Parvatibai Chowgule College of Arts & Science, Margao Goa.

(Higher Secondary Section)

Class: - XII Science **Max Marks:- 20**

Day: – Thursday **(Subject:-Chemistry)** **Date:- 6-8-2015**

Time: - _____ **PRACTICE-TEST (Answer Key)** **Duration: - One Hour**

Total No of Questions: - 2 **For Formative-I Examination August - 2015** **Total No Of Printed pages: 4**

Q No	***INSTRUCTIONS:***	Marks
	(1) Figures to the right-indicate full marks. (2) Use of calculators is not permitted, however mathematical tables will be provided on request. (3) Multiple Choice Questions should be attempted only once. (4)Atomic masses & Constants: K=39,Br=80,S=32,H=1,C=12,N=14,O=16,N_A=6.023×10^{23}	
Q 1 A	**Name the factors that influence the rate of a chemical reaction and Derive an equation for calculating the half life of a first order reaction from rate equation** **Ans.** The rate of a chemical reaction is influenced by the following factors i) Concentration of the reactants ii) Temperature of the reactants iii) Nature of the reacting substances iv) Presence of catalyst v) Exposure to radiations The rate equation for a first order reaction is: K = $\frac{2.303}{t}\log\frac{[R_0]}{[R]}$ At $t_{1/2}$ [R] = $\frac{[R_o]}{2}$ $\Rightarrow k=\frac{2.303}{t1/2}\log\frac{[R_0]}{[R]/2}$ $\Rightarrow t_{1/2}=\frac{2.303}{k}\log 2$ $\Rightarrow t_{1/2}=\frac{2.303}{k}\times 0.301$ $\Rightarrow t_{1/2}=\frac{0.693}{k}$	**3**
Q 1 B	The half-life for radioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample. Ans:	**2**

	$k = \frac{0.693}{t_{1/2}}$ Here, $= \frac{0.693}{5730}\ \text{years}^{-1}$ It is known that, $t = \frac{2.303}{k}\log\frac{[R]_0}{[R]}$ $= \frac{2.303}{\frac{0.693}{5730}}\log\frac{100}{80}$ = 1845 years (approximately) Hence, the age of the sample is 1845 years.	
Q 1 C	The density of KBr is 2.75gcm^{-3} .The length of the edge of the unit cell is 654pm,what is the nature of the cubic unit cell of KBr Density of the **KBr** , d = 2.7 × 10^3 kg m^{-3} Molar mass, M – **119** kg mol^{-1} Edge length, a = **654** pm = **654** × 10^{-12} m = **6.54** × 10^{-10} m It is known that, Avogadro's number, N_A = 6.022 × 10 mol^{-1} Using the formula, $d=z.M/a^3.N_A$ $z=d.\ a^3.\ N_A/M$ =2.7*10^3 kgm^{-3}*(**6.54** 10^{-10}m)^3*6.022*10^{23} mol^{-1}/ **119** kg mol^{-1} = **3.89** =4	**2**
Q 1 D	Explain with the help of diagram the formation of tetrahedral and octahedral voids. A void surrounded by 4 spheres is called a tetrahedral void and a void surrounded by 6 spheres is called an octahedral void. Figure 1 represents a tetrahedral void and figure 2 represents an octahedral void.	**2**

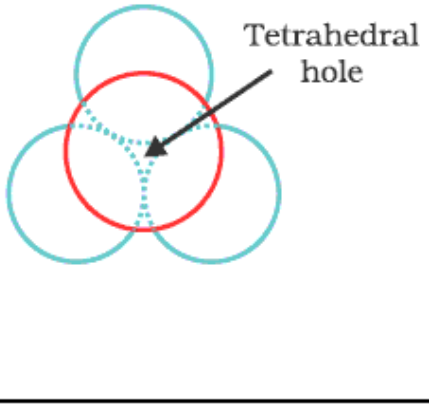


Figure 1

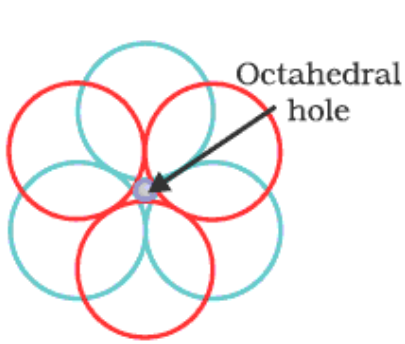


Figure 2

Q 1 E Complete the following statement by choosing the *correct* alternative from those given below the statement and rewrite the completed statement: **1**

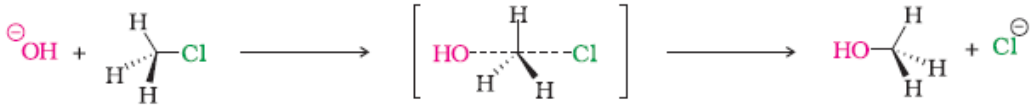
The Mond process is used for the refining of ____ **Nickel** _____.

