Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Kinetics

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Name of the Student:_____
Max. Marks : 15 Marks **Time : 15 Minutes**

Q1.

Which statement explains why the rate of a reaction increases when a catalyst is added to a reaction mixture at a constant temperature?

A The collision frequency increases because there is an increase in the activation energy. ⬭

B The collision frequency increases because there is an increase in the mean energy of the particles. ⬭

C The proportion of successful collisions increases because there is a decrease in the activation energy. ⬭

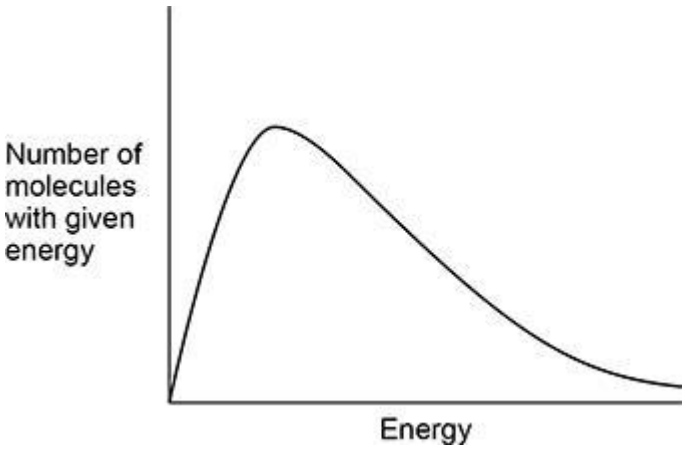
D The proportion of successful collisions increases because there is an increase in the mean energy of the particles. ⬭

(Total 1 marks)

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Q2.

The Maxwell–Boltzmann distribution curve is shown for a gaseous reaction mixture.



What is represented by the total area under the curve?

A The total energy of the molecules in the reaction mixture ⬭

B The total energy of reacting molecules in the reaction mixture ⬭

C The total number of molecules in the reaction mixture ⬭

D The total number of reacting molecules in the reaction mixture ⬭

(Total 1 mark)

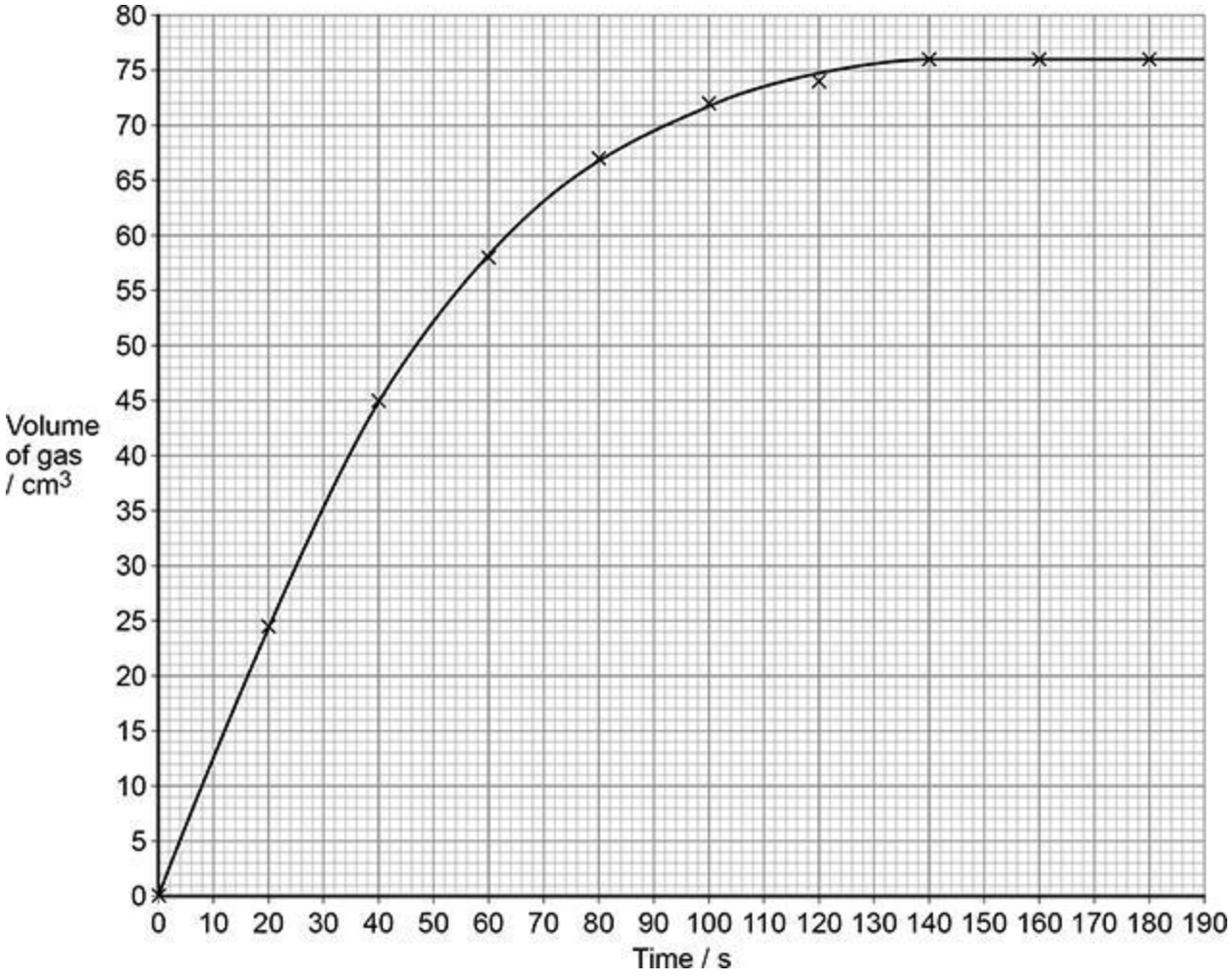
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Q3.

