

**DEPARTMENT OF CHEMISTRY**

**CET, KATTANKULATHUR**

**MULTIPLE CHOICE QUESTIONS**

**PROGRAM : B.Tech [Common]**

**Sem: I and II**

**SUBJECT/ CODE: CHEMISTRY PRACTICAL/18CYB101J**

1. The color of phenolphthalein indicator in acid solution is
  - a. Pink
  - b. Yellow
  - c. Colourless
  - d. Orange

**Answer: c. Colourless**

2. The equivalent weight of Sodium Carbonate [ $\text{Na}_2\text{CO}_3$ ] is
  - a. 40
  - b. 53
  - c. 55.85
  - d. 63

**Answer: b. 53**

3. When basic solution is titrated against HCl in the burette with Methyl orange indicator, the end point is the color change from
  - a. Yellow to Violet
  - b. Orange to Yellow
  - c. Appearance of Pink color
  - d. Yellow to Orange

**Answer: Yellow to Orange**

4. Methyl orange is
  - a. Pink in acidic medium, yellow in basic medium
  - b. Yellow in acidic medium, pink in basic medium
  - c. Colourless in acidic medium, pink in basic medium
  - d. Pink in acidic medium, colourless in basic medium.

**Answer: a. Pink in acidic medium, yellow in basic medium**

5. Phenolphthalein color in basic medium is
  - a. Pink
  - b. Orange
  - c. Yellow
  - d. Colourless

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**Answer: a. Pink**

6. When mixture of sodium carbonate and sodium hydroxide solution is titrated against HCl solution, the Phenolphthalein end point correspond to
- Neutralization of  $\text{OH}^-$  ions and  $\text{CO}_3^{2-}$  ions
  - Neutralization of  $\text{OH}^-$  ions only
  - Neutralization of  $\text{CO}_3^{2-}$  ions only
  - Neutralization of  $\text{OH}^-$  ions and half of  $\text{CO}_3^{2-}$  ions

**Answer: d. Neutralization of  $\text{OH}^-$  ions and half of  $\text{CO}_3^{2-}$  ions**

7. A neutralization reaction is a ----- reaction taking place between the acids and the bases.
- double displacement
  - Displacement
  - Substitution
  - Addition

**Answer: a. double displacement**

8. A precipitation reaction is a double displacement reaction taking place between
- Acids and bases
  - two aqueous ionic compounds
  - two bases
  - two acids

**Answer: b. two aqueous ionic compounds**

9. In determination of mixture of bases by titration method, the amount of Sodium Hydroxide is calculated as---
- $N \times \text{Equivalent mass of Sodium Carbonate} / 10$
  - $N [\text{OH and } \text{CO}_3^{2-} \text{ portion}] \times \text{Equivalent mass of Sodium Hydroxide and Sodium carbonate} / 10$
  - $N [\text{OH portion}] \times \text{Equivalent mass of Sodium Hydroxide} / 10$
  - $N [\text{CO}_3^{2-} \text{ portion}] \times \text{Equivalent mass of Sodium carbonate} / 10$

**Answer: c.  $N [\text{OH portion}] \times \text{Equivalent mass of Sodium Hydroxide} / 10$**

10. When pH is below 8.5 the indicator ---- is colourless.
- EBT
  - Methyl orange
  - Phenolphthalein
  - $\text{K}_2\text{CrO}_4$

**Answer: c. Phenolphthalein**

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11. What is the indicator used for estimation of hardness?

- a) Phenolphthalein
- b) Methyl orange
- c) Eriochrome Black – T
- d) Potassium dichromate

Answer: c. **Eriochrome Black – T**

12. Hardness of water is conventionally expressed in terms of equivalent amount of \_\_\_\_\_.

- a)  $\text{H}_2\text{CO}_3$
- b)  $\text{MgCO}_3$
- c)  $\text{CaCO}_3$
- d)  $\text{Na}_2\text{CO}_3$

Answer: c.  **$\text{CaCO}_3$**

13. One ppm is equal to \_\_\_\_\_.

- a) 100 mg / L
- b) 10 mg / L
- c) 1000 mg / L
- d) 500 mg / L

Answer: c. **1000 mg / L**

14. Which of the following does not cause the permanent hardness in water?

- a) Nitrates
- b) Sulphates
- c) Chlorides
- d) Bicarbonates

Answer: d. **Bicarbonates**

15. Soft water + Buffer + EBT -----□

- a. Appearance of wine-red colour
- b. Appearance of steel blue colour
- c. Formation of weak complex
- d. Formation of brown precipitate

