**Karan Arora**  **R.L. Institute M: 9416974837**

**“CHEMICAL BONDING , ELECTROCHEMISTRY & REDOX”**

**Max Time : 1 hr LEVEL – 1**  **CODE : A**

1. Which one of the following pair of species have the same bond order ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) CO & NO | b) O2 & NO+ | c) CN– & CO | d) N2 & |

1. The hybridization of atomic orbitals of nitrogen in , & respectively are :

|  |  |  |  |
| --- | --- | --- | --- |
| a) sp , sp3 & sp2 | b) sp2 , sp3 & sp | c) sp , sp2 & sp3 | d) sp2 , sp , sp3 |

1. Which of the following species contains equal number of and - bonds ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) | b) XeO4 | c) (CN)2 | d) CH2(CN)2 |

1. Which one of the following species has plane triangular shape ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) N3 | b) | c) | d) CO2 |

1. In the case of alkali metals, the covalent character decreases in the order :

|  |  |  |  |
| --- | --- | --- | --- |
| a) MCl > MI > MBr > MF | b) MF > MCl > MBr > MI | c) MF > MCl > MI > MBr | d) MI > MBr> MCl > MF |

1. In a regular octahedral molecule ,MX6 the number of X – M – X bonds at 180˚ is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3 | b) 2 | c) 6 | d) 4 |

1. In which of the following, bond angle is maximum ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) NH3 | b) | c) PCl3 | d) SCl2 |

1. Linus Pauling received the Nobel prize for his work on

|  |  |  |  |
| --- | --- | --- | --- |
| a) atomic structure | b) Photosynthesis | c) chemical bonds | d) thermodynamics |

1. Among the following which compound will show the highest lattice energy ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) KF | b) NaF | c) CsF | d) RbF |

1. Linear combination of two hybridized orbitals belonging to the two atoms, each having one electron leads to a

|  |  |  |  |
| --- | --- | --- | --- |
| a) Sigma bond | b) Double bond | c) Coordinate bond | d) pi-bond |

1. The pressure of H2 required to make the potential of H2 electrode zero in pure water at 298 K is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 10 – 12  atm | b) 10 – 10  atm | c) 10 – 4  atm | d) 10 – 14  atm |

1. The molar conductivity of a 0.5 mol/dm3 solution of AgNO3 with electrolytic conductivity of 5.76 x 10 – 3 S/cm at 298 K.

|  |  |  |  |
| --- | --- | --- | --- |
| a) 2.88 S cm2/mol | b) 11.52 S cm2/mol | c) 0.086 S cm2/mol | d) 28.8 S cm2/mol |

1. If the for a given reaction has a negative value, which of the following gives correct relationship for the values of Go and ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Go > 0 ; < 1 | b) Go > 0 ; > 1 | c) Go < 0 ; > 1 | d) Go < 0 ; < 1 |

1. A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as

|  |  |  |  |
| --- | --- | --- | --- |
| a) fuel cell | b) electrolytic cell | c) dynamo | d) Ni-Cd cell |

1. Aqueous solution of which of the following compounds is the best conductor of electric current?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Acetic acid, C2H4O2 | b) Hydrochloric acid, HCl | c) Ammonia , NH3 | d) Fructose, C6H12O6 |

1. A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of PH = 10 and by passing hydrogen gas around the platinum wire at 1 atm pressure. The oxidation potential of electrode would be

|  |  |  |  |
| --- | --- | --- | --- |
| a) 0.059 V | b) 0.59 V | c) 0.118 V | d) 1.18 V |

1. Given , (i) Cu2+ + 2 Cu ; Eo = 0.337 V (ii) Cu2+ + Cu+ ; Eo = 0.153 V

Electrode potential, Eo for the reaction, Cu+ + Cu, will be

|  |  |  |  |
| --- | --- | --- | --- |
| a) 0.52 V | b) 0.90 V | c) 0.30 V | d) 0.38 V |

1. The efficiency of a fuel cell is given by :

|  |  |  |  |
| --- | --- | --- | --- |
| a) / | b) / | c) / | d) / |

1. A hypothetical electrochemical cell is shown below A | A+ (xM) || B+ (yM) | B

The EMF measured is + 0.2 V. The cell reaction is

|  |  |
| --- | --- |
| a) A + B+ A+ + B | b) A+ + B A + B+ |
| c) A+ + A ; B+ + B | d) the cell reaction cannot be predicted |

1. The standard EMF of a galvanic cell involving cell reaction with n = 2 is found to be 0.295 V at 25˚C. The equilibrium constant of the reaction would be . (Given = R = 8.314 J K – 1 mol– 1 , F = 96500 C/mol)

|  |  |  |  |
| --- | --- | --- | --- |
| a) 2 x 1011 | b) 4 x 1012 | c) 1 x 102 | d) 1 x 1010 |

