weight of  $\text{KMnO}_4$  in acidic solution is
- 158
  - 31.6
  - 52.7
  - 79.0
100. The normality of 0.05 M  $\text{H}_2\text{SO}_4$  is
- 0.05N
  - 0.025N
  - 0.1 N
  - 0.2N
101. The next step after quality control is
- Quality assurance
  - RM
  - CRM
  - SRM
102. When a definite item in a sequential lot is selected for sampling it is known as
- Random sampling
  - Systematic sampling
  - Sequential sampling
  - None of the above
103. Filter photometers is an example of
- Uv visible detector
  - Refractive index detector
  - Chromatographic detector
  - IR detector
104. When scattering is less due to small concentration of dispersed phase which method is more preferable?
- Nephelometry
  - Turbidimetry
  - Fluorimetry
  - Phosphometry

105. Which of the following is spectroscopic grade salt?

- a.  $\text{AlCl}_3$
- b.  $\text{AlBr}_3$
- c.  $\text{K}_2\text{SO}_4$
- d.  $\text{KBr}$

106. Manual injection method relates to

- a. Detectors
- b. Pumps
- c. Sample injection system
- d. Precolumn

107. Titration of bromide ions against  $\text{AgNO}_3$  is an example of

- a. Turbidimetric titration
- b. Phase titration
- c. Acid-base titration
- d. Redox titration