Answer: b. **Appearance of steel blue colour**

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16. Temporary hardness in water can be removed by:

- a) adding soda
- b) distillation
- c) boiling
- d) adding lime-soda

**Answer: c. boiling**

17. In EDTA method, the purpose of adding buffer is \_\_\_\_\_.

- a) to maintain the pH of 6-8 range
- b) to maintain the pH of 8-10 range
- c) to maintain the pH of 4-6 range
- d) to maintain the conc. of the reagent

**Answer: b. to maintain the pH of 8-10 range**

18. Which of the following is not a unit of hardness?

- a) Parts per million
- b) Degree centigrade
- c) Degree clarke
- d) Degree French

**Answer: b. Degree centigrade**

19. Temporary hardness of water is caused due to the presence of dissolved

- a) calcium hydrogen carbonates only
- b) magnesium hydrogen carbonates only
- c) Sulphates and chlorides of calcium or magnesium
- d) calcium hydrogen carbonates and magnesium hydrogen carbonates

**Answer: d. calcium hydrogen carbonates and magnesium hydrogen carbonates**

20. Permanent hardness of water cannot be removed by

- a) Adding soda
- b) Adding lime soda
- c) Distillation
- d) Boiling

**Answer: d. Boiling**

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21. When sodium hydroxide is added to HCl, the  $\text{H}^+$  ions are replaced by

- a) slow moving  $\text{Na}^+$  ions
- b) fast moving  $\text{Na}^+$  ions
- c) slow moving  $\text{OH}^-$  ions
- d) fast moving  $\text{OH}^-$  ions

**Answer: a. slow moving  $\text{Na}^+$  ions**

22. When a strong base is added to a strong acid after the neutralization point

- a) conductance decreases
- b) conductance increases
- c) conductance remains constant
- d) conductance decreases initially and then increases gradually

**Answer: b. conductance increases**

23. Conductance of a solution depends upon

- a) mobility of ions
- b) charge of the ions
- c) size of the ions
- d) colour of the ions

**Answer: a. mobility of ions**

24. The end point in the conductometric titration of strong acid Vs strong base can be determined by plotting

- a) Conductance Vs Volume of acid
- b) Conductance Vs Volume of base
- c) pH Vs volume of acid
- d) pH Vs volume of base

**Answer: b. Conductance Vs Volume of base**

25. Which among the following reagents is NOT required in conductometric titration of strong acid Vs strong base

- a) HCl
- b) NaOH
- c) distilled water

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d)  $\text{K}_2\text{Cr}_2\text{O}_7$

**Answer: d.  $\text{K}_2\text{Cr}_2\text{O}_7$**

26. Which among the following apparatus is NOT used in conductometric titration

a) conductivity meter

b) conductivity cell

c) beaker

d) pH meter

**Answer: d. pH meter**

27. In order to get accurate values in titration of HCL Vs NaOH, the NaOH is added in increments of

a) 2ml near and beyond the end point

b) 1 ml near and beyond the end point

c) 0.2 ml near and beyond the end point

d) 0.5ml near and beyond the end point

**Answer: c. 0.2 ml near and beyond the end point**

28. When NaOH is added to HCl after the neutralization point the conductance increases rapidly

a) because of fast moving  $\text{OH}^-$  ions

b) because of fast moving  $\text{H}^+$  ions

c) Because of fast moving  $\text{Na}^+$  ions

d) because of fast moving  $\text{Cl}^-$  ions

**Answer: a. because of fast moving  $\text{OH}^-$  ions**

29. In the pilot titration of NaOH Vs HCl by conductometry, the base is added in increments of

a) 0.1ml

b) 0.2ml

c) 1ml

d) 2ml

**Answer: c. 1ml**

30. Conductance is measured in the unit

a. ohm

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- b. mho
- c. volts
- d. ml

**Answer: b. mho**

31. Which indicator is used in potentiometric titration?

- a. Methyl orange
- b. Potassium Chromate
- c. Eriochrome Black T (EBT)
- d. No indicator is used.

