TYBSC SEM VI PHYSICAL CHEMISTRY (MODEL MCQ's)

1	Which of the following is a uni-univalent electrolyte? a) KCl b) $CaCl_2$ c) $AlCl_3$ d) $MgCl_2$
2	The ionic strength of a solution of molality m_i and valency of the ion Zi is ____ a) $\mu = \frac{1}{2} m_i Zi^2$ b) $\mu = \sum m_i Zi^2$ c) $\mu = \frac{1}{2} \sum Zi^2$ d) $\mu = \frac{1}{2} \sum m_i Zi^2$
3	Which of the following is an example of electrolyte concentration cell with transference? a) Cu | $CuSO_4$ | | $AgNO_3$ | Ag b) Pt , $H_{2(g)}$ | $HCl_{(aq)}$ | $AgCl_{(s)}$ Ag c) Pt , $H_{2(g)}$ | $HCl_{(aq)}(a_1)$ | | $AgNO_3(a_2)$ | Ag d) Ag – AgCl | NaCl (a_1) | NaCl(a_2) | AgCl - Ag
4	A concentration cell which has salt bridge in its representation is ___ a) electrolyte concentration cell with transference b) Electrode concentration cell c) Electrolyte concentration cell without transference d) Gas concentration cell
5	The total emf of the electrolyte concentration cell with transference containing the liquid junction potential is given by------- a) $E_j = E_{oxidation} + E_{reduction}$ b) $E_{cell} = E_{oxidation} + E_{reduction} + E_j$ c) $E_{cell} = E_{oxidation} - E_{reduction} - E_j$ d) $E_j = E_{oxidation} - E_{reduction}$
6	The activity 'a' is related to the activity coefficient '' γ' by the equation___ a) $a = \frac{m}{\gamma}$ b) $\gamma = a - m$ c) $a = m + \gamma$ d) $a = m\gamma$

7	While working, the free energy of a concentration cell ____ due to the transfer of matter from one half cell to other. a) increase b) decrease c) no change d) first increase, then decrease
8	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. a) minimum b) maximum c) average d) Mean
9	Tafel equation is the relation between hydrogen overvoltage and _____. a) current density b) decomposition potential c) emf d) Concentration
10	The ionic strength of 0.03m NaCl solution is same as that of ____ solution. a) 0.02m H_2SO_4 b) 0.05m NaCl c) 0.01m $ZnCl_2$ d) 0.03m $MgCl_2$
11	The activity of 0.5 molal $MgNO_3$ solution with activity coefficient 0.9 is ____ a) 0.295 b) 0.3645 c) 0.246 d) 0.335
12	A hydrogen overvoltage on a metal cathode was found to be 0.6V at a current density of 0.1 mA/ cm^2. The discharge potential of hydrogen on this electrode from a solution of pH 6.2 is ____ a) 0.423V b) 0.967V c) 0.763V d) 0.967V
13	When the current density of an electrode is reduced to $1/10^{th}$ of its previous value, then the change in overvoltage of hydrogen at the electrode is _____(b=0.15) a) 0.10V b) 0.12V

	c) 0.15V d) 0.25V
14	For the cell, Ag | $AgNO_3$ (m = 0.01, r = 0.94) | $AgNO_3$ (m = 0.1, γ = 0.82) | Ag , if the transport number of Ag^+ is 0.466V, then the emf of the cell is ____ a) 5 .94 x 10^{-1} V b) 5.94 x 10^{-2} V c) 5.94 x 10^{-3} V d) 5.94 x 10^{-4} V
15	Silk is an example of _____ polymer. a) Natural b) Synthetic c) Semisynthetic d) Artificial
16	$\frac{\Sigma Ni\ Mi}{\Sigma Ni}$ Formula is used for calculating _____ molecular weight. a) Number average b) Weight average c) Viscosity average d) Z-average
17	Which of the following is not a characteristic property LED? a) Greater power efficiency b) Light weight c) Convert electric power into visible light d) Heavy weight
18	Which of the following is an example of thermoplastic polymer? a) Cellulose nitrate b) Bakelite c) Vulcanized rubber d) Epoxy resin
19	Poiseuille equation is used to measure _____ a) Coefficient of viscosity b) Density c) Pressure

	d) Temperature
20	Antistatic agent improves _____of a polymer surface by absorbing a thin layer of moisture on surface. a) Resistance b) Conductance c) Solubility d) Thermal stability
21	Which of the following polymer can be reclaimed from waste? a) Cross linked b) Thermosetting c) Thermoplastic d) Vulcanized
22	Colorants are available in the form of _____. a) Curing agent b) Diodes c) Ultraviolet absorbers d) Pigment and Dyes
23	For monodisperse polymer, polydispersity index is _____ a) Equal to One b) Less than one c) Greater than one d) Zero
24	In viscosity average molecular weight, value of α can vary from _____ a) 0.03 and 0.07 b) 0.1 and 0.3 c) 0.05 and 0.1 d) 0.5 and 1.0
25	Amines are _____ for epoxy resin. a) Antistatic agent b) Colorant c) Stabilizer d) Curing agent
26	Calculate weight average molecular weight of a polymer 10 molecules of molecular weight 15000 and 10 molecules of molecular weight 20000.

