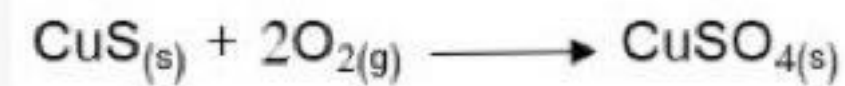


Copper (II) sulfide reacts with oxygen under standard conditions to form copper (II)sulfate as shown in the equation below. Which of the following is correct?

يتفاعل كبريتيد النحاس (II) مع الأكسجين في ظل ظروف قياسية لتكوين كبريتات النحاس (II) كما في المعادلة أدناه. أي مما يأتي صحيح؟



$$\Delta H^0_{\text{rxn}} = -718.3\text{kJ} \quad , \quad \Delta S^0_{\text{rxn}} = -368.0\text{J/K}$$

العملية (تلقائية / غير تلقائية) Process (Spontaneous / Non-Spontaneous)	ΔG^0 (kJ)	
Nonspontaneous غير تلقائية	+727.5	A
Spontaneous تلقائية	-609.0	B
Nonspontaneous غير تلقائية	+571.8	C
Spontaneous تلقائية	-571.8	D

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

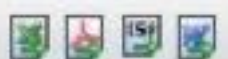
Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	A	6.72% [773]
2	B	72.23% [8306]
3	C	9.67% [1112]
4	D	11.26% [1295]

In the following table, what is the correct equilibrium constant expression for the corresponding reaction?

في الجدول التالي، ما تعبير ثابت الاتزان الصحيح للتفاعل الذي يُقابله؟

تعبير ثابت الاتزان	التفاعل	
$\frac{[H_2][I_2]}{[HI]^2}$	$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$	A
$\frac{[Na_2CO_3][CO_2][H_2O]}{[NaHCO_3]^2}$	$2NaHCO_3(s) \rightleftharpoons Na_2CO_3(s) + CO_2(g) + H_2O(g)$	B
$\frac{[CH_4][H_2O]}{[CO][H_2]^3}$	$CO(g) + 3H_2(g) \rightleftharpoons CH_4(g) + H_2O(g)$	C
$\frac{[CaCO_3]}{[CaO]}$	$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$	D

Question Type: **Multiple Choice** Difficulty Level: **Intermediate** Question Lesson(s): **No specific lesson** Question Marks: **5**

Question Outcome Analysis



#	Answer Option	Responses
1	A	5.5% [633]
2	B	4.96% [570]
3	C	87.57% [10071]
4	D	1.9% [218]

The reaction $2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{3(g)}$ reaches equilibrium. If the equilibrium concentrations are:

$[\text{SO}_2] = 0.0170 \text{ mol / L}$

$[\text{O}_2] = 0.0230 \text{ mol / L}$

K_{eq} is 4.32

التفاعل $2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{3(g)}$ يصل إلى حالة الاتزان، فإذا كانت التراكيز عند الاتزان هي:

$[\text{SO}_2] = 0.0170 \text{ mol / L}$ و $[\text{O}_2] = 0.0230 \text{ mol / L}$

وثابت الاتزان K_{eq} لهذا التفاعل هو 4.32

What is the equilibrium concentration of SO_3 in mol / L

فما تركيز الاتزان لـ SO_3 بوحدة mol / L ؟

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

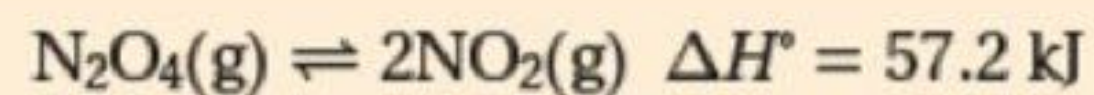
Question Outcome Analysis



#	Answer Option	Responses
1	0.00536	77.08% [8864]
2	0.0411	11.28% [1297]
3	0.6850	6.81% [783]
4	0.9970	4.66% [536]
5	No Response	0.17% [20]

جميع التغيرات التالية تُسبب انزياح الاتزان إلى جهة اليسار في التفاعل
أدناه عدا.....

All the following changes cause the equilibrium to shift
to the left in the reaction below except



Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	Lowering the system temperature	خفض حرارة النظام 8.27% [951]
2	Increasing the pressure	زيادة الضغط 9.23% [1062]
3	Reducing the concentration of N_2O_4	تقليل تركيز N_2O_4 13.15% [1512]
4	Reducing the concentration of NO_2	تقليل تركيز NO_2 69.25% [7964]
5	No Response	0.1% [11]

What is the effect of decreasing the volume of the reaction vessel on the equilibrium systems below?

