

INDIAN SCHOOL SOHAR
UNIT TEST 2014-2015
CHEMISTRY

STD: XII
Date: 21-05-2014

MARKS: 50
TIME: 2 Hrs

Instructions:

1. All questions are compulsory.
 2. Question nos. 1-3 are very short answer questions and carry 1 mark each.
 3. Question nos. 4-6 are short answer questions and carry 2 marks each.
 4. Question nos. 7-15 are short answer questions and carry 3 marks each.
 5. Question no. 16 is short answer questions and carry 4 marks.
 6. Question nos. 17-18 are long answer questions and carry 5 marks each.
 7. Write serial no. of the question before attempting it.
 8. Use log tables for calculations.
-

1. The rate constant of a reaction $A \longrightarrow \text{Product}$ is doubled on increasing the concentration of reactant four times. What is the order of the reaction?
2. Draw the graph for the plot of $\ln k$ and $1/T$. What is the slope of this line?
3. Measurement of which colligative property is preferred for determination of molar mass of biomolecules?
4. A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolysed between platinum electrodes using a current of 5A for 20 min. What mass of Ni will be deposited at the cathode?
(At mass of Ni = 58.7 gmol^{-1} ; $1F = 96,500C$)
OR
The equivalent conductivity of 0.05N solution of a monobasic acid is $15.8 \text{ Scm}^2\text{eq}^{-1}$. If equivalent conductivity of the acid at infinite dilution is $350 \text{ Scm}^2\text{eq}^{-1}$, calculate
a) degree of dissociation b) dissociation constant of the acid.
5. Calculate the mass of a non-volatile solute (molar mass 40 gmol^{-1}) which should be dissolved in 114g of octane to reduce its v.p to 80%. (molar mass of octane = 114 gmol^{-1}).
6. Calculate the boiling point elevation for a solution prepared by adding 10g of CaCl_2 to 200g of water. ($K_b = 0.512 \text{ Kkgmol}^{-1}$, molar mass of $\text{CaCl}_2 = 111 \text{ gmol}^{-1}$)
7. How is benzene diazonium salt prepared? What happens when this salt reacts with cuprous chloride in the presence of HCl? What are these reactions called? Write the reactions.
8. What is Raoult's law? Explain why the law does not hold good for a mixture of chloroform and acetone and represent it graphically.
9. How does collision theory provide a greater insight into the energetic and mechanistic aspects of reactions? Explain.
10. Define molar conductivity. Explain the variation of molar conductivity with concentration for a strong and weak electrolyte.
- 11.a) Define i) racemic mixture ii) enantiomers
b) Explain why racemic mixture is optically inactive.

12. An aqueous solution containing urea was found to have a higher boiling point than water but when the same solution was cooled, its freezing point was less than that of water. Explain these observations.

OR

State Henry's law about the gas phase pressure and solubility of a gas in a solvent and mention two of its application.

13. Define activation energy. What is the effect of catalyst on it? Represent it graphically.
14. A voltaic cell is set up at 25°C with the following half cells, Al³⁺ (0.001M) and Ni²⁺ (0.50M). Write the cell reaction when the cell generates an electric current and determine the cell potential given $E^0_{\text{Ni}^{2+}/\text{Ni}} = -0.25\text{V}$; $E^0_{\text{Al}^{3+}/\text{Al}} = -1.66\text{V}$
15. a) Derive the general expression for the half life of a first order reaction.
b) A 1st order reaction has a rate constant of 0.005 min⁻¹. If we begin with 0.1M concentration of the reactant, what will be the concentration of the reactant after 3 hours.
16. Rakesh, a science student went with his friend Ravi to buy a battery for his friend. The shopkeeper showed them two type of batteries, one a nickel-cadmium storage battery and the other a lead-acid storage battery. Ravi wanted to purchase lead-acid storage battery as it was cheaper but Rakesh insisted him to purchase the expensive nickel-cadmium storage battery.
a) As a student of chemistry, why do you think Rakesh insisted on buying nickel-cadmium storage battery?
b) What values are associated with Rakesh's decision?
17. a) Explain the mechanism involved in nucleophilic substitution reaction of alkyl halides by S_N¹ reaction.
b) Why does S_N¹ reaction take place by racemisation?
c) Which kind of alkyl halides undergo S_N¹ reaction readily and why?
- (OR)
- a) Write chemical equations when
i) ethyl chloride is treated with aqueous KOH
ii) chlorobenzene is treated with CH₃COCl in presence of anhydrous AlCl₃.
b) Explain why alkyl halides undergo nucleophilic substitution reactions whereas aryl halides undergo electrophilic substitution reactions.
c) Which is more readily hydrolysed and why? Vinyl chloride or allyl chloride
18. a) What are fuel cells? Give an example and write the reactions taking place at the electrodes.
b) Write the reactions taking place at the electrodes for the following cells
i) mercury cell ii) dry cell iii) lead storage cell
- (OR)
- a) Define corrosion
b) Explain the electrochemical theory of rusting of iron giving all the reactions taking place.
c) Explain sacrificial protection for prevention of rusting of iron.

---oOo---