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Department of Chemistry

B. Sc. I Sem. - II Paper No. IV (Analytical Chemistry)



Q.1 MCQ-

1. The urea is.....type of fertilizer.

a) potash b) phosphatic c) mixed d) nitrogenous

2. In instrumental analysis physical property of a substance is measured by any known

a) chemical test b) instrument c) sample d) none of these

3. Determinate errors are associated with.....failures.

a) personal b) instrumental c) both a & b d) none of these

4. Accuracy is described as the degree of agreement between a measured value andvalue.

a) most probable b) the true c) the actual d) all of these

5. Standard deviation is often used as a measure of

a) accuracy b) mean c) precision d) none of these

6. Significant figure is awhich denotes the amount the quantity in the place in which it stands.

a) picture b) analysis c) digit d) none of these

7. The difference between the observed or measured value and true or most probable value is called

Error.

a) relative b) absolute c) both a & b d) none of these

8. In paper chromatography the filter paper acts as.....

a) Stationary phase b) mobile phase c) absorbent d) support to hold stationary phase

9. The number of phases operating in chromatography

a) 4 b) 2 c) 3 d) varies with type

10. The ratio of concentration of solute in stationary and mobile phase at equilibrium is termed ascoefficient .

- a) permeability b) partition c) adsorption d) chromatography

11. In TLC Stationary phase is.....

- a) adsorbent itself b) liquid film around adsorbent c) organic d) either a or b

12. In paper chromatographyreagents cannot be used.

- a) corrosive b) sensitive c) colourless d) either a or b

13. Rf value is the ratio of

- a) two concentration b) two distances c) rate of migration d) either a or b

14. Lower the Rf value of solute

- a) greater the affinity for support b) lesser the affinity for mobile phase
c) greater the affinity for stationary phase d) either b or c

15. Which of the following is used as an indicator in the titration of iodine with hypo?

- (a) Methyl red (b) Methyl orange (c) Starch (d) Potassium ferricyanide

16. What will be the pH at the equivalence point in the titration of a weak acid and a strong base?

- (a) 0 (b) >7 (c) 7 (d) <7

17. On adding a large amount of titrant, an asymptote is obtained in the titration curve, this asymptote represents

- (a) K_a of the initial solution (b) pH of the initial solution (c) pH of the titran (d) none of the above

18. The buffer region is represented by.....

- (a) the concave curve after adding titrant
(b) the flat curve before the equivalence point
(c) the flat curve after the equivalence point
(d) the steep curve after the equivalence point

19. How many mmols of NaOH will be used in the titration with 33ml of 3 M HCl to form NaCl and water?

- (a) 10 mmol (b) 100 mmol (c) 3 mmol (d) 33 mmol

20. The pH range of methyl orange as an indicator is.....

- (a) 3-5 (b) 8-9 (c) 2-4 (d) 6-8

21. The amount of NaOH used in the titration of 100 ml 0.1 N HCl is....

- (a) 4 g (b) 0.04 g (c) 2 g (d) 0.4 g

22. The equivalent weight of an acid can be calculated by.....

(a) Molecular weight \times basicity

(b) Molecular weight/basicity

(c) Molecular weight \times acidity

(d) Molecular weight/acidity

23. The normal rain water is acidic due to.....

(a) SO_2

(b) NO_2

(c) NH_3

(d) CO_2

24. Which of the following represents the equivalence point in the graph of pH Vs volume of titrant?

(a) Point at the highest pH

(b) Point at the greatest magnitude of the slope of the curve

(c) Point at the lowest pH

(d) Point at the least magnitude of the slope of the curve

25. Titremetric analysis referes to_____

a) Qualitative b) Quantitative c) Both a & b d) none of these

26. The point at which titration is completed.....

a) equivalence point b)theoretical point c)stoichiometric end point d)all of the above

27. Which of the following titrations will have the equivalence point at a pH more than 8?

(a) HCl and NH_3

(b) CH_3COOH and NH_3

(c) HCl and NaOH

(d) CH_3COOH and NaOH

28. Which of the following is used as an indicator in the titration of a strong acid and a weak base?

(a) Phenolphthalein

(b) Thymol blue

(c) Fluorescein

(d) Methyl orange

29. The ideal indicator for the titration of strong acid and weak base should have pH range between __

a) 3-5

- b) 4-6
- c) 6-8
- d) 7-9

30. A difference between strong and weak acid is _____.

- a) proton donation and electron acceptance
- b) complete and partial ionisation
- c) negative and positive pH
- d) presence and absence of halogen ions