1. The specific conductance of a 0.1 N KCl solution at 23˚C is 0.012 S/cm. The resistance of cell containing the solution at the same temperature was found to be 55 Ω . The cell constant will be

|  |  |  |  |
| --- | --- | --- | --- |
| a) 0.142 cm – 1 | b) 0.66 cm – 1 | c) 0.918 cm – 1 | d) 1.12 cm – 1 |

1. Without losing its concentration ZnCl2 solution cannot be kept in contact with

|  |  |  |  |
| --- | --- | --- | --- |
| a) Au | b) Al | c) Pb | d) Ag |

1. Reduction potential for the following half-cell reactions are

Zn Zn2+ + 2 ( = 0.76 V) ; Fe Fe2+ + 2 ( = 0.44 V)

The EMF for the cell reaction, Fe2+ + Zn Zn2+ + Fe will be

|  |  |  |  |
| --- | --- | --- | --- |
| a) + 0.32 V | b) – 0.32 V | c) + 1.2 V | d) – 1.2 V |

1. The compound that cannot act both as oxidizing and reducing agent is

|  |  |  |  |
| --- | --- | --- | --- |
| a) H3PO4 | b) HNO2 | c) H2SO3 | d) H2O |

1. Which of the following reactions is an example of a redox reaction?

|  |  |
| --- | --- |
| a) XeF4 + O2F2 XeF6 + O2 | b) XeF2 + PF5 [XeF]+ |
| c) XeF6 + H2O XeOF4 + 2 HF | d) XeF6 + 2 H2O XeO2F2 + 4 HF |

1. The species given below that does NOT show disproportionation reaction is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) | b) BrO – | c) | d) |

1. Oxidation number of potassium in K2O , K2O2 and KO2 respectively is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) + 2 , + 1 & +1/2 | b) + 1 , + 1 & + 1 | c) + 1 , + 4 & + 2 | d) + 1 , + 2 & + 4 |

1. Amongst the following, identify the species with an atom in + 6 oxidation state :

|  |  |  |  |
| --- | --- | --- | --- |
| a) [MnO4] – | b) [Cr(CN)6] 3– | c) Cr2O3 | d) CrO2Cl2 |

1. How many electrons are involved in the following redox reaction?

+ Fe2+ + Cr3+ + Fe3+ + CO2 (unbalanced)

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3 | b) 4 | c) 6 | d) 5 |

1. Oxidation state of sulphur in anions S2 & S2 increases in the orders:

|  |  |  |  |
| --- | --- | --- | --- |
| a) S2 < S2 < | b) < S2 < S2 | c) S2 < < S2 | d) S2 < S2< |

**Integer value type question**

1. The difference in the oxidation numbers of the two types of sulphur atoms in Na2S4O6 is

**Fill in the blanks**

1. The compound YBa2Cu3O7, which shows super conductivity, has copper in oxidation state ………………….., assume that the rare earth element yttrium is in it usual +3 oxidation state.

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**“CHEMICAL BONDING , ELECTROCHEMISTRY & REDOX”**

**Max Time : 1 hr LEVEL – 1**  **CODE : B**

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| a) + 0.32 V | b) – 0.32 V | c) + 1.2 V | d) – 1.2 V |

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**Answers**

**CHEMICAL BONDING , REDOX & ELECTROCHEMISTRY [LEVEL – 1 ]**

|  |  |
| --- | --- |
| **CODE : A** | **CODE : B** |
| 1. c | 1. b |
| 2. c | 2. a |
| 3. b | 3. a |
| 4. b | 4. a |
| 5. d | 5. a |
| 6. a | 6. b |
| 7. b | 7. d |
| 8. c | 8. a |
| 9. b | 9. b |
| 10. a | 10. d |
| 11. d | 11. a |
| 12. b | 12. b |
| 13. a | 13. b |
| 14. a | 14. a |
| 15. b | 15. b |
| 16. b | 16. c |
| 17. a | 17. a |
| 18. b | 18. b |
| 19. a | 19. a |
| 20. d | 20. c |
| 21. b | 21. b |
| 22. b | 22. b |
| 23. a | 23. c |
| 24. a | 24. d |
| 25. a | 25. b |
| 26. a | 26. b |
| 27. b | 27. d |
| 28. d | 28. a |
| 29. a | 29. a |
| 30. c | 30. c |
| 31. 5 | 31. 5 |
| 32. +7/3 | 32. +7/3 |