ما تأثير تقليل حجم وعاء التفاعل على أنظمة الاتزان أدناه؟

$\text{CO(g)} + 3\text{H}_2\text{(g)} \rightleftharpoons \text{CH}_4\text{(g)} + \text{H}_2\text{O(g)}$	1
$\text{H}_2\text{(g)} + \text{Cl}_2\text{(g)} \rightleftharpoons 2\text{HCl(g)}$	2

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis

#	Answer Option	Responses
1	The equilibrium 1 shifts to the right and the total number of gas moles decreases ينزاح الاتزان 1 جهة اليمين ويقل عدد مولات الغاز	68.83% [7915]
2	The equilibrium 2 shifts to the left ينزاح الاتزان 2 جهة اليسار	4.9% [563]
3	The equilibrium 1 shifts to the left and the total number of gas moles increases ينزاح الاتزان 1 جهة اليسار ويزداد عدد مولات الغاز	15.76% [1812]
4	The equilibrium in both 1,2 shifts to the right ينزاح الاتزان في كل من 1 و 2 جهة اليمين	10.37% [1192]
5	No Response	0.16% [18]

If the K_{sp} of calcium hydroxide Ca(OH)_2 is 5.32×10^{-6} at 298 K. What is the solubility of calcium hydroxide in mol/L?

إذا كانت قيمة K_{sp} لهيدروكسيد الكالسيوم Ca(OH)_2 تُساوي 5.32×10^{-6} عند 298 K . فما ذائبية هيدروكسيد الكالسيوم بوحدة ؟ mol/L



Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

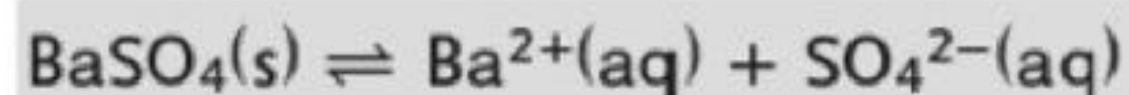
Question Outcome Analysis



#	Answer Option	Responses
1	1.10×10^{-2}	64.6% [7429]
2	1.60×10^{-3}	24.18% [2781]
3	2.80×10^{-7}	6.72% [773]
4	3.30×10^{-8}	4.37% [502]
5	No Response	0.13% [15]

Greater definition is possible in a gastrointestinal X-ray when patients drink a thick mixture containing barium sulfate. What happens when sodium sulfate Na_2SO_4 is added to barium sulfate before it is given to a patient?

يُمكن الحصول على وضوح أعلى لصور الأشعة السينية للجهاز الهضمي عند قيام المرضى بشرب خليط لزج يحتوي على كبريتات الباريوم. ماذا يحدث عندما تتم إضافة كبريتات الصوديوم Na_2SO_4 إلى كبريتات الباريوم قبل إعطائها للمريض؟



Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	The equilibrium shifts to the right and the number (concentration) of the barium ions Ba^{2+} increases	22.89% [2632]
2	The equilibrium shifts to the left and the number (concentration) of the barium ions Ba^{2+} decreases	52.66% [6056]
3	The equilibrium shifts to the right to produce BaSO_4 solid	8.82% [1014]
4	The equilibrium shifts to the left and the number (concentration) of the barium ions Ba^{2+} increases	15.47% [1779]
5	No Response	0.17% [19]

يُوضح الشكل أدناه التفاعل الماص للحرارة التالي عند الاتزان في درجة حرارة الغرفة. ماذا يحدث إذا تم وضع الشورق في حوض به ثلج؟



5

#	Answer Option	Responses
1	The equilibrium shifts to the right and the blue color increases	14.49% [1666]
2	The equilibrium shifts to the left and the pink color increases	67.97% [7816]
3	The equilibrium shifts to the right and the concentration of Cl^- ions increases	7.16% [823]
4	The equilibrium shifts to the left and the concentration of CoCl_4^{2-} ions increases	10.26% [1180]

Which of the enthalpy changes in the following reactions represents a standard heat of formation (ΔH_f°) ?

أي من التغيرات في المحتوى الحراري في التفاعلات التالية يُمثل حرارة تكوين قياسية (ΔH_f°) ؟