Nickel # Zirconium # Iron # Zinc

Q 2 A Explain the following with suitable example and chemical equation. **3**

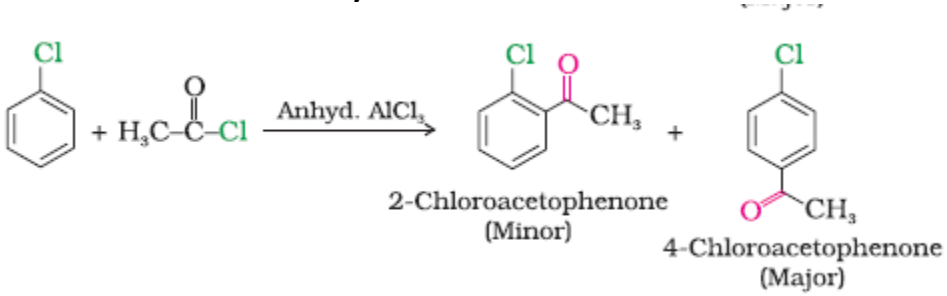
a. SN^2 Reaction mechanism

The reaction between CH_3Cl and hydroxide ion to yield methanol and chloride ion follows a second order kinetics, i.e., the rate depends upon the concentration of both the reactants.



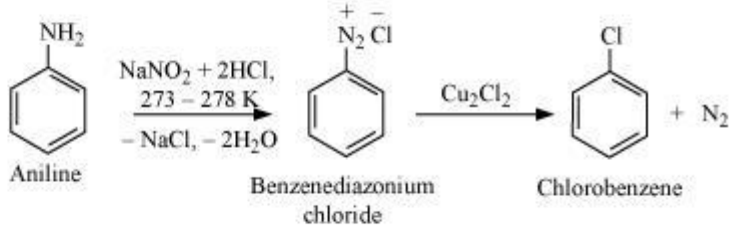
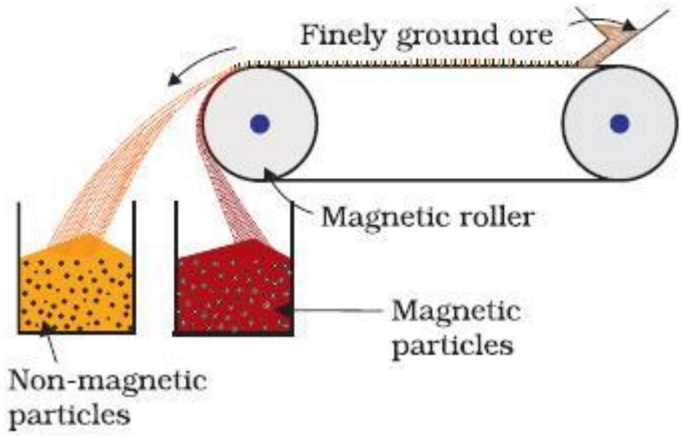
the incoming nucleophile interacts with alkyl halide causing the carbonhalide bond to break while forming a new carbon-OH bond. These two processes take place simultaneously in a single step and no intermediate is formed. As the reaction progresses and the bond between the nucleophile and the carbon atom starts forming, the bond between carbon atom and leaving group weakens. As this happens, the configuration of carbon atom under attack inverts in much the same way as an umbrella is turned inside out when caught in a strong wind, while the leaving group is pushed away. This process is called as **inversion of configuration**. In the transition state, the carbon atom is simultaneously bonded to incoming nucleophile and the outgoing leaving group and such structures are unstable and cannot be isolated. This is because the carbon atom in the transition state is simultaneously bonded to five atoms and therefore is unstable.

b. Friedal –Craft alkylation reaction.



c. **Swart's Reaction**.

The synthesis of alkyl fluorides is best accomplished by heating an alkyl chloride/bromide in the presence of a metallic fluoride such as AgF, Hg_2F_2, CoF_2 or SbF_3. The reaction is termed as **Swarts** reaction.

	$H_3C-Br + AgF \longrightarrow H_3C-F + AgBr$	
Q 2 B	Write chemical equations showing following conversions **a. Aniline to chlorobenzene**  **b. 1-chlorobutane to n-octane** $2CH_3CH_2CH_2CH_2-Cl + 2Na \xrightarrow[-2NaCl]{dry\ ether} CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3$ 1 – Chlordrutane n – Octane	**2**
Q 2 C	Name the principle involved in Zone refining of metals and Draw a neat labeled diagram showing magnetic separation process of purification. **Ans.** impurities are more soluble in the melt than in the solid state of the metal.  	**2**
Q 2 D	Answer the following. 1. Write two points of difference between Antiseptic and Disinfectant. Drugs that are produced from micro-organisms and are used to kill other harmful micro-organisms are known as Antibiotics. Disinfectants are chemical substances which kill micro-organisms but are not safe to be applied on living tissues. These are used to kill the micro-organisms present in the drains, toilets etc. 2. Write an example and function of non-narcotic Analgesic drug. Non-narcotic (non-addictive) analgesics: These drugs are effective in relieving skeletal pain such as that due to arthritis and preventing platelet coagulation.	**2**
Q 2 E	Complete the following statement by choosing the *correct* alternative from those given below the statement and rewrite the completed statement: The transparent soaps are prepared by dissolving the soap in____ **Ethanol** __ # Glycerol # Ethanol # Propanol # Ethylene glycol	**1**

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