CHEMISTRY 9th (New Book)

CHAPTER NO 5 ENERGETICS

EXERCISE MULTIPLE CHOICE QUESTIONS

1.	From sunlight	2.	$NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
3.	HI	4.	ATP + Ethanol + H_2O
5.	Option B	6.	It shows the bonds which break are weaker than those are formed.
7.	Exothermic with a negative enthalpy change.	8.	$CH_4 \rightarrow CH_3^+ + H$
9.	-102 kJ	10.	The change from diamond to graphite has high activation energy.

Q # 2: Short Question Answer

i. What is the difference between enthalpy and enthalpy change?

Enthalpy	Enthalpy Change
The total amount of heat energy present in a molecule under standard conditions (0°C and 760 mm pressure) is called enthalpy.	The difference between the energy of reactants and that of the products comes out in the form of heat is called enthalpy change of the reaction.
It is represented by H.	It is represented by ΔH.
It is calculated by the formula: H = E + PV	It is calculated by the formula: ΔH = ΔE + PΔV
Its unit is kJ mol^{-1}.	Its unit is kJ mol^{-1}.

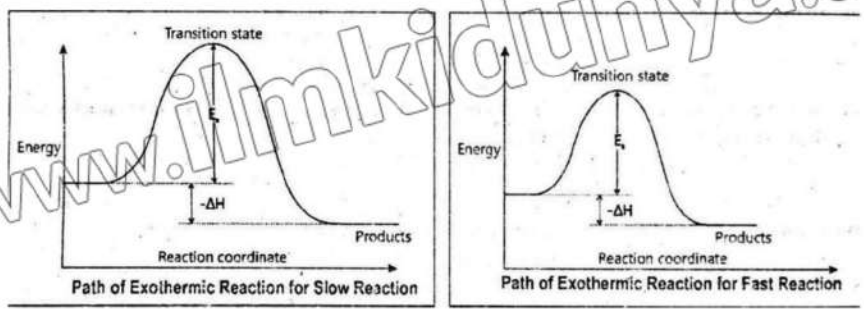
ii. Why is breaking of bond an endothermic process?

Breaking of a bond is an endothermic process because energy is used to separate the atoms that are held together by the bond. To break this bond, we have to provide energy to break the attractive forces between the atoms. This energy is absorbed from the surroundings to break the bond.

iii. Depict the transition state for the following reaction.

Reaction: $H_2 + Cl_2 \rightarrow 2HCl$

iv. Draw the reaction profiles for two exothermic reactions one of which moves faster than the other.



v. What is the role of glycogen in our body?

Glycogen is the primary storage form of glucose. It is stored in the liver and muscles. When energy is needed, it can be broken down to release glucose into the blood.

Q # 3: Constructed Response Questions

i. Physical changes which usually occur around us are given in the table. Write down whether they are exothermic or endothermic.

Physical Change	Exothermic or Endothermic
Conversion of hydrated salt into anhydrous salt	Endothermic
Burning of water	(Likely a typo; should be "burning of fuel" or similar?)
Vaporizing liquid nitrogen	Endothermic
Evaporation of dry ice	Endothermic
Conduction of electricity by metals	Exothermic
Dissolving ammonium chloride in water	Endothermic
Formation of rain from clouds	Exothermic
Dissolving sodium carbonate in water	Exothermic

ii. Explain why the reaction between atmospheric gases oxygen and nitrogen does not take place under normal conditions? But in the presence of lightning these gases react to give NO. The reaction stops as soon as the lightning stops.

Under normal conditions, the reaction between oxygen (O_2) and nitrogen (N_2) does not take place because it is highly endothermic and has a high activation energy. Lightning provides the necessary energy in the form of heat and light to overcome this activation energy. So these gases react to form nitric oxide (NO):

$$N_2 + O_2 \rightarrow 2NO$$

When the lightning stops, the energy source is removed, and the reaction stops.

iii. A reaction between natural gas (CH_4) and atmospheric oxygen does not take place when you mix them. As soon as you show a burning match stick, the reaction starts immediately and then it continues until one or both of the reactants is/are used up. Explain.

A reaction between natural gas and atmospheric oxygen does not take place when you mix them because methane (CH_4) and oxygen (O_2) need an initial energy to cross the activation energy barrier. The energy required to initiate the reaction is provided by a burning matchstick. Once the reaction begins, it becomes self-sustaining and releases heat. The reaction continues until one or both reactants are used up.