

**O Level Pure Chemistry MCQs**

**Energy from Chemicals Test 1.0**

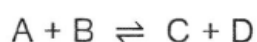
Q1

Which statement about hydrogen as a fuel is correct?

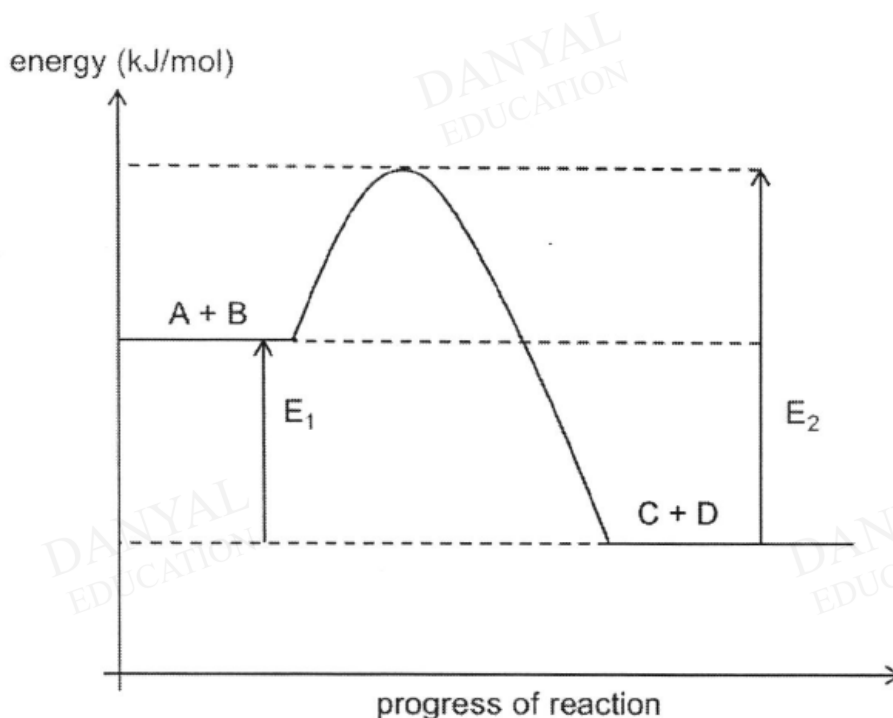
- A Hydrogen can be obtained by fractional distillation of crude oil.
- B Hydrogen is the main component found in natural gas.
- C Hydrogen is a fuel that is easily transported and stored.
- D Hydrogen reacts with oxygen to produce energy and water.

Q2

The equation below represents a reversible reaction.



The energy profile diagram of the reaction shown.



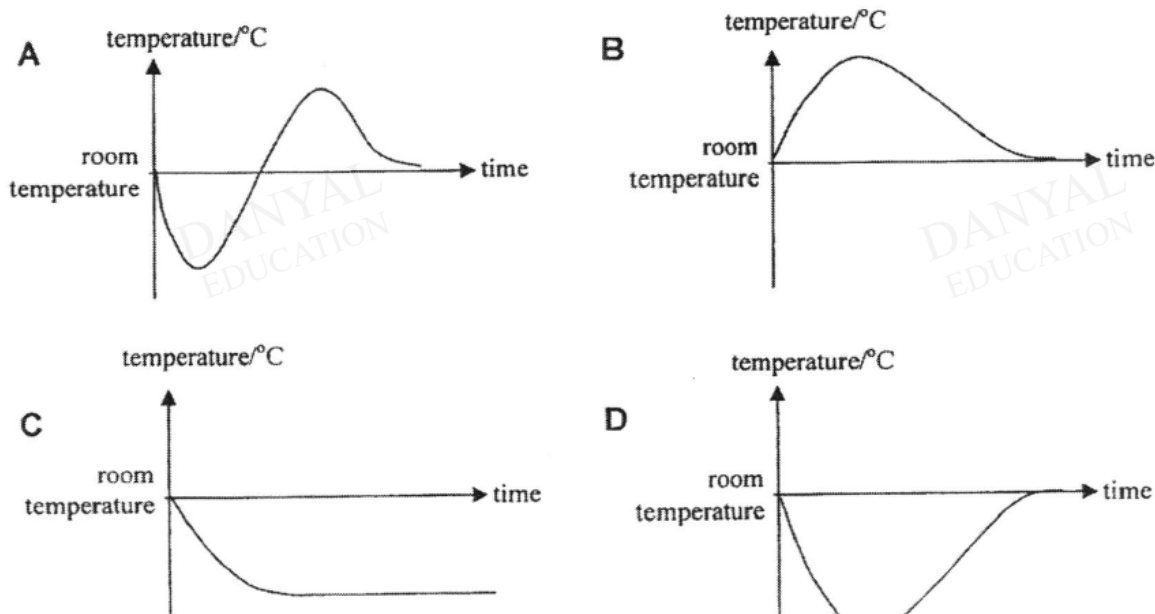
Which statement is correct?