A student investigated the reaction between magnesium and hydrochloric acid.

$$Mg(s) + 2\ HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$$

The results are plotted on this graph.



Which value is closest to the rate of reaction, in $cm^3\ s^{-1}$, at 70 s?

A 0.4 ⬭

B 0.9 ⬭

C 1.1 ⬭

D 2.5 ⬭

(Total 1 mark)

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Q4.

Which statement explains why the rate of a reaction increases when a catalyst is added at a constant temperature?

A The collision frequency increases because there is a decrease in activation energy. ⬭

B The collision frequency increases because there is an increase in the average energy of the particles. ⬭

C The proportion of successful collisions increases because there is a decrease in activation energy. ⬭

D The proportion of successful collisions increases because there is an increase in the average energy of the particles. ⬭

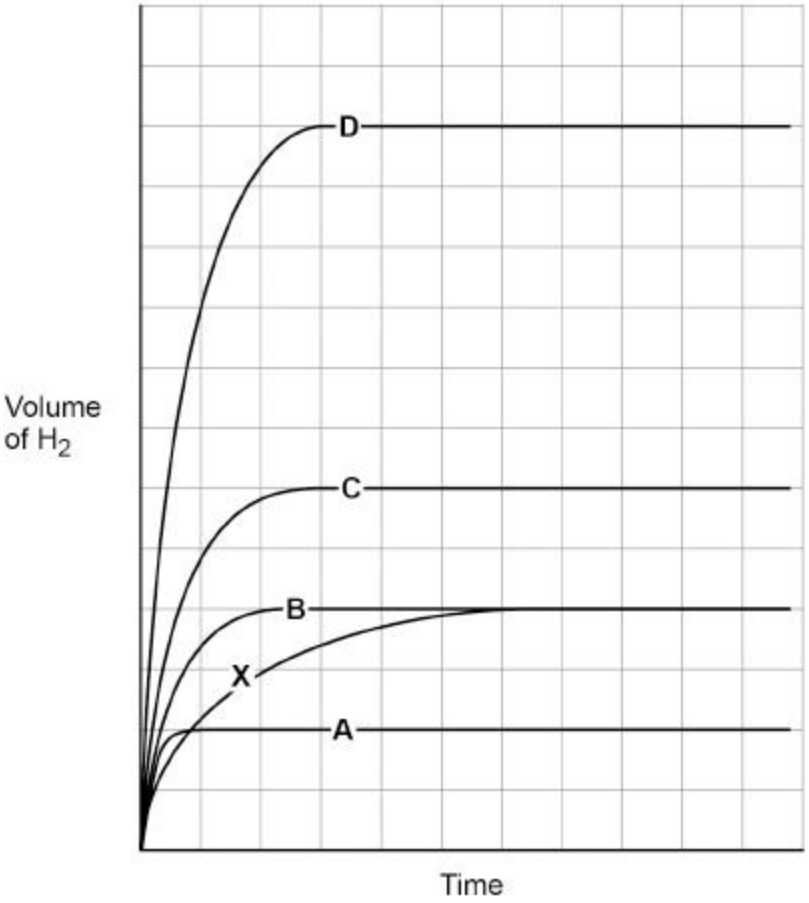
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Q5.

