DELHI PUBLIC SCHOOL, JAMMU.

CLASS – XI   SUBJECT- CHEMISTRY

VERY SHORT QUESTIONS

Q1. Write the formula of borax and basic structural unit of silicate.

Q2. Hard water is softened before using in boilers. Why?

Q3. Why are potassium and caesium rather than lithium used in photoelectric cells?

Q4. Arrange the following species in increasing order of their vander wall's radii: Cl, H, O and N.

Q5. Draw the structure of the compound : 2-(2-hydroxylbut-1-yl) cyclohexane-1-ol.

SHORT QUESTIONS

Q6. (i) Calculate uncertainity in the velocity of an electron of mass $9.1*10^{-31}$ kg, if the uncertainity in

position is of the order of 10^{-8}m.($h=6.626*10^{-34}$Js)

(ii) How many total electrons are present in fully filled subshells having value of n + l =5?

Q7. A chemical A is used for the preparation of washing soda to recover ammonia. When CO_2 is

bubbled through an aqueous solution of A, the solution turns milky. It is used in white washing

due to disinfectant nature. What is the chemical formula of A?

Q8. Arrange the following carbocations in decreasing order of their stability.

   (a) CH_3CH-CH_3 (b) $CH_3-CH-OCH_3$ (c) $CH_3-CH-CH_2-OCH_3$

Q9. Four moles of PCl_5 are heated in a closed $4dm^3$container to reach at equilibrium at 400K. At

equilibrium, 50% of PCl_5 is dissociated. What is the value of K_c for the dissociation of PCl_5into

PCl_3 and Cl_2 at 400K.

Q10. Enthalpy of combustion of carbon to CO_2 is 393.5kj mol^{-1}. Calculate the heat released upon

formation of 35.2g of CO_2 from carbon and dioxygen gas.

LONG QUESTIONS

Q11. (i) Name the reagents used for softening of the temporary hardness of water.

(ii) What is the role of the resin in synthetic resin method in removing hardness of water?

(iii) How hydrogen is obtained commercially by electrolysis?

Q12. (i) How many moles of iron can be made from Fe_2O_3 by use of 16 moles of carbon monoxide in the following reactin?

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$
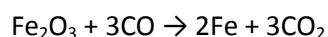
(ii) What will be the pressure exerted by a mixture of 3.2g of methane and 4.4 g of carbon dioxide contained in a 9 dm^3 flask at 27°C?

Q13. A compound containg sodium, sulphur, hydrogen and oxygen gave the following result on analysis : Na= 14.28% , S= 9.92% and H= 6.20%. If all the atoms of hydrogen in the compound are present in the combination with oxygen as water of crystallisation, what is the structure of anhydrous compound? The molecular mass of crystalline salt is 322.

Q14. (i) In NO_3^- ion, calculate the number of bond pairs and lone pairs of electron on nitrogen atom.

(ii) Explain why HF is less viscous than H_2O?

Q15. How can the following conversions be carried out?
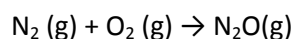
(i) Ethyne to methane   (ii) Propene to propyne   (iii) Ethyl benzene to benzene

Q16. (i) Calculate the frequency and wave number of a radiation having wavelength 600nm.

(ii) A certain particle carries $2.5*10^{-6}$ of static charge. Calculate the number of electron present in it.

Q17. Reaction between N_2 and O_2 takes place as follows:

$$N_2 (g) + O_2 (g) \rightarrow N_2O(g)$$

If a mixture of 0.482 mol N_2 and 0.933 mol of O_2 is placed in 10 L reaction vessel and allowed to form N_2O at a temperature for which $K_c=2.0*10^{-37,}$ determine the composition of the reaction mixture.

Q18. Write any three observation of Rutherford scattering experiment. Draw the figure in support of your answer.

Q19.(i) Arrange the following compounds in decreasing order of melting point:

KF, KBr, KCl and KI

(ii) Among the following elements B, Al, C and Si ,

(a) Which element has the highest first ionisation enthalpy?
(b) Which element is the most metallic? Justify your answer.

Q20. Write down the reactive intermediates formed from the heterolytic cleavage of the following

Compounds.

(i)CH_3-SCH_3 (ii) CH_3-CN   (iii) CH_3-Cu

Q21. The sample of nitrogen occupies a volume of 320cm^3 at STP. Calculate its volume at 546.3 K

and 0.5 bar pressure.

Q22. Assign the oxidation number to the bold elements in each of the following species:

(i)$NaH_2\mathbf{P}O_4$ (ii) $H_2\mathbf{S}_4O_6$ (iii) $K\mathbf{Al}(SO_4)_2.12H_2O$

Q23. Rahul went to market to buy fruits and vegetables. The vendor put the fruits and vegetables in

The polythene bag but Rahul asks the vendor to put the things in the jute bag which he had

carried with him.

Answer the following questions:

(i)   Why did Rahul refused to use polythene bag?
(ii)   As a chemistry student, why would you advocate the use of jute bags instead of polythene bags?
(iii)   What are the values possessed by Rahul?
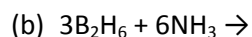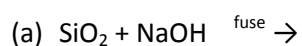(iv)   Suggest two activities to ban the use of polythene bags.

VERY LONG QUESTIONS

Q24. (i) Gallium undergoes disproportionation reaction. Why ?

(ii) Conc. HNO_3 can be transported in aluminium container. Why ?

(iii) Tin(II) is a reducing agent whereas Pb(II) is not. Why ?

(iv) Complete the following reactions:

(a) $SiO_2 + NaOH \xrightarrow{\text{fuse}}$

(b) $3B_2H_6 + 6NH_3 \rightarrow$

Q25.(i) An alkene A contains three C-C; eight C-H sigma bonds and one C-C π bond. A on ozonolysis

gives two moles of an aldehyde of molar mass 44 u. Write the IUPAC name of A.

(ii) How will you convert benzene into p-bromonitrobenzene ?

Q26.(i) Calculate the resonance energy of N_2O from the following data:

$\Delta H_f^{\circ}(N_2O) = 82$ kJ mol^{-1};

BE of N≡N =946 kJ mol^{-1};   BE of N=N =418 kJ mol^{-1};

BE of O=O =498 kJ mol^{-1};   BE of N=O =607 kJ mol^{-1};

(ii) The enthalpy change for the reaction of 50 ml of ethylene with 50ml of H_2 at 1.5 atm pressure

is $\Delta H= -0.31$ kJ. What is the value of ΔE?