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Slow Learners and Advance learners Assignments-Sample Copy

NAME: Yashwanth
CLASS: I BSc
SUBJECT: Chemistry
DATE: 18/05/2018

Chemistry Assignment

1. Question involving 2/3 marks

1. What is a substitution reaction? Give eg.

— A substitution reaction is a chemical reaction during which an atom or more one functional group in a chemical compound is replaced by another atom or functional group.

Example:

$$\text{Nu} + \text{R-LG} \rightarrow \text{R-Nu} + \text{LG}^-$$

2. What is a leaving group? Give eg.

— A leaving group is a molecular fragment that departs, as a stable species with a pair of electrons in heterolytic bond cleavage.

Example:

$$\text{Cl}^-, \text{Br}^-, \text{H}_2\text{O}, \text{NH}_3$$

3. Alkyl halide undergoes nucleophilic substitution reaction. Give reaction.

— Because the electrophilic alkyl halide forms a new bond with the nucleophile which substitutes for the halogen at the alpha-carbon.

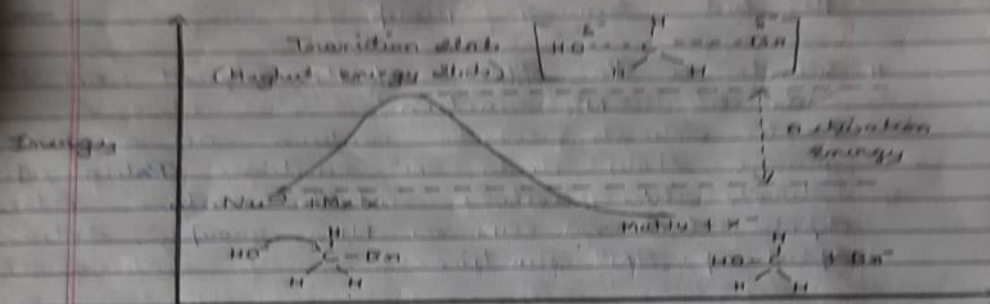
4. What is a nucleophilic substitution reaction? Give example.

— A nucleophile is an electron rich species that tends to attack the substrate at a point of low electron density. As these substitution reactions involving electron rich species i.e., nucleophiles, they are called nucleophilic substitution.

Eg: $\text{R-Br} \rightarrow \text{R-OH}$ (corresponding alcohol)

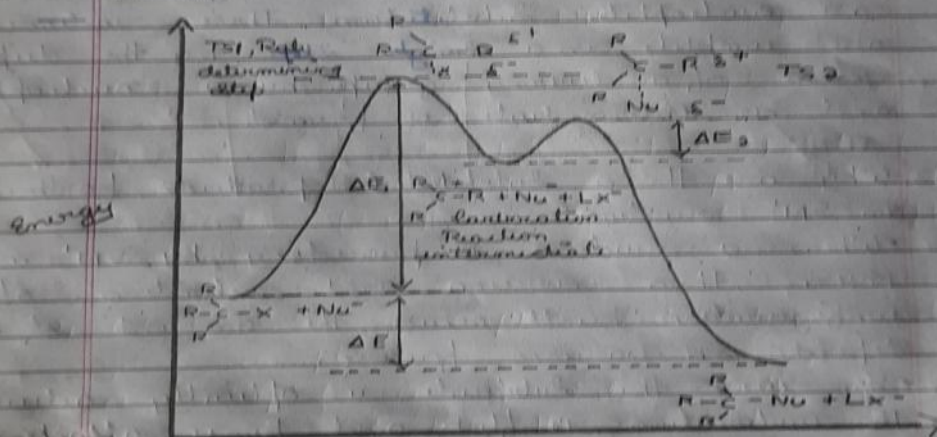
Rajguru Super

8. Give the energy profile diagram for S_N2 reaction.



Reaction Progress

9. Give the energy profile diagram for S_N1 reaction.



Reaction coordinate

10. What are the effect of the leaving group on the rate of S_N2 reaction?

The leaving group usually has a negative charge group which best stabilize a negative charge group which best stabilize a negative charge group.

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Elementary Quantum Mechanics

1965

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2 mark questions

1) What is photo electric effect?

When light of certain frequency falls on the surface of metal, electrons are ejected from metal. This phenomenon is known as photo electric effect.

2) Give an account of Heisenberg's uncertainty principle.

Heisenberg's uncertainty principle states that it is not possible to determine exactly both position & momentum of small moving particles.

$$\Delta x \Delta p \approx \frac{h}{4\pi} \quad \text{--- (i)}$$

Putting $\Delta p = m \cdot \Delta v$ eqn (i) becomes

$$\Delta x (m \cdot \Delta v) = \frac{h}{4\pi} \quad \text{(ii)}$$

$$\Delta x \cdot \Delta v = \frac{h}{4\pi m} \quad \text{--- (iii)}$$

This implies that position & velocity of particle can't be measured simultaneously with certainty.

3) Give an account of dual nature of material particles such as e.

The phenomena of black body radiation & photoelectric effect could be explained only if light is considered to have particle character. \therefore , it was concluded that light has particle nature as well as wave nature i.e. it has dual nature.

4) What is black body?

A body which completely absorbs radiant energy falling on it.

5) Explain Compton effect.

The phenomenon of decrease in energy or increase in wavelength of x-rays after scattering from surface of an object, called Compton effect.

6) Explain photo electric effect on basis of quantum theory of radiation.

Albert Einstein explained photoelectric effect by applying Planck's quantum theory. According to this theory light consists of bundles of energy called photons, the energy of each photon being equal to $h\nu$, where ν is frequency of light. When photon of light of frequency ν_0 strikes an electron in metal,

Q. What is relation between wave length & momentum of particle?

According to planck's quantum theory its energy is given by,

$$E = h\nu \rightarrow (1)$$

ν is frequency of wave & h is planck's constant

If photon is supposed to have particle character, according to einstein eq energy is given by,

$$E = mc^2 \rightarrow (2)$$

From eq (1) & (2)

$$h\nu = mc^2$$

$$\text{but } \nu = c/\lambda$$

$$h \cdot c/\lambda = mc^2 \rightarrow (3)$$

$$\text{or } \lambda = h/mc$$

Thus for any material particle like e^- , we may write

$$\lambda = h/mv$$

$$\text{or } \lambda = h/p \rightarrow (4)$$

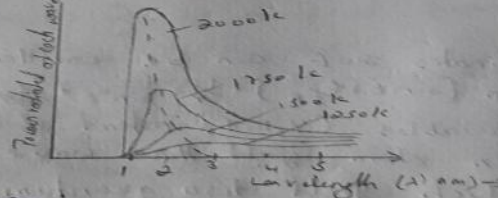
where $mv = p$ is momentum of particle

The above eqn called de broglie equation.

Q. 4 marks

Briefly explain spectral distribution of black body radiation.

The energy emitted by black body at any temp doesn't consist of single frequency. The distribution of energy amongst different wavelengths of black spectrum is given below.



Characteristics of curve are:

For each temp, there is wavelength (λ_{max}) at which energy radiated maximum (E_m).

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