Magnesium reacts with an acid to form hydrogen gas.

Line **X** on the graph shows how the volume of hydrogen gas varies with time when 50 cm^3 of 0.50 mol dm^{-3} acid reacts with an excess of magnesium.



The reaction is repeated under the same conditions but using 25 cm^3 of 1.50 mol dm^{-3} acid. The magnesium is in excess.

Which line represents this second reaction?

A line **A** ⬭

B line **B** ⬭

C line **C** ⬭

D line **D** ⬭

(Total 1 mark)

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Q6.

The rate of reaction is greater when a catalyst is used, without changing the temperature.

Which statement explains why the rate of reaction is greater with a catalyst?

A The collision frequency increases because the catalysed reaction has a lower activation energy. ⬭

B The collision frequency increases because there is an increase in the average energy of the particles. ⬭

C The proportion of successful collisions increases because the catalysed reaction has a lower activation energy. ⬭

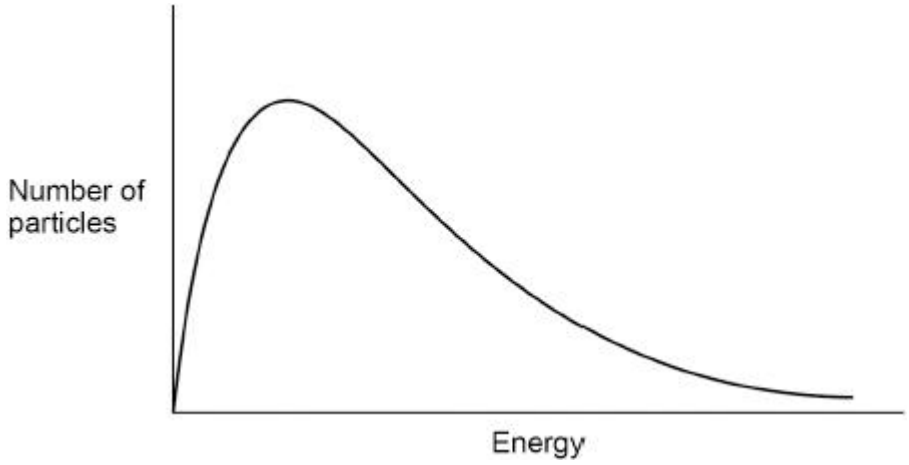
D The proportion of successful collisions increases because there is an increase in the average energy of the particles. ⬭

(Total 1 mark)

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Q7.

This is a Maxwell–Boltzmann distribution for a gaseous reactant.



What is represented by the total area under the curve?

A total energy of the particles ⬭

B activation energy for the reaction ⬭

C total number of reacting particles ⬭

D total number of particles present ⬭

(Total 1 mark)

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Q8.

Which statement about molecules in a gas is correct?

A At a fixed temperature they all move at the same speed. ⬭

B At a fixed temperature their average kinetic energy is constant. ⬭

C As temperature increases, there are more molecules with the most probable energy. ⬭

D As temperature decreases, there are fewer molecules with the mean energy. ⬭

(Total 1 mark)

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Q9.

Which statement about catalysts used in reactions at equilibrium, at a constant temperature, is correct?