**Answer: d. No indicator is used**

32. Name the reference electrode and working electrode used in the estimation of Fe(II) ions by potentiometry.

- a. Platinum electrode and Standard Calomel Electrode
- b. **Standard Calomel Electrode and Platinum electrode**
- c. Standard Calomel Electrode and Glass electrode
- d. Glass electrode and Platinum electrode

**Answer: b. Standard Calomel Electrode and Platinum electrode**

33. Estimation of Fe(II) ions by potentiometry is \_\_\_\_\_ titration.

- a. Redox
- b. Acid-base
- c. Precipitation
- d. Complexometric

**Answer: a. Redox**

34. Oxidation states of Cr in Potassium Dichromate and Fe in FAS are \_\_\_\_\_ respectively.

- a. (+VII) and (+II)
- b. (+V) and (+II)
- c. (+VI) and (+III)
- d. (+VII) and (+III)

**Answer: a. (+VII) and (+II)**

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35. Which of the following chemical agent is added during the estimation of Fe(II) ions by potentiometry to avoid the hydrolysis reaction during the titration?

- a. FAS
- b. Phenolphthalein
- c. dil.  $\text{H}_2\text{SO}_4$
- d. dil. HCl

**Answer: c. dil.  $\text{H}_2\text{SO}_4$**

36. In the experiment, “Estimation of Fe(II) ions by potentiometry”,  $\text{K}_2\text{Cr}_2\text{O}_7$  acts as ---.

- a. Reducing agent
- b. Oxidizing agent**
- c. Indicator
- d. Catalyst

**Answer: b. Oxidizing agent**

37. Which of the following represents the equivalence point in the graph of EMF vs volume of titrant?

- a. Point at the highest EMF
- b. Point at the lowest EMF
- c. Point at the greatest magnitude of the slope of the curve



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- d. Point at the least magnitude of the slope of the curve

**Answer: c. Point at the greatest magnitude of the slope of the curve**

38. All of the following statements are correct regarding potentiometric titration except

- a. They are suitable for colored or turbid solutions
- b. The EMF of the cell is zero at the equivalence point
- c. The results obtained are accurate
- d. Acid base titration can also be carried out by potentiometry

**Answer: b. The EMF of the cell is zero at the equivalence point**

39. Basically, potentiometer is a device for ---.

- a. Comparing two voltages
- b. Measuring a current
- c. Comparing two currents
- d. Measuring a voltage

**Answer: a. Comparing two voltages**

40. The significance of first derivative and second derivative plot in potentiometric titration is -.

- a. To get additional information about the redox reaction
- b. To get the voltage of reference electrode
- c. To get the value of standard electrode potential
- d. To get more accurate equivalence point in case of colored and dilute solutions

**Answer: d. To get more accurate equivalence point in case of colored and dilute solutions**

41. What is the working principle of conductometry?

- a. measurement of potential.
- b. measurement of conductivity of solution.
- c. measurement of emf.
- d. measurements of pH

**Answer: b. measurement of conductivity of solution**

42. Among the following applications for which the conductometry titration is not used?

- a. To determine of moisture

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- b. Purity of water
- c. Ionic product of water.
- d. Precipitation titration

**Answer: a. To determine of moisture**

43. If the ion size decreases in solutions then
- a. conductance decreases
  - b. conductance increases
  - c. does not affect the conductance
  - d. first decreases and then increases

**Answer: b. conductance increases**

44. Conductivity cell is made up of...
- a. Two silver rods
  - b. Two parallel sheets of platinum
  - c. Glass membrane of Ag/AgCl
  - d. Sb-Sb<sub>2</sub>O<sub>3</sub>

**Answer: b. Two parallel sheets of platinum**

45. The units for specific conductance is...
- a. Ohms
  - b. Ohms.cm
  - c. Mhos
  - d. Mhos.cm

**Answer: b. Ohms.cm**

46. Conductivity of a solution is directly proportional to
- a. dilution
  - b. current density
  - c. number of ions
  - d. volume of the solution

**Answer: c. number of ions**

47. In conductometric titration, after both the acids are consumed, there is a steep increase in conductivity due to...
- a. increase in total volume of solution
  - b. increase in temperature
  - c. increase in OH<sup>-</sup> ions

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d. increase in  $H^+$  ions

**Answer: c. increase in  $OH^-$  ions**

48. At the same concentration and temperature, dilute aqueous solution of strong acid will conduct electricity....

- a. better than dilute aqueous solution of weak acid
- b. as much as dilute aqueous solution of weak acid
- c. lower than the dilute aqueous solution of weak acid
- d. two-fold higher than the weak acid

**Answer: a. better than dilute aqueous solution of weak acid**

49. In conductometric titration when KOH is titrated against mixture of  $H_2SO_4$  and malonic acid, which one will be reacting first?

