**Model Questions – Chemistry Paper 1**

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| Question | Answer1 | Answer2 | Answer3 | Answer4 |
| **Unit 1** |  |  |  |  |
| Which of the following is a uni-univalent electrolyte? | KCl | CaCl2 | AlCl3 | MgCl2 |
| The ionic strength of a solution of molality mi and valency of the ion Zi is \_\_\_\_ |  |  |  |  |
| Which of the following is an example of electrolyte concentration cell with transference? | Cu | CuSO4  | | AgNO3 | Ag | Pt , H2(g) | HCl(aq) | AgCl(s) Ag | Pt , H2(g) | HCl(aq)  (a1)  | | AgNO3(a2)  | Ag | Ag – AgCl | NaCl (a1) | NaCl(a2) | AgCl | Ag |
| A concentration cell which has salt bridge in its representation is \_\_\_ | electrolyte concentration cell with transference | Electrode concentration cell | Electrolyte concentration cell without transference | Gas concentration cell |
| The total emf of the electrolyte concentration cell with transference containing the liquid junction potential is given by------- |  |  |  |  |
| The activity ‘a’ is related to the activity coefficient ‘‘’ by the equation\_\_\_ |  |  |  |  |
| While working, the free energy of a concentration cell \_\_\_\_due to the transfer of matter from one half cell to other. | increase | decrease | no change | first increase, then decrease |
| Decomposition potential is the \_\_\_\_\_\_\_\_ potential that must be applied between two electrodes immersed in the electrolytic solution so as to bring about continuous decomposition of an electrolyte. | minimum | maximum | average | mean |
| Tafel equation is the relation between hydrogen overvoltage and \_\_\_\_\_\_\_\_. | current density | decomposition potential | emf | concentration |
| The ionic strength of 0.03mNaClsolution is same as that of \_\_\_\_ solution. | 0.02m H2SO4 | 0.05m NaCl | 0.01m ZnCl2 | 0.03m MgCl2 |
| The activity of 0.5 molalMg NO3 solution with activity coefficient 0.9 is \_\_\_\_ | 0.295 | 0.3645 | 0.246 | 0.335 |
| A hydrogen overvoltage on a metal cathode was found to be 0.6V at a current density of 0.1 mA/ cm2 . The discharge potential of hydrogen on this electrode from a solution of pH 6.2 is \_\_\_\_ | – 0.423V | – 0.967V | – 0.763V | 0.967V |
| When the current density of an electrode is reduced to 1/10th of its previous value, then the change in overvoltage of hydrogen at the electrode is \_\_\_\_\_(b=0.15) | 0.10V | 0.12V | 0.15V | 0.25V |
| For the cell,  Ag | AgNO3 (m = 0.01, r = 0.94) | AgNO3 ( m = 0.1, γ = 0.82) | Ag , if the transport number of Ag + is 0.466V, then the emf of the cell is \_\_\_\_ | 5 .94 x 10 – 1 V | 5.94 x 10 – 2 V | 5.94 x 10 – 3 V | 5.94 x 10 – 4 V |
| **Unit II** |  |  |  |  |
| Silk is an example of \_\_\_\_\_\_\_\_\_\_\_ polymer. | Natural | Synthetic | Semisynthetic | Artificial |
| Formula isused for calculating \_\_\_\_\_\_\_\_\_ molecular weight. | Number average | Weight average | Viscosity average | Z-average |
| Which of the following is not a characteristicproperty LED? | Greater power efficiency | Light weight | Convert electric power into visible light | Heavy weight |
| \_\_\_\_\_\_\_\_\_\_\_ is an example of thermoplastic polymer. | Cellulose nitrate | Bakelite | Vulcanized rubber | Epoxy resin |
| Poiseuille equation is used to measure \_\_\_\_\_\_\_\_ | Coefficient of viscosity | Density | Pressure | Temperature |
| Antistatic agent improves \_\_\_\_\_\_\_of a polymer surface by absorbing a thin layer of moisture on surface. | Resistance | Conductance | Solubility | Thermal stability |
| \_\_\_\_\_\_\_\_\_ polymer can be reclaimed from waste. | Cross linked | Thermosetting | Thermoplastic | Vulcanized |
| Colorants are available in the form of \_\_\_\_\_\_\_\_\_\_\_. | Curing agent | Diodes | Ultraviolet absorbers | Pigment and Dyes |
| For monodisperse polymer, polydispersity index is \_\_\_\_\_\_\_\_\_ | Equal to One | Less than one | Greater than one | Zero |
| In viscosity average molecular weight, value of α can vary from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 0.1 and 0.3 | 0.03 and 0.07 | 0.05 and 0.1 | 0.5 and 1.0 |
| Amines are \_\_\_\_\_\_\_\_\_ for epoxy resin. | Antistatic agent | Colorant | Stabilizer | Curing agent |