- A  $E_1$  is the enthalpy change of the forward reaction.
- B  $E_2$  is the enthalpy change of the backward reaction.
- C  $(E_2 - E_1)$  is the activation energy of the backward reaction.
- D  $(E_2 - E_1)$  is the activation energy of the forward reaction.

Q3

The process of dissolving potassium iodide in water is endothermic.

Which of the following graphs shows the temperature changes that occur when potassium iodide is stirred with water until no further change in temperature is observed?



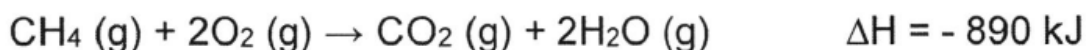
Q4

Which one of the following is an endothermic process?

- A  $\text{C (s)} + \text{O}_2 \text{ (g)} \rightarrow \text{CO}_2 \text{ (g)}$
- B  $\text{HCl (aq)} + \text{NaOH (aq)} \rightarrow \text{NaCl (aq)} + \text{H}_2\text{O (l)}$
- C  $6\text{CO}_2 \text{ (g)} + 6\text{H}_2\text{O (g)} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6\text{ (aq)} + 6\text{O}_2\text{ (g)}$
- D  $\text{H}_2\text{O (g)} \rightarrow \text{H}_2\text{O (l)}$

Q5

The combustion of methane is an exothermic process.

