

2020
(CBCS)
(4th Semester)
CHEMISTRY
FOURTH PAPER (CHEM/4/CC/241)
(Analytical Chemistry - I)

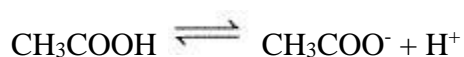
SECTION – A

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

1. What is the solubility product expression for $\text{Fe}_2(\text{CO}_3)_3$?

- a) $K_{sp} = [2\text{Fe}^{3+}][3\text{CO}_3^{2-}]$
- b) $K_{sp} = [2\text{Fe}^{3+}]_2[3\text{CO}_3^{2-}]^3$
- c) $K_{sp} = [\text{Fe}^{2+}]_2[\text{CO}_3^{2-}]^3$
- d) $K_{sp} = [\text{Fe}^{3+}]_2[\text{CO}_3^{3+}]^3$

2. The following equilibrium exists in aqueous solution



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.
- 3
 - 4
 - 5
 - 6
12. A measurement which on repetition gives same or nearly same result is called
- accurate measurement
 - average measurement
 - precise measurement
 - estimated measurement
13. An independent t-test can be used to assess which of the following?
- It assesses relationships between two ratio data sets.
 - It assesses differences between two groups of participants.
 - It assesses relation between two groups of participants.
 - none of these
14. In chemistry, accuracy refers to
- how close a value is to its true value.
 - how consistent results are when measurements are repeated.
 - how reproducible measurements.
 - none of these
15. Examples of the sources of Systematic errors is :
- fluctuation of the power supply during the use of electronic equipment such as an electronic balance.
 - using a contaminated reagent in a particular experiment.
 - changes in densities of solutions with changing conditions such as temperature.
 - experimenter being distracted while taking a measurement.
16. A buffer solution comprises which of the following?
- A weak acid in solution.
 - A strong acid in solution.
 - A weak base in solution.
 - 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:
- 1.02 M
 - 2.05 M
 - 0.50 M
 - 1.78 M
18. With increase in temperature, which of these changes?
- molality
 - weight fraction of solute
 - mole fraction
 - fraction of solute present in water
19. The term “iodometry” describes the type of titration that uses a standardised sodium thiosulfate solution as
- Titrant
 - Analyte
 - Indicator
 - Catalyst
20. Which one is correct?
- Molality changes with temperature.
 - Molality does not change with temperature.
 - Molarity does not change with temperature.
 - Normality does not change with temperature.
21. Precipitation is applicable for what types of solutes?
- Insoluble
 - Soluble
 - Sparingly soluble
 - Both insoluble and soluble
22. Tick the correct statement.
- Co-precipitation is the precipitation that occurs as a layer upon the already formed precipitate.
 - Mixed crystals appear after co-precipitation.
 - Post-precipitation is the precipitation that occurs simultaneously by more than one soluble component in a single solution.
 - Post-precipitation is helpful for the separation of tracer in radio isotopes.

23. What is the role of Oxine in Aluminium assay ?
- Surfactants
 - Colloidal
 - Precipitating agent
 - Emulsifier agent.
24. In fractional distillation, a large surface area for condensation is provided through a
- Thermometer
 - water bath
 - column
 - reflux condenser
25. Chemical formula of Rhodamine B is
- $C_{28}H_{31}ClN_2O_3$
 - $C_{27}H_{31}ClN_2O_4$
 - $C_2H_4N_2O_2$
 - $C_2H_4(NH_3)_2$

SECTION – B

(Fill in the blacks)

- An _____ is a chemical substance that stops or controls the effect of a poison.
- Carrying out a filtration using vacuum filtration is faster than _____ filtration.
- 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.
- In _____, the liquid boils when the sum of vapour pressure due to organic liquid and due to water becomes equal to the atmospheric pressure.
- The most common crown ethers are oligomers of _____.
- Dry ice, solid CO_2 , provides a common example of _____.
- The _____ of a measurement depends on its reproducibility.
- In evaluation of experiment data, If you're adding or subtracting quantities with uncertainties, you add the _____ uncertainties.
- _____ techniques have assumed an integral role in both the interpretation and quality assessment of analytical results.
- The _____ is the point in a titration where the amount of titrant added is enough to completely neutralize the analyte solution.
- _____ is a general method to determine the concentration of an oxidising agent in solution.
- 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**)

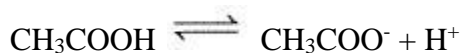
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SECTION – B

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- 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.



