BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL
TERM-1 EXAMINATION 2025-26
CHEMISTRY (043)

Class: XII Answer Key
Duration: Roll no:

General Instructions:

(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
(iv) There is no overall choice. Answer all 33 questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION-A

Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

Q.no	Question	Marks
1.	(d) vapour pressure	1
2.	(b) 1	1
3.	(c) paste of KOH and ZnO	1
4.	(a) ionic conductance increases and electronic con	1
5.	(a) Zero order reaction	1
6.	(b) mol L-1s-1	1
7.	(d) Ni^{2+}, Ti^{3+}	1
8.	(b) Zn, Cd, Hg	1
9.	(a) Vitamin B12	1
10.	(c) 6 and +3	1
11.	(a) Cl_2/UV light	1
12.	(d) $(CH_3)_3C—I$	1
13.	c	1
14.	d	1
15.	c	1
16.	a	1
	SECTION-B	
17.	a) Henry's Law constant (KH) helps in comparing the relative solubilities of different gases in the same solvent (e.g. water). In general, the lesser the value of KH, the more the solubility of a gas. b) increases due to increase in number of particles on dissociation.	2

18.	n=6, log $Kc = n$ 0.059 Ecell 0 = 3.224 x 10 30, ΔG° = -nFE°cell = -1737.7KJ/mol,	2
19.	(i) A given temperature, rate is equal to the rate constant of reaction when concentration of the reactant in unity. Thus rate constant is also known as specific reaction rate. (ii) Additional energy required by the reacting molecules to attain Threshold energy is called Activation energy. Order of reaction Molecularity of reaction 1 It is the sum of powers of concentrations of reactants expressed in rate law. The number of reacting species (atoms, ions or molecules) taking part in an elementary reaction, which must collide simultaneously in order to bring about a chemical reaction 2 Order of a reaction is an experimental quantity. Molecularity of a reaction is a theoretical quantity. 3 It can be zero and even a fraction Molecularity cannot be zero or a non integer. 4 Order is applicable to elementary as well as complex reactions Molecularity is applicable only for elementary reactions.	2
20.	Lanthanoid contraction: The regular decrease in the atomic and ionic radii of lanthanoids with increasing atomic number is known as Lanthanoid contraction. Cause for lanthanoid contraction: Poor shielding of 4f electrons. Consequences of Lanthanoid contraction: (i) Difficult to separate the lanthanoids because the change in ionic radii is very small, their chemical properties are similar. Hence, separation of lanthanoids are difficult. (ii) Similarity in size of elements belonging to same group of second and third transition series due to lanthanoid contraction the size of Zr (160 pm) is same as that of Hf (159 pm).	2
21.	[Co(NH3)5Cl]SO4 with BaCl2 gives white ppt of BaSO4 [Co(NH3)5 (SO4)]Cl with AgNO3 gives white ppt of AgCl	2
	SECTION-C	
22.	a) Mole fraction of gas in the solution is directly proportional to partial pressure of gas in the vapour phase b) Chilled as solubility of CO2 is more at low temp. c) Helium as greater the KH value lower the solubility Or a) Temperature is higher in upper layer so solubility of oxygen is less b) M.P./F.P. changes due to impurities. c) Bacterium in canned fruit loses water through the process of osmosis, shrivels and dies. .	3
23.	. Given : Λm∘ (CH3COONa)=83 mho cm2mol−1 Λm∘ (NaCl)=127 mho cm2mol−1 Λm∘ (HCl)=426 mho cm2mol−1 Λm∘ (CH3COOH)= ? Using Kohlrausch law of independent migration of ions Λm∘ (CH3COOH)=Λm∘ (CH3COONa)+Λm∘ (HCl)−Λm∘ (NaCl) or Λm∘ (CH3COOH)=83+426−127 =382 mho cm2mol−1	3
24.	Decay constant k=0.693t1/2=0.6935730year=1.209×10−4/years The rate of counts is proportional to the number of C-14 atoms in the sample. N0=100, N=80 The age of the sample t=2.303/k log(N0/N) t=2.303/1.209×10−4 × log(10080)=1846years	3
25.	(a) Scandium is a transition element because it has incompletely filled d orbitals but Zinc has completely filled d orbitals i.e 3d10 configuration. (b) Silver (Z = 47) can exhibit +2 oxidation state wherein it will have incompletely filled d-orbitals (4d), hence a transition element. (c) because in the formation of metallic bonds, no electrons from 3d-orbitals are involved in case of zinc, while in all other metals of the 3d series, electrons from the d-orbitals are always involved in the formation of metallic bonds.	3
26.	Write the state of hybridization, the shape and the magnetic behaviour of the following complex entities : (i) $[Co(NH_3)_6]^{3+}$ (at no. Co =27)	3

