2020

(CBCS)

(4^{th} Semester)

CHEMISTRY

FOURTH PAPER (CHEM/4/CC/241)

(Analytical Chemistry - I)

SECTION – A

Put a tick (√) mark against the correct answer in the brackets provided :

1. What is the solubility product expression for $Fe_2(CO_3)_3$?
   a) $Ksp = [2Fe^{3+}][3CO_3^{2-}]$
   b) $Ksp = [2Fe^{3+}]_2[3CO_3^{2-}]^3$
   c) $Ksp = [Fe^{2+}]_2[CO_3^{2-}]^3$
   d) $Ksp = [Fe^{3+}]_2[CO^{3+}]^3$

2. The following equilibrium exists in aqueous solution

   $CH_3COOH \rightleftharpoons CH_3COO^- + H^+$

   If dilute HCl is added, Acetate in concentration will

   a) increase
   b) decrease
   c) not change
   d) none of these

3. In a saturated solution of electrolyte, the ionic product of their concentration are constant at constant temperature and this constant for electrolyte is known as
   a) Solubility product
   b) Ionic product
   c) Ionization constant
   d) Dissociation constant

4. Acid should be neutralized with :
   a) distilled water
   b) weak acids
   c) weak Base
   d) strong base

5. When ethers are exposed to air for a long time, it forms :
   a) peroxides
   b) diethyl ether
   c) esters
   d) amyl alcohols

6. Which of the following separation techniques is dependent on difference in volatility?
   a) Distillation
   b) Crystallization
   c) Magnetic separation
   d) Fractional crystallization

7. Solvent extraction is better if repeated extractions are done using
   a) normal solvent
   b) large solvent
   c) extra solvent
   d) small solvent

8. Tick the incorrect statements :
   'In extraction process', Crown ethers are used
   a) to bring inorganic catalysts into the organic phase
   b) to increase the solubility of inorganic compounds in organic solvents
   c) to increase the acidity of the compounds
   d) to promote chemical reactions.

9. liquid-liquid extraction (**LLE**) is a method to separate compounds based on their
   a) boiling points
   b) melting points
   c) solubility
   d) mobility

10. A method used for mixtures containing chemicals with boiling points close to each other is called
    a) Sublimation
    b) Zone refining
    c) Steam distillation
    d) Fractional distillation

11. The number 0.032040 has a significant figures.
    a) 3
    b) 4
    c) 5
    d) 6

12. A measurement which on repetition gives same or nearly same result is called
    a) accurate measurement
    b) average measurement
    c) precise measurement
    d) estimated measurement

13. An independent t-test can be used to assess which of the following?
    a) It assesses relationships between two ratio data sets.
    b) It assesses differences between two groups of participants.
    c) It assesses relation between two groups of participants.
    d) none of these

14. In chemistry, accuracy refers to
    a) how close a value is to its true value.
    b) how consistent results are when measurements are repeated.
    c) how reproducible measurements.
    d) none of these

15. Examples of the sources of Systematic errors is :
    a) fluctuation of the power supply during the use of electronic equipment such as an electronic balance.
    b) using a contaminated reagent in a particular experiment.
    c) changes in densities of solutions with changing conditions such as temperature.
    d) experimenter being distracted while taking a measurement.

16. 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.

17. The density of a solution prepared by dissolving 120 g of urea (mol.mass = 60 u) in 1000 g of water is 1.15 g/mL. The molarity of this solution is:
    a) 1.02 M
    b) 2.05 M
    c) 0.50 M
    d) 1.78 M

18. With increase in temperature, which of these changes?
    a) molality
    b) weight fraction of solute
    c) mole fraction
    d) fraction of solute present in water

19. The term "iodometry" describes the type of titration that uses a standardised sodium thiosulfate solution as
    a) Titrant
    b) Analyte
    c) Indicator
    d) Catalyst

20. Which one is correct?
    a) Molality changes with temperature.
    b) Molality does not change with temperature.
    c) Molarity does not change with temperature.
    d) Normality does not change with temperature.

21. Precipitation is applicable for what types of solutes?
    a) Insoluble
    b) Soluble
    c) Sparingly soluble
    d) Both insoluble and soluble

22. Tick the correct statement.
    a) Co-precipitation is the precipitation that occurs as a layer upon the already formed precipitate.
    b) Mixed crystals appear after co-precipitation.
    c) Post-precipitation is the precipitation that occurs simultaneously by more than one soluble component in a single solution.
    d) Post-precipitation is helpful for the separation of tracer in radio isotopes.

23. What is the role of Oxine in Aluminium assay ?
    a) Surfactants
    b) Colloidal
    c) Precipitating agent
    d) Emulsifier agent.

24. In fractional distillation, a large surface area for condensation is provided through a
    a) Thermometer
    b) water bath
    c) column
    d) reflux condenser

25. Chemical formula of Rhodamine B is
    a) $C_{28}H_{31}ClN_2O_3$
    b) $C_{27}H_{31}ClN_2O_4$
    c) $C_2H_4N_2O_2$
    d) $C_2H_4(NH_3)_2$

SECTION – B

(Fill in the blacks)

1. An_____is a chemical substance that stops or controls the effect of a poison.
2. Carrying out a filtration using vacuum filtration is faster than _____ filtration.
3. The _____refers to the decrease in solubility of an ionic precipitate by the addition to the solution of a soluble compound with an ion in common with the precipitate.
4. In_____, the liquid boils when the sum of vapour pressure due to organic liquid and due to water becomes equal to the atmospheric pressure.
5. The most common crown ethers are oligomers of_____.
6. Dry ice, solid CO_2, provides a common example of _____.
7. The _____of a measurement depends on its reproducibility.
8. In evaluation of experiment data, If you're adding or subtracting quantities with uncertainties, you add the_____ uncertainties.
9. _____techniques have assumed an integral role in both the interpretation and quality assessment of analytical results.
10. The _____is the point in a titration where the amount of titrant added is enough to completely neutralize the analyte solution.
11. _____is a general method to determine the concentration of an oxidising agent in solution.
12. the estimation of an acid solution using a standard alkali solution is called _____.

13. _____occurs when a small nucleus begins to form in the liquid, the nuclei then grows as atoms from the liquid are attached to it.
14. N-Nitroso-N-phenyl hydroxylamine is also called_____
15. In gravimetric analysis, dimethyl glyoxime is used for determination of _____.

KEY TO ANSWER

(Bold letters are the correct answer)

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SECTION – B

(Fill in the blacks)

26. antidote
27. gravity
28. common-ion effect
29. steam distillation
30. ethylene oxide.
31. sublimation.
32. precision
33. absolute
34. Statistical

35. equivalence point
36. iodometric titration
37. alkalimetry.
38. Nucleation
39. cupferron.
40. Nickel.