31. What is the sum of the concentrations of H_3O^+ ions and OH^- ions in water?

- a) 10^{-28}
- b) 10^{-14}
- c) 10^{-7}
- d) 55.4

32. A water solution with a pH of 10 is.....

- a) is always acidic
- b) is always basic
- c) is always neutral
- d) might be acidic, basic, or neutral

33. The acid concentration is determined by neutralising 30 mL of acid with 15 mL of 0.2 N alkali.

- a) 0.4 N
- b) 0.1 N
- c) 0.3 N
- d) 0.15 N

34. Hardness of water is due to the presence of salts of _____

- a) Potassium
- b) Chlorine
- c) Magnesium
- d) Boron

35. Hardness of water is conventionally expressed in terms of equivalent amount of _____

- a) H_2CO_3
- b) MgCO_3
- c) CaCO_3
- d) Na_2CO_3

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

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

37. EDTA method for hardness determination is a less accurate and inconvenient procedure.

- a) True
- b) False

38. Water is oxidised to oxygen by.....

- a) H_2O_2
- b) KMnO_4
- c) ClO_2
- d) fluorine

39. The action of water or dilute mineral acids on metals can give.....

- a) tritium
- b) dihydrogen
- c) trihydrogen
- d) mono hydrogen

40. Permanent hardness to the water arises due toof Ca and Mg.

- a) chlorides
- b) sulphates
- c) Both a & b
- d) Bicarbonates

41. This chemical fertilizer is essential for better rhizobial nitrogen fixation.....

(a) calcium (b) potassium (c) sodium (d) phosphorus

42. Maximum N content found in N fertilizer....

(A) Urea (B) Anhydrous ammonia (C) Sodium nitrate (D) Ammonium sulphate

43. Rock phosphate has P_2O_5

(A) 10-20% (B) 20-40% (C) 30-50 % (D) 20-30%

44. The conversion factor for calculating P from P_2O_5

(A) $P_2O_5 \times 2.29$ (B) $P \times 0.44$ (C) $P \times 2.29$ (D) $P_2O_5 \times 0.44$

45. The central cation on silica tetrahedron is ____

(A) Al^{3+} (B) Si^{4+} (C) Fe^{2+} (D) None of the above

46. Which plant is used for indication of permanent wilting point?

(A) Safflower (B) Sunflower (C) Marigold (D) Both A and C

47. Chemical formula of thiourea is ____

(A) $CO(NH_2)_2$ (B) $SC(NH_2)_2$ (C) HCN (D) None of the above

48. N content in thiourea is ____

(A) 46% (B) 36.8% (C) 22.5% (D) 33%

49. One of the following is a nitrogen fixing enzyme....

a) Urease

(b) Arginase

(c) Nitrate reductase

(d) All above

50. Best fertilizer for paddy fields is.....

(a) *Azolla pinnata*

(b) *Rhizobium melilotii*

(c) *Bacillus megatherium*

(d) *Bacillus polymyxa*

Q.2.Long answer questions:

1. Discuss detail, importance of analysis.

2.Explain in brief:

a) Qualitative analysis b) Quantitative analysis c) Structural analysis d) instrumental analysis

3.Development of methods of paper chromatography.

4. A) explain TLC methodology

B) types of paper chromatography

5.A) reagents used for detection of paper chromatography.

B) List the applications of paper chromatography.

6. What are acid–base indicators? Explain Ostwald's ionization theory.

7. Explain the neutralization of weak base with strong acid or weak acid with strong base or strong acid with strong bases.

8. Mention physical parameter of water. Explain any one or pH /conductance / colour/odour/turbidity/taste.

9. Explain any two or five chemical parameter.

10. Explain the estimation of potassium by STPB method.

Q.3.Short answer type questions:

1. What is analytical chemistry? Mention its applications.

2. Explain in brief, mean deviation and relative.

3. Define the following-

a) Qualitative analysis b) Error c) analytical chemistry d) Precision e) standard deviation

4. What do you mean by absolute and relative errors? Explain with suitable examples.

5. Give the classification of analytical process.

6. Spraying reagents in chromatography.

7. Applications of paper chromatography.

8. Comparison of paper and Thin layer chromatography.

9. Advantages of paper chromatography and TLC.

10. Explain basic terms used in chromatography.

11. Define the following terms-

a) Standard solutions b) Titrand c) Mole d) Molar solution e) Normal solution

12. Types of EDTA titrations .

13. Write note on pH

14. Write note on conductance

15. Write note on colour & odour

16. Write note on Turbidity & Salinity

17. Explain types of fertilizers.

18. What are good qualities of fertilizer.

19. Draw Kjeldahl's set up for total nitrogen estimation.

20. Principle of phosphomolybdate method.

