

**T.I. MATRICULATION HIGHER SECONDARY SCHOOL, AMBATTUR
HALF YEARLY EXAMINATION**

SCORING KEY

MARKS: 70
TIME :2 ½ HRS

SECTION I

CHOOSE THE BEST ANSWER.

15X1=15

1. Which of the following does not result in an increase in the entropy?
a. **Crystallization of sucrose from its solution**
b. Rusting of iron
c. Conversion of ice to water
d. Vaporization of camphor
2. Entropy is a function.
a. **state** b. path c. real d. unequal
3. The standard entropy of all substances above 0 K always have...
a. negative value **b. positive value**
c. zero d. both positive and negative
4. For the titration between oxalic acid and sodium hydroxide, the indicator used is
a. potassium permanganate **b. phenolphthalein**
c. litmus solution d. methyl orange
5. When one coulomb of electricity is passed through an electrolytic solution the mass deposited on the electrode is equal to
a. equivalent weight b. molecular weight
c. **electrochemical equivalent** d. one gram
6. The pH of a solution containing 0.1 N NaOH solution is
a. 1 b. 0.1 c. **13** d. 10^{-13}
7. Electron affinity is expressed in
a. kJ b. J c. kJ mol **d. kJmol⁻¹**
8. The bond length of Cl₂ molecule is
a. 0.74 b. 1.44 c. **1.98** d. 2.28
9. The value of screening constant for the last electron in chlorine atom is
a. 17.2 b. **10.9** c. 6.1 d. 4.8
10. The compound used in smoke screen is
a. phosphorous trichloride b. phosphorous pentachloride
c. **phosphine** d. phosphorous acid
11. Among the halogen acid, the weakest acid is
a. **HF** b. HCl c. HBr d. HI
12. The lightest gas which is non –flammable is
a. **He** b. H₂ c. N₂ d. Ar
13. The catalyst used in Bergius process is
a. ferrous oxide b. **ferric oxide**
c. chromic oxide d. nitric oxide
14. Which of the following is used as an eye lotion?
a. colloidal antimony b. colloidal gold
c. **silver sol** d. kalazar

15. Acetone reacts with chloroform to form
a. phorone b. mesityl oxide c. mesitylene d. **chloretone**

SECTION II

ANSWER ANY SIX OF THE FOLLOWING.

QUESTION NUMBER 21 IS COMPULSORY.

6X2=18

16. Define entropy?

Measure of randomness-1m, formula $S = q / T$ -1m

17. When does entropy increase?

In chemical reaction where the no. of moles of products is more than the reactants-1m

In a physical process like solid to liquid, liquid to gas and solid to gas.-1m

18. Electronic conduction decreases with increase in temperature- Justify

Enhanced thermal vibration-1m,

disrupting the movement of electrons passing through them-1m

19. Phenolphthalein is not a suitable indicator for the titration of a strong acid against a weak base-Justify.

The OH⁻ ions produced by the weak base at the end point is too low to cause the ionization of Phenolphthalein. Hence the pink colour appears only after a sufficient excess of the weak base is added.-2m

20. Compare the ionization energy of aluminium and magnesium.

Atomic number and electronic configuration-1m, easy to remove a p-electron than an s-electron-1m

21. Compare the electron affinity of fluorine and chlorine.

Electronic configuration- 1/2 m, small size and compact nature- 1/2 m, electron repulsion, 2p and 3p orbital comparison-1m

22. Prove that Phosphorous pentoxide is a powerful dehydrating agent.

Any 2 equations-2m

23. What is Cannizaro's reaction?

Explanation- self oxidation, self-reduction, concentrated NaOH1m, equation-1m

SECTION III

ANSWER ANY SIX OF THE FOLLOWING.

QUESTION NUMBER 30 IS COMPULSORY.

6X3=18

24. State Trouton's rule. What are its limitations?

Statement-1m, Any two limitations-2m

25. State and explain Kohlraush's law.

Statement- 2m, examples-1m

26. What are buffer solutions? Write a note on the buffer action of an acidic buffer.

Definition -1m. Buffer action of an acidic buffer- explanation -1m, Diagrammatic representation-1m

27. Explain the application of electro negativity to predict the nature of the bond.

Three conditions-Difference in electro negativity is zero- non polar covalent bond, Difference is small, polar covalent bond, difference is large,polar bond- 3x1=3

28. Write a note on etching of glass.

Explanation- 1m, Equations-2m

29. Explain Holme's signal.

Explanation-1m, Equations -2m

30. Write a note on Perkin's reaction and Benzoin condensation.

Each equation -1m, each explanation ½ m

31. Define adsorption. Distinguish between physical adsorption and chemisorption

Definition-1m, difference- any 2 points -2m

32. Write a note on Bredig's arc method of preparation of a colloidal solution.

Explanation- 2m, diagram-1m

SECTION IV

ANSWER ALL THE QUESTIONS.

5x5=25

33. a. Explain the characteristics of Gibb's free energy.

All points- 5m, for careless mistake ½ m will be reduced

OR

b. Explain the various statements of second law of thermodynamics

Kelvin Planck statement-1m, Clausius statement-1m, entropy statement-1m, Efficiency - 1m, formula of efficiency and terms defined-1m

34. a. Derive Henderson's equation.

All steps-4m, explanation for the replacement of salt and acid- 1m

OR

b. Explain Ostwald's dilution law.

Statement- 1m, Assumption along with the equation--1m, formula for Ka-1/2 m, substitution-and deduction of the final formula -1m, condition if alpha is very much less than 1, and hence modification of the formula- 1m, finding the concentration of hydrogen ions and acetate ions

35. a. Explain Pauling's method of calculation of ionic radii.

Condition- isoelectronic point- 1 m, example- 1 m, two assumptions-2m, explanation-1m

OR

b. Explain the factors influencing ionization energy

Five factors with explanation- 5x1=5m

36. a. Explain Ramsay-Raleigh's method of isolation of noble gases.

Explanation-2m, equation-2m, diagram-1m

OR

b. Write a note on silicones.

Explanation-2m, equations and structure of silicones -3m

37. a. An organic compound A of molecular formula C_3H_6O does not reduce Tollen's reagent. A on wolf kishner's reduction forms a hydrocarbon with the same number of carbon atoms. A also polymerises in the presence of concentrated sulphuric acid to form another hydrocarbon C of molecular formula C_9H_{12} . Identify A, B and C and write the chemical reactions involved.

Identification of A,B and C with equation-3m, final tabulation with name formula and structure-2m

OR

b. Explain adsorption theory of catalysis.

Applicable for heterogeneous catalysis-1m, 4 stages with diagram, -4 marks