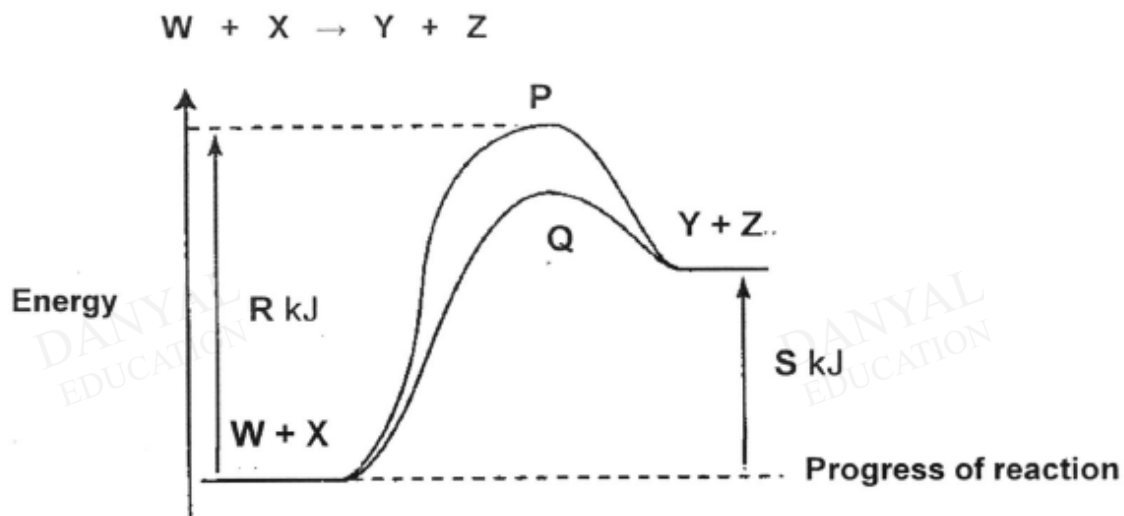


How much methane should be used to produce 2670 kJ of heat?

- A 48 g
- B 64 g
- C 96 g
- D 120 g

Q6

The diagram shows different energy paths, P and Q, and energy levels for a reaction represented by the following equation :



Which of the following conclusions can be made based on the diagram?

- A the temperature of the surrounding increases when Y and Z are formed
- B enthalpy change of the reaction equals  $(R - S)$  kJ/mol
- C more products Y and Z are formed through path Q than through path P
- D the pathway Q is achieved by using a catalyst

Q7

Hydrogen reacts with oxygen forming water according to the equation :



Using the bond energies given below, calculate  $\Delta H$  of the reaction.

Chemical Bond	Bond Energy, kJ/mol
O - H	110
O = O	142
H - H	104

The enthalpy change for the reaction is:

- A  $-440$  kJ/mol
- B  $+90$  kJ/mol
- C  $-350$  kJ/mol
- D  $-90$  kJ/mol

Q8

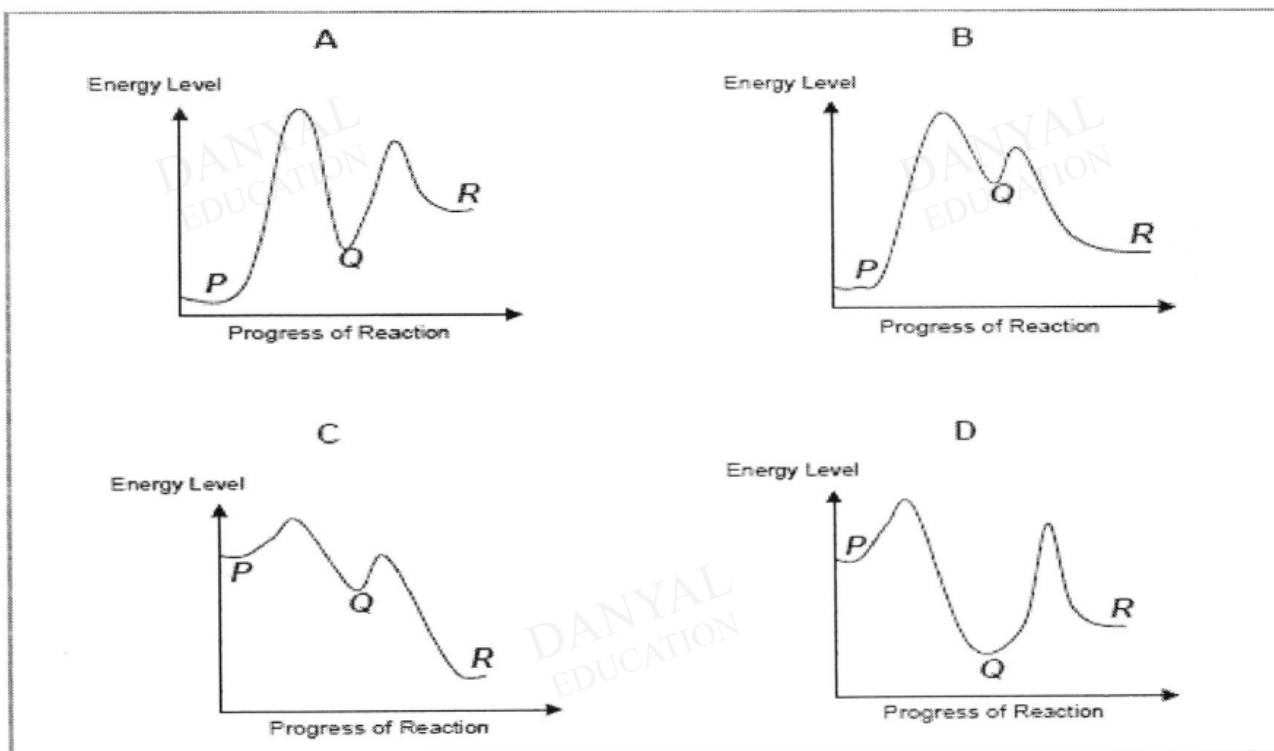
Compound **R** can be produced from Compound **P**, via a 2-stage reaction.