27.	(i) C6H4 CHBr NO2 CH3 (ii) Hexane (iii) CH3 CH2 NC	3
28.	(i) CH3CH2 CH2 CH2 Br (ii) CH3CH2 CHBr CH3 (iii) CH3 C Br CH3 CH3	3
	SECTION-D	
29.	(a) Rate = k[A]1/2[B]3/2, as it is an elementary reaction, Order of reaction = 1/2 + 3/2 = 2 (b) Rate of reaction increases with increase in temperature. (c) Rate of reaction is the rate of change in concentration of a reactant per unit time. (d) For first order reaction R = 0.693/t1/2 = (0. 693)/(77.78min) = 8.90x 10- 3 min Time required to complete 30% reaction, t = (2.303)/k x log a / (a - x) = (2.303) / (8.9x 10- 3 min- 1) x log (100 / (100 - 30)) = ((2.303 x103 x 0.155)/(8.9) = 40minutes OR For a first order reaction t = (2.303)/k x log a/(a - x) = 2.303/1x10- 3x log 5/3 = 2.303x 103 x 0.2219 s = 511 s	4
30.	(i)Linkage isomerism (ii)Solvate/ Hydrate Isomerism (iii)Arises from the interchange of ligands between cationic and anionic entities [Co (NH3)6] [Cr (CN)6] and [Cr(NH3)6][Co(CN)6] OR Ambidentate ligand – It is a ligand that can bind to the central metal atom through any of the two donor atoms present in it. Ex: NO2−, SCN−	4
	SECTION-E	
31.	Attempt either option A or B. A Ans. (i) pollution free, 75% efficiency, continuous source of energy. (ii) m=ZIt = 4.029g, V=m/d = 0.3837 cm3, thickness of Ag deposited is x, V= A. x = 7.67x10-4cm OR B (i) Limiting Molar conductivity -limiting value of molar conductivity when concentration approaches to zero. Fuel cell - device which converts energy produced during the combustion of fuels directly into electrical energy. (ii) cell constant = conductivity x resistance = 1.29 cm–1, Conductivity, k = Cell constant/Resistance = 0.00248 ohm–1 cm–1, $\Lambda m = k \times 1000/M = 124$ ohm–1 cm2 mol–1	5
32.	a. FeCr2O4 b. Na2CrO4 c. K2CrO4 d. K2Cr2 O7 OR Complete & balance the following reactions: - (a) Fe^{3+} (b) 2 CO_2 (c) K_2MnO_4 (d) I_2 (e) Sn^{4+}	5
33.	Explain the following reaction (i) R-X + Ag F (ii) R-X + Ag F (iii) C6 H5 N2Cl – C6H5 Br (iv) 2 R-X--→ R-R	5

	(v) $C_6H_5CH_3 \rightarrow$ Anhy $AlCl_3 \rightarrow C_6H_4(CH_3)CH_3$ OR (a) KCN is predominantly ionic and provides cyanide ions in solution. Although both carbon and nitrogen atoms are in a position to donate electron pairs, the attack takes place mainly through carbon atom and not through nitrogen atom since C—C bond is more stable than C—N bond. However, AgCN is mainly covalent in nature and nitrogen is free to donate electron pair forming isocyanide as the main product 2+3 (b) (i) NaI (ii) H_2O_2 /HBr (iii) Na/Dry Ether	