| Calculate weight average molecular weight of a polymer 10 molecules of molecular weight 15000 and 10 molecules of molecular weight 20000. | 15630 | 18587 | 17857 | 12650 |
| **Unit III** |  |  |  |  |
| Which of the following is known as the Schrodinger wave equation | E = h | E = mc2 | λ = h/p | Hψ = Eψ |
| \_\_\_\_\_\_\_ is the square of the magnitude of the wave function. | current density | probability density | zero density | volume density |
| In the Heisenberg’s uncertainty principle, which two measurable properties of a particle cannot be observed precisely at the same time? | Mass and velocity | Position and momentum | Mass and position | Momentum and mass |
| According to the de Broglie relation, the wavelength of a matter wave is inversely proportional to\_\_\_\_\_\_\_\_ | Planck’s constant | momentum of the particle | time | amplitude |
| Compton effect is the ejection of \_\_\_\_\_\_\_ from metal surface when it is struck by electromagnetic radiation. | proton | electron radiation | Photon | neutron |
| The electrons are \_\_\_\_\_\_\_ when X-rays strikes a metal surface | emitted | reflected | diffracted | scattered |
| In the Schrodingers wave equation ψ = Eψ which is the Eigen value? | Hamiltonian operator | wave function | total energy | Hamiltonian function |
| If  = 2x = cos x f(x) = x Find (   ) f(x) | 2x2 + xcosx | 2x2 cosx | 2xcosx | 2x2  + cosx |
| Calculate the de Broglie wavelength of a neutron (*m* = 1.67 ×10-27 kg) which has a speed of 4.0 m/s.[h=6.626 × 10‒34Js] | 9.919× 10‒8 m | 9.919× 10‒61 m | 15.870× 10‒6 m | 9.919× 108 m |
| Two operators and on a function f(x) should be Additive  if \_\_\_\_\_\_\_\_ | f(x) |  |  |  |
| The energy difference between the valence band and conduction band in a semiconductor is called \_\_\_\_\_\_\_\_ . | Band gap | energy range | Energy band | insulator |
| A semiconductor in which the conductance is due to the presence of extra electrons is called \_\_\_\_. | p- type semiconductor | n- type semiconductor | insulator | Metallic conductor |
| In semiconductors the gap between the valence band and conduction band is \_\_\_\_\_. | Large | zero | small | Very large |
| In the electrolysis of water \_\_\_\_\_\_\_\_ is produced at the cathode. | oxygen | hydrogen | Carbon dioxide | nitrogen |
| **Unit 4** |  |  |  |  |
| Nuclear magnetic resonance spectrum is a result of the \_\_\_\_\_\_\_\_\_\_\_\_. | movements of neutrons in the nucleus | Electrons being unpaired | behavior of nucleus as a magnet | Neutrons being unpaired |
| Which of the following cannot be used as a solvent in NMR spectroscopy? | CCl4 | CDCl3 | C6D6 | H2O |
| Nuclear spin is due to \_\_\_\_ | Spin of protons | Spin of electrons | Half integral or integral value of the spin | relaxation |
| The nuclear transition in NMR is induced by the radiation of \_\_\_\_ frequency | microwave | radio wave | uv-visible | infrared |
| A nucleus in the high energy state transfers its energy to the nucleus in the surrounding framework is called \_\_\_\_\_ . | Spin-spin relaxation | Spin-lattice relaxation | activation | deactivation |
| The protons, neutrons, and electrons are collectively known as \_\_\_\_\_\_\_\_\_ . | nucleons | fermions | nucleus | None of these |
| In the ESR spectrum ,the spectrum is recorded in derivative mode because\_\_\_\_\_ | It is normal procedure | The width of the peak  Is too small to record it | It is easier to record in that mode | The width of the peak  Is too broad to record it |
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| In ESR and NMR spectrometer the magnetic field generated by the magnet must be \_\_\_\_\_ . | homogeneous | heterogeneous | static | dynamic |
| In ESR a field strength of \_\_\_\_ units is used | 0.34 T | 3.4T | 34 T | 340T |
| What happens when a radiation is absorbed by a spinning nucleus present in a magnetic field? | The angle of precession flips so that the magnetic moment of the nucleus opposes the applied field | The precessional frequency of the nucleus increases | The nucleus spins faster | The nucleus stops spinning |
| Which of the following statement is true? | Microwave region is associated with ESR | IR region is associated with ESR | UV-visible region is associated with ESR | Radiofrequency region is associated with ESR |