	a) 15630 b) 18587 c) 17857 d) 12650
27	Which of the following is known as the Schrodinger wave equation a) $E = h\frac{c}{\lambda}$ b) $E = mc^2$ c) $\lambda = h/p$ d) $H\psi = E\psi$
28	_____ is the square of the magnitude of the wave function. a) current density b) probability density c) zero density d) volume density
29	In the Heisenberg's uncertainty principle, which two measurable properties of a particle cannot be observed precisely at the same time? a) Mass and velocity b) Position and momentum c) Mass and position d) Momentum and mass
30	According to the de Broglie relation, the wavelength of a matter wave is inversely proportional to_____ a) Planck's constant b) momentum of the particle c) time d) amplitude
31	Compton effect is the ejection of _____ from metal surface when it is struck by electromagnetic radiation. a) proton b) electron radiation c) Photon d) neutron
32	The electrons are _____ when X-rays strikes a metal surface a) emitted b) reflected c) diffracted d) scattered
33	In the Schrodingers wave equation $\hat{H}\psi = E\psi$ which is the Eigen value?

	a) Hamiltonian operator b) wave function c) total energy d) Hamiltonian function
34	If $\hat{A}$ = 2x $\hat{B}$ = cos x f(x) = x Find ($\hat{A} + \hat{B}$) f(x) a) $2x^2$ + xcosx b) $2x^2$ cosx c) 2x cosx d) $2x^2$ + cosx
35	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^{-34} Js] a) 9.919× 10^{-8} m b) 9.919× 10^{-61} m c) 15.870× 10^{-6} m d) 9.919× 10^{8} m
36	Two operators $\hat{A}$and $\hat{B}$ on a function f(x) should be Additive, if _____ a) $\hat{A}\hat{B}$ f(x) b) $\hat{A}$ f(x) + $\hat{B}$ f(x) c) $\hat{A}$ f(x) ÷ f(x) d) $\hat{A}$ f(x) – $\hat{B}$ f(x)
37	The energy difference between the valence band and conduction band in a semiconductor is called _____ . a) Band gap b) energy range c) Energy band d) Insulator
38	A semiconductor in which the conductance is due to the presence of extra electrons is called ____. a) p- type semiconductor b) n- type semiconductor c) insulator d) Metallic conductor
39	In semiconductors the gap between the valence band and conduction band is _____. a) Large b) zero c) small d) Very large
40	In the electrolysis of water _____ is produced at the cathode.

	a) oxygen b) hydrogen c) Carbon dioxide d) Nitrogen
41	Nuclear magnetic resonance spectrum is a result of the _____. a) movements of neutrons in the nucleus b) Electrons being unpaired c) behavior of nucleus as a magnet d) Neutrons being unpaired
42	Which of the following cannot be used as a solvent in NMR spectroscopy? a) CCl_4 b) $CDCl_3$ c) C_6D_6 d) H_2O
43	Nuclear spin is due to ____ a) Spin of protons b) Spin of electrons c) Half integral or integral value of the spin d) Relaxation
44	The nuclear transition in NMR is induced by the radiation of ____ frequency a) microwave b) radio wave c) uv-visible d) infrared
45	A nucleus in the high energy state transfers its energy to the nucleus in the surrounding framework is called _____ . a) Spin-spin relaxation b) Spin-lattice relaxation c) activation d) deactivation
46	The protons, neutrons, and electrons are collectively known as _____ . a) nucleons b) fermions c) nucleus d) protons
47	In the ESR spectrum ,the spectrum is recorded in derivative mode because_____ a) It is normal procedure

	b) The width of the peak is too small to record it c) It is easier to record in that mode d) The width of the peak is too broad to record it
48	In ESR and NMR spectrometer the magnetic field generated by the magnet must be _____ . a) homogeneous b) heterogeneous c) static d) dynamic
49	In ESR a field strength of ____ units is used a) 0.34 T b) 3.4T c) 34 T d) 340T
50	What happens when a radiation is absorbed by a spinning nucleus present in a magnetic field? a) The angle of precession flips so that the magnetic moment of the nucleus opposes the applied field b) The precessional frequency of the nucleus increases c) The nucleus spins faster d) The nucleus stops spinning
51	Which of the following statement is true? a) Microwave region is associated with ESR b) IR region is associated with ESR c) UV-visible region is associated with ESR d) Radiofrequency region is associated with ESR