The following stages were involved.

stage 1:  $P \rightarrow Q$ ;  $\Delta H$ , negative

stage 2:  $Q \rightarrow R$ ;  $\Delta H$ , positive

Which reaction profile fits these data?



Refer to the following table to answer questions 21 and 22.

formula	fuel	molar mass/g	density kg/ litre	enthalpy change of combustion / kJ/ mol
CH <sub>4</sub>	methane	16	6.4 X 10 <sup>-4</sup>	- 891
C <sub>2</sub> H <sub>5</sub> OH	ethanol	46	0.79	- 1360
H <sub>2</sub>	hydrogen	2	8.4 X 10 <sup>-5</sup>	- 285
C <sub>8</sub> H <sub>18</sub>	petrol	114	0.69	- 5460

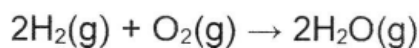
Q9

Which row shows the correct enthalpy change for its process?

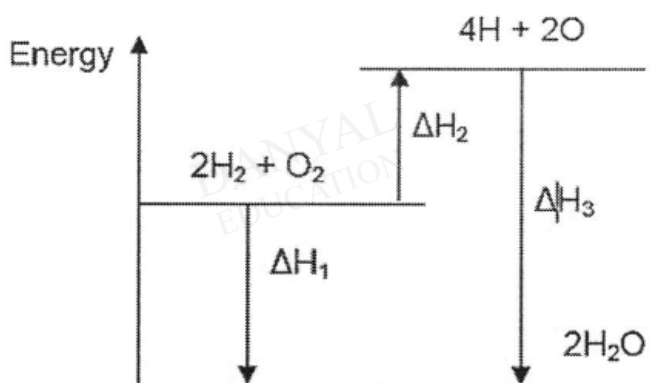
	process	enthalpy change, $\Delta H$
<b>A</b>	$\text{CO}_2(\text{g}) \rightarrow \text{C}(\text{g}) + 2\text{O}(\text{g})$	negative
<b>B</b>	$\text{PbCl}_2 \rightarrow \text{Pb}(\text{s}) + \text{Cl}_2(\text{g})$	positive
<b>C</b>	$\text{C}_2\text{H}_4(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$	positive
<b>D</b>	$\text{N}_2(\text{l}) \rightarrow \text{N}_2(\text{g})$	negative

Q10

Hydrogen and oxygen react to form steam as shown in the equation below.



The following energy level diagram represents this reaction.



Which symbols represent the energy involved in the bond breaking and formation?

	energy involved in bond breaking only / kJ	energy involved in bond formation only / kJ
<b>A</b>	$\Delta H_1$	$\Delta H_2$
<b>B</b>	$\Delta H_1$	$\Delta H_3$
<b>C</b>	$\Delta H_2$	$\Delta H_1$
<b>D</b>	$\Delta H_2$	$\Delta H_3$

**Answers**

**Energy from Chemicals Test 1.0**

Q1 D

Q2 D

Q3 D

Q4 C

Q5 A

Q6 D

Q7 D

Q8 D

Q9 B

Q10 D

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