A They are always used in the solid state. ⬭

B They increase the rate of the forward reaction but decrease the rate of the reverse reaction. ⬭

C They have no effect on the value of the equilibrium constant. ⬭

D They make the forward reaction more exothermic. ⬭

(Total 1 mark)

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Q10.

Consider the change that occurs in the shape of the curve for the distribution of molecular energies in a gas when the temperature of the gas is increased.

Which is a correct statement about the gas molecules at a higher temperature?

A There are more molecules with any given energy. ⬭

B There are more molecules with the mean energy. ⬭

C There are more molecules with the most probable energy. ⬭

D There is an increase in the most probable energy of the molecules. ⬭

(Total 1 mark)

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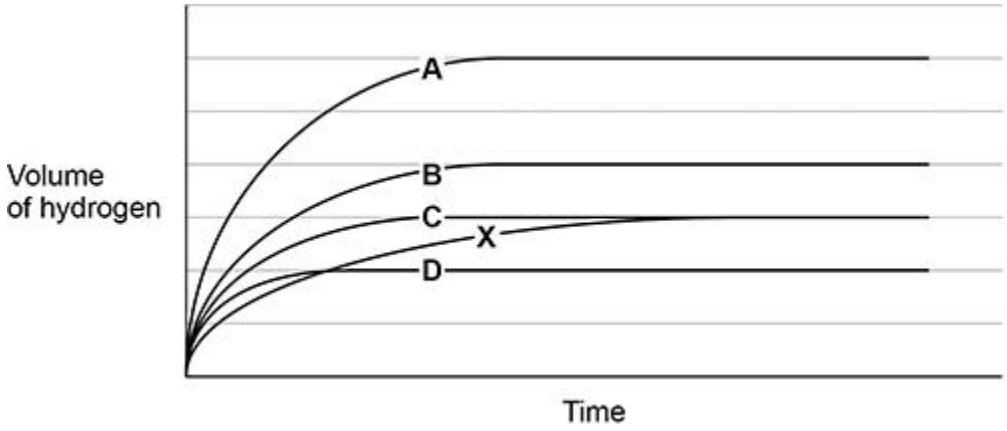
Q11.

An excess of magnesium reacts with hydrochloric acid to form hydrogen gas.

Line **X** on the graph shows how the volume of hydrogen produced changes with time as magnesium reacts with 30 cm^3 of 1.0 mol dm^{-3} hydrochloric acid.

The reaction is repeated using 20 cm^3 of 2.0 mol dm^{-3} hydrochloric acid, with all other conditions the same.

Which line shows how the volume of hydrogen produced changes with time?



A ⬭

B ⬭

C ⬭

D ⬭

(Total 1 mark)

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Q12.

Which statement about the distribution curve of molecular energies in an ideal gas at a given temperature is correct?

A There are no molecules with zero energy. ⬭

B The curve is symmetrical about the maximum. ⬭

C Changing the temperature has no effect on the position of the maximum. ⬭

D Most molecules have the mean energy. ⬭

(Total 1 mark)

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Q13.

A mixture of 2 dm^3 of hydrogen and 1 dm^3 of oxygen is at room temperature.

Which statement is correct?

A There is no reaction to form water because the molecules do not collide with sufficient energy. ⬭

B There is no reaction to form water because the molecules do not collide with sufficient frequency. ⬭

C The mean velocity of the hydrogen molecules is less than that of the oxygen molecules. ⬭

D The partial pressure of each gas is the same. ⬭

(Total 1 mark)

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Q14.

Which statement about the addition of a catalyst to an equilibrium mixture is correct?

A The activation energy for the reverse reaction increases. ⬭

B The equilibrium constant for the forward reaction increases. ⬭

C The rate of the reverse reaction increases. ⬭

D The enthalpy change for the forward reaction decreases. ⬭

(Total 1 mark)

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Q15.

Which statement about the molecules in a sample of a gas is correct?

A At a given temperature they all move at the same speed. ⬭

B At a given temperature their average kinetic energy is constant. ⬭

C As temperature increases, there are more molecules with the most probable energy. ⬭

D As temperature decreases, there are fewer molecules with the mean energy. ⬭

(Total 1 mark)

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