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

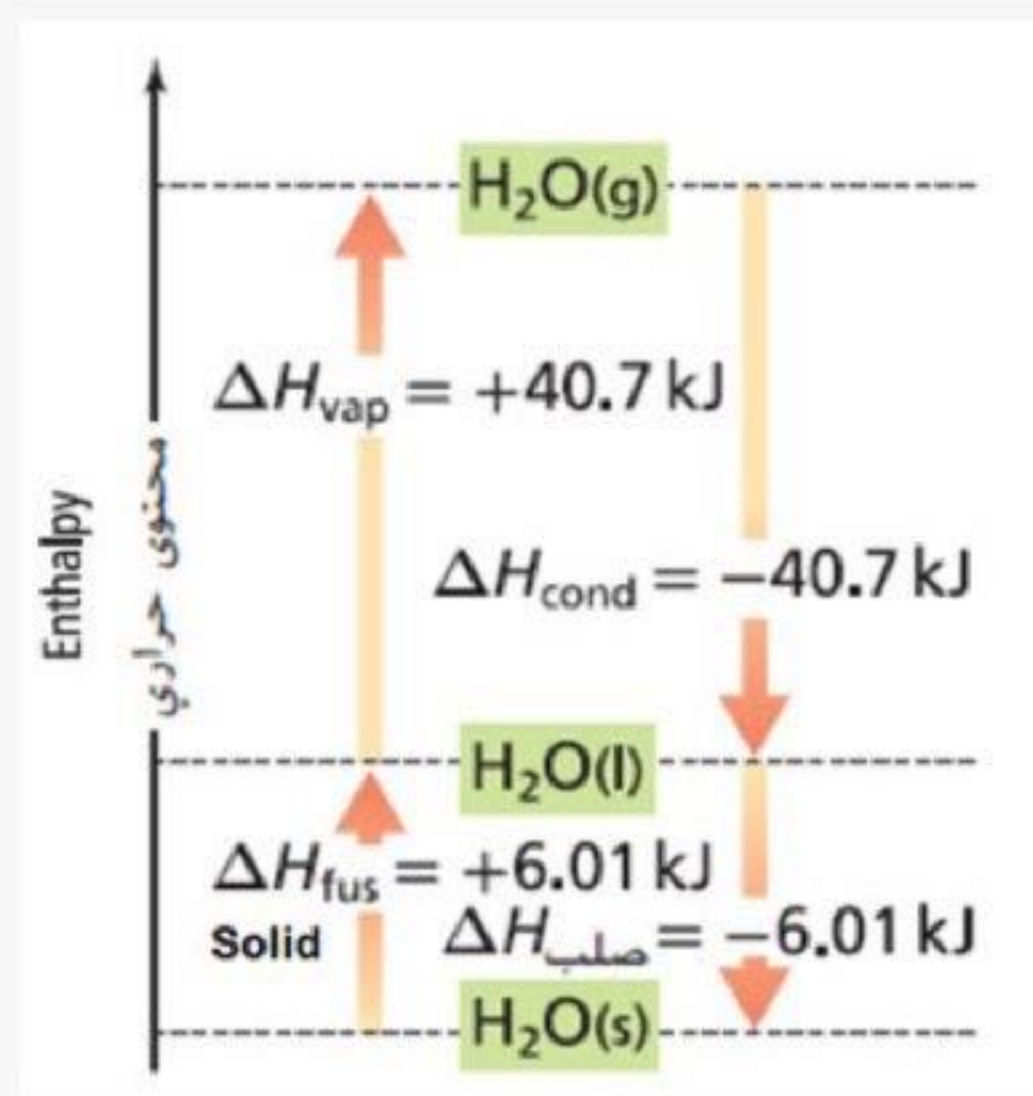
5

Question Outcome Analysis

#	Answer Option	Responses
1	$\frac{1}{2} \text{N}_{2(g)} + \text{O}_{2(g)} \longrightarrow \text{NO}_{2(g)} , \Delta H = +33.2 \text{ kJ}$	61.68% [7093]
2	$\text{CO}_{(g)} + \frac{1}{2} \text{O}_{2(g)} \longrightarrow \text{CO}_{2(g)} , \Delta H = -283 \text{ kJ}$	16.45% [1892]
3	$2\text{S}_{(s)} + 3\text{O}_{2(g)} \longrightarrow 2\text{SO}_{3(g)} , \Delta H = -792 \text{ kJ}$	9.32% [1072]
4	$2\text{Fe}_2\text{O}_{3(s)} \longrightarrow 4\text{Fe}_{(s)} + 3\text{O}_{2(g)} , \Delta H = 1625 \text{ kJ}$	12.37% [1423]
5	No Response	0.17% [20]

Using the figure below, how much heat in (kJ) is required to evaporate 156.1 g of water at 100°C?
(The molar mass of water is 18.02 g/mol)

موظفًا الشكل أدناه، ما كمية الحرارة بوحدة (kJ) اللازمة لتبخير 156.1 g من الماء عند درجة حرارة 100°C؟
(الكتلة المولية للماء تساوي 18.02 g/mol)



Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	353	80.67% [9277]
2	236	8.17% [940]
3	185	5.34% [614]
4	347	5.65% [650]

If an equal volumes of the solutions 0.0322 M CaCl_2 and 0.0145 M NaOH are mixed, a precipitate of Ca(OH)_2 is predicted. Which of the following is true?

إذا تم خلط حجوم متساوية من محلول CaCl_2