APEEJAY SCHOOL ,PITAMPURA

First terminal examination

2016-17

CLASS XI **TIME ALLOWED: 3HRS**

CHEMISTRY **MAXIMUM MARKS. 60**

GENERAL INSTRUCTIONS :

- *All questions are compulsory.*
- *Marks for each question are indicated against it.*
- *Q.No. 1 to 6 are very short answer questions, each of one mark. Answer these in one sentence each.*
- *Q.No. 7 to 12 are short answer questions of two marks each. Answer these in about 30 words each.*
- *Q.No. 13 to 21 are short answer questions of three marks each. Answer these in about 40 words each.*
- *Q.No. 22 to 24 are long answer questions of five marks each. Answer these in about 70 words each.*
- *Use log tables if necessary. Calculators are not permitted.*

Q1	Write the empirical formula of acetic acid ?	1
Q2	Arrange the molecules in the order of increasing ionic character: LiF, K_2O,N_2,SO_2 and ClF_3	1
Q3	Name a dipositive metal ion with configuration : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$	1
Q4	Critical temperature for CO_2 and CH_4 are 31.1^0C and -81.9^0C respectively .Which of these has stronger inter molecular forces and why ?	1
Q5	Why is the size of anion always greater than the parent atom?	1
Q6	What will happen to the system if work is done by the internal energy of the system ?	1
Q7	How many series are found in the spectrum of atomic hydrogen? Mention their names and the regions in which they appear.	2
Q8	Although both carbon dioxide and water are triatomic molecules, the shape of water molecule is bent while that of carbon dioxide is linear. Explain this on the basis of dipole moment.	2
Q9	The standard molar entropy of $H_2O(l)$ is$70\ JK^{-1}$.Will the standard molar entropy of H_2O (s) be more or less than $70\ JK^{-1}$. Give reason. b)Express the change in internal energy of the system when no work is done on the system , but q amount of heat is taken out from the system and given to the surroundings. What type of wall does the system have?	2
Q10	Answer the following: i) Under what conditions do real gas tend to show ideal gas behavior?	2

	ii) The compressibility factor Z for a gas is less than one .What does it signify? OR i) What is the significance of 'a' and 'b' in the vanderwaal's equation.Also give the units of 'a' and 'b'. ii) Out of NH_3 and N_2 which will have larger value of 'a' and why?	
Q11	Derive the relationship between Cp and Cv for an ideal gas.	2
Q12	How many oxygen atoms are present in 96g of ozone?	2
Q13	2.4 gm of Mg is reacted with 3.2 gm of oxygen to form magnesium oxide .What mass of magnesium oxide shall be formed ? How much of excess reagent shall be left behind?	3
Q14	What will be the pressure exerted (in pascal) by a mixture of 3.2g of methane and 4.4g of carbon dioxide contained in a 9 dm^3 flask at 27^0C?	3
Q15	a) What is the maximum number of electrons that can be accommodated i) in the shell with n=2 ii)in the subshell with l=2 and iii) in one orbital with m_l= +2 b) Explain the reason for extra stability of electronic configuration of chromium. **OR** a) Name the orbital in which the electron with following quantum numbers is present : n=4 , l= 2 , m= -2 ms = -1/2 b) What is the value of n that allows g orbitals to exist ? c) How many electrons in an atom may have the following quantum numbers:n=4 , ms =1/2	3
Q16	a) First ionization energy of carbon atom is greater than that of boron whereas the reverse is true for second ionization energy. Explain. b) Arrange the following in the increasing order of size : Na^+ , F^- , O^{2-} , Mg^{2+}	3
Q17	a) Both propane and carbon dioxide diffuse at the same rate under identical conditions of temperature and pressure .Why? b)What is the effect of temperature on i) Density ii) Surface tension iii) Viscosity and iv) Vapour pressure of a liquid	3
Q18	a) A sample of NaOH weighing 0.38g is dissolved in water and the solution is made to 50ml in a volumetric flask .What is the molarity of the resulting solution? b) How many moles of NaOH are contained in 27ml of 0.15 M NaOH? (At.mass of Na=23,O=16,H=1)	3
Q19	Predict the period , group number and block to which the following elements belong:-A (Atomic No.20) , B (Atomic no.29)	3
Q20	a)Define electronegativity.How does it differ from electron affinity. b)Explain diagonal relationship	3
Q21	a) Draw the lewis dot structure of NO_3^- and CO molecule showing the formal charge and lone pairs. b) Give the resonating structures of CH_3COO^-.	3
Q22	a) State Heisenberg's uncertainty principle. Give mathematical expression for	5

	the same . b) Mention the fundamental change which uncertainty principle introduced in Bohr's concept of definite path of electron in an orbit. c) Calculate the uncertainty in the velocity Δv of an electron , if the uncertainty in its position is 3×10^{-9} m. **OR** a) Define wavelength ,frequency and wave number. Also give their units.how is frequency related to wave number? b) Electromagnetic radiation of wavelength 242nm is just sufficient to ionise the sodium atom. Calculate the ionisation energy of sodium in Kj/mol.	
Q23	a) Draw the structures of SF_6 and XeF_2 on the basis of VSEPR theory. b) Explain the hybridization of ethene molecule. c) How many sigma bonds and Pi bonds are present in the following compound :- CH_3-C≡C -COOH OR a) Write the molecular orbital configuration of N_2,O_2, $O_2^+$and O_2^- . Arrange them in increasing order of i)Bond order ii)bond dissociation energy. a) Out of sigma and pi bonds which one is stronger and why?	5
Q24	a) Enthalpy of combustion of CH_4, C and H_2 at 298K are -890.3Kj/mol -393.5kJ/mol and -285.8Kj/Mol. Calculate the standard enthalpy of formation of CH_4. b) For the reaction : $2Cl\,(g) \rightarrow Cl_2\,(g)$, what are the signs of ΔH and ΔS ? c) State second law of thermodynamics. **OR** a) In the reaction $C_3H_8(g) + 5O_2 \rightarrow 3CO_2\,(g) + 4H_2O$ Calculate ΔH given that bond energies of C-C,C-H,C=O,O=O and O-H bonds are 347,414,,741,498 and 464 kJ/mol respectively. b) Derive the relationship $\Delta H = \Delta U + \Delta n_g RT$	5