- a. Malonic acid
- b. Sodium malonate
- c. Disodium malonate
- d.  $H_2SO_4$

**Answer: d.  $H_2SO_4$**

50. If 20 g of NaOH is dissolved in 1 L distilled water, then what is the concentration of the solution?

- a. 1 N
- b. 2 N
- c. 0.5 N
- d. 0.05 N

**Answer: c. 0.5 N**

51. A pH value less than 7.0 means that the solution is

- a) Conductive
- b) Caustic
- c) Alkaline
- d) Acidic

**Answer: d. Acidic**

52. Which of the following is the formula for pH calculation?

- a)  $\log_{10}[H^+]$
- b)  $-\log_{10}[H^+]$
- c)  $\log_2[H^+]$
- d)  $-\log_2[H^+]$

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**Answer: b.  $-\log_{10}[\text{H}^+]$**

53. The pH meter is a

- a) Ammeter
- b) Voltmeter
- c) Potentiostat
- d) Spectrophotometer

**Answer: b. Voltmeter**

54. What is the pH value of pure water?

- a) Less than 7
- b) Greater than 7
- c) Equal to 7
- d) Greater than 14

**Answer: c. Equal to 7**

55. How we will come to know that a given solution is acidic?

- a) If its pH value is less than 7
- b) If its pH value is greater than 7
- c) If its pH value is less than 5
- d) If its pH value is 5

**Answer: a. if its pH value is less than 7**

56. What happens when a base is added to an acid?

- a) the pH value increases
- b) the pH value decreases
- c) no change in pH
- d) the pH value becomes zero

**Answer: a. the pH value increases**

57. A buffer solution is used with pH measuring instruments to

- a) protect the equipment
- b) standardize the equipment
- c) clean the electrodes
- d) plantinize the reference electrode

**Answer: b. standardize the equipment**

58. The pH of a liquid solution is a measure of

- a) dissolved salt content

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- b) hydrogen ion activity
- c) hydroxyl ion molarity
- d) electrical conductivity

**Answer: b. hydrogen ion activity**

59. The electrolyte solution within the glass electrode (reference) of the pH meter is

- a) saturated KCl
- b) concentrated HCl
- c) dilute HCl
- d) dilute NaCl

**Answer: a. saturated KCl**

60. A buffer solution comprises which of the following?

- a) a weak acid in solution
- b) a strong acid in solution
- c) a weak base in solution
- d) a weak acid and its conjugate base in solution

**Answer: d. a weak acid and its conjugate base in solution**

61. Which one of the following methods is not related to calculate the molecular weight of a polymer?

- a) Number average molecular weight,
- b) Weight average molecular weight,
- c) Gel permeation chromatography,
- d) High performance liquid chromatography

**Answer: d. High performance liquid chromatography**

62. Measurement of solution viscosity offers a simple and convenient method for molecular weight determination if

- a) Polymer is insoluble in solvent
- b) Polymer is soluble in solvent
- c) Polymer is sparingly soluble in solvent
- d) Polymer is used as neat

**Answer: b. Polymer is soluble in solvent**

63. The Staudinger – Mark-Houwink equation is

- a)  $\eta_i = K (M)^a$
- b)  $l = \eta / p$
- c)  $E = mc^2$

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d)  $E = \eta u$

**Answer: a.  $\eta_i = K (M)^a$**

64. Viscosity is due to one of the following

- a) Potential energy stored in fluid
- b) Resistance to fluid motion
- c) Roughness of the surface
- d) The pressure difference between the two fluids

