

**Royal College of Arts Science and Commerce**  
**S.Y.B.Sc.**  
**Semester III Sample Questions**  
**Chemistry I**  
**USCH 301**

**Instructions:**

- 1) Fill in the blanks with the most appropriate option
- 2) Each question is for 1m in Section I
- 3) Each question is for 2m in Sections II and III

**Section I**

- 1 The escaping tendency of a real gas is represented by \_\_\_\_\_
  - a Activity coefficient
  - b fugacity
  - c activity
  - d Chemical potential
  
- 2 Born Haber's cycle is used for the determination of -----
  - a Solvation energy
  - b Bond energy
  - c Lattice energy
  - d Hydration energy
  
- 3 A covalent molecule after bond formation has -----
  - a Lower energy than the combining atoms
  - b Higher energy than the combining atoms
  - c Same energy as combining atoms
  - d Zero energy
  
- 4 O-alkylation of phenols would give .....
  - a Esters
  - b Ethers
  - c Acids
  - d Alcohols
  
- 5 Aryl halides undergo nucleophilic substitution by .....  
mechanism
  - a S<sub>N</sub>1
  - b S<sub>N</sub>2
  - c S<sub>N</sub>i
  - d Benzyne

## Section II

- 6  $\Delta G^0 = -RT \ln K$  is known as \_\_\_\_\_
- a Gibbs Helmholtz equation
  - b Van't Hoff equation
  - c Van't Hoff Isotherm
  - d Gibbs Duhem equation
- 7 Molar conductance is expressed in the units \_\_\_\_\_
- a S.m .mol<sup>-1</sup>
  - b S.m<sup>2</sup>.mol
  - c S.m<sup>-2</sup>.mol<sup>-1</sup>
  - d S.m<sup>2</sup>.mol<sup>-1</sup>
- 8 Lower alcohols are ..... with water due to .....
- a immiscible; intermolecular H-bonding
  - b immiscible; intramolecular H-bonding
  - c miscible; intermolecular H-bonding
  - d miscible; intramolecular H-bonding
- 9 There are ----- number of electrons in the  $\pi$  -antibonding molecular orbitals of O<sub>2</sub><sup>-</sup> and O<sub>2</sub><sup>+</sup>
- a 3 and 1
  - b 2 and 4
  - c 3 and 5
  - d 2 and 3
- 10 The hybridization undergone by the central atom and the structure of PCl<sub>5</sub> are-----
- a sp<sup>3</sup> and planar trigonal
  - b sp<sup>3</sup> and tetrahedral
  - c sp<sup>3</sup>d and trigonal bipyramidal
  - d sp<sup>3</sup>d<sup>2</sup> and octahedral

## Section III

- 11 The equivalent conductance at infinite dilution for NH<sub>4</sub>Cl , NaOH and NaCl are respectively 129 , 248 and 126 ohm<sup>-1</sup> cm<sup>2</sup> eq<sup>-1</sup>. Calculate equivalent conductance at infinite dilution of NH<sub>4</sub>OH.
- a 7.0 ohm<sup>-1</sup> cm<sup>2</sup> eq<sup>-1</sup>
  - b 503 ohm<sup>-1</sup> cm<sup>2</sup> eq<sup>-1</sup>
  - c 251 ohm<sup>-1</sup> cm<sup>2</sup> eq<sup>-1</sup>
  - d 245 ohm<sup>-1</sup> cm<sup>2</sup> eq<sup>-1</sup>

- 12 Calculate the equivalent conductivity of 1N solution of electrolyte having conductivity  $1.72 \times 10^{-3} \text{ S cm}^{-1}$ .
- a  $1.72 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$
  - b  $1.72 \times 10^{-6} \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$
  - c  $1.72 \times 10^{-3} \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$
  - d  $17.2 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$
- 13 The increasing order of acidity of the given phenols is .....
- a p-methyl phenol < phenol < p-nitrophenol
  - b p-nitro phenol < phenol < p-methyl phenol
  - c phenol < p-methyl phenol < p-nitrophenol
  - d p-nitrophenol < phenol < p-methyl phenol
- 14 The bond energy of  $\text{NaNO}_3$  as per Kapustinskii equation is-----  
Given: Radius of  $\text{Na}^+ = 97 \text{ pm}$  Radius of  $\text{NO}_3^-$  ion is  $189 \text{ pm}$
- a  $-600 \text{ kJ/mol}$
  - b  $-754.54 \text{ kJ/mol}$
  - c  $-925 \text{ kJ/mol}$
  - D  $-224 \text{ kJ/mol}$
- 15  $\text{CH}_3\text{CHO}$  on treatment with  $\text{CH}_3\text{MgBr}$  followed by hydrolysis will give.....
- a 1-propanol
  - b 2-propanol
  - c Propanoic acid
  - d Propanal