**Answer: b. Resistance to fluid motion**

65. What is the SI unit of viscosity?

- a) Candela
- b) Poiseuille
- c) Newton/m
- d) No units

**Answer: b. Poiseuille**

66. Which of these fluids has the highest viscosity?

- a) Water
- b) Honey
- c) petrol
- d) brine solution

**Answer: b. Honey**

67. Which one of the following equations is used to calculate the relative viscosity?

- a)  $\eta / \eta_0 = t/t_0$
- b)  $\eta_{sp} = \eta / \eta_0 - 1$
- c)  $\eta_{red} = \eta_{sp}/C \times 100$
- d)  $\eta_i = K (M)^a$
- e) **Answer: a.  $\eta / \eta_0 = t/t_0$**

68. On increasing the temperature, the viscosity of the fluid \_\_\_\_\_

- a) Decreases
- b) Increases
- c) Initially decreases then increases
- d) Neither decrease nor increase

**Answer: a. Decreases**

69. A plot of  $\eta_{sp} / C$  (reduced viscosity) vs  $C$  is a ..... for dilute polymer solutions

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- a) "S" shape curve
- b) Triangle
- c) Straight line
- d) "V" shape curve

**Answer: c. Straight line**

70. Volume of different concentrations of polymer solution used (0.1, 0.2, 0.3 , 0.4 and 0.5 %) for each viscosity measurement

- a) Varies with respect to concentration
- b) Varies with respect to the size of the Ostwald viscometer
- c) Varies with respect to polymer used
- d) Remains fixed

**Answer: d. Remains fixed**

71. To prepare 25 ml of 0.2 % diluted solution from a 1% solution, we need

- a) 2.5 ml of 1 % solution
- b) 5 ml of 1 % solution
- c) 7.5 ml of 1 % solution
- d) 10 ml of 1 % solution

**Answer: b. 5 ml of 1 % solution**

72. What is the role of chromate ions in chloride estimation?

- a. It acts as a reducing agent
- b. It acts as a buffer
- c. It acts as an indicator
- d. It acts as an oxidizing agent

**Answer: c. It acts as an indicator**

73. What is the pH range in which chloride determination using Mohr's method is conducted?

- a. < 3
- b. 5
- c. > 12
- d. 6 -9

**Answer: d. 6 -9**

74. Which of the following is not a primary standard?

- a. NaCl

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- b. Anhydrous  $\text{Na}_2\text{CO}_3$
- c.  $\text{AgNO}_3$
- d. Oxalic acid

**Answer: c.  $\text{AgNO}_3$**

75. Which indicator is used in Mohr's method?

- a. Potassium Chromate
- b. Silver Nitrate
- c. Potassium dichromate
- d. Silver Chromate

**Answer: a. Potassium Chromate**

76. Estimation of chloride reaction is

- a. Redox reaction
- b. Equilibrium reaction
- c. Precipitation reaction
- d. Catalytic reaction

**Answer: c. Precipitation reaction**

77. Which type of reaction occurs in the following reaction  $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$ ?

- a. Displacement reaction
- b. Single replacement
- c. Decomposition
- d. Double displacement reaction

**Answer: d. Double displacement reaction**

78. Why do we have to standardize  $\text{AgNO}_3$  solution?

- a. To find the normality of  $\text{NaCl}$
- b. To calculate the normality of  $\text{AgCl}$
- c. To find the normality of  $\text{AgNO}_3$
- d. To calculate the volume of  $\text{NaCl}$

**Answer: c. To find the normality of  $\text{AgNO}_3$**

79. What is the oxidation state of Mn in  $\text{KMnO}_4$  ?

- a. +6



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- b. +7
- c. +9
- d. +5

**Answer: b. +7**

80. What is the advantage of Mohr's method?

- a. A Very clear colour change
- b. Simple method
- c. Capability for different PH
- d. Must be 1M nitric acid solution.

**Answer: b. Simple method**

81. In Mohr's method the solution needs to be near neutral, because

- a. Silver chloride forms at high pH,
- b. Silver precipitates at low pH
- c. Chromate forms  $\text{H}_2\text{CrO}_4$  at low pH, which delays the formation of the precipitate.
- d. Potassium chromate dissolves at high pH.

**Answer: c. Chromate forms  $\text{H}_2\text{CrO}_4$  at low pH, which delays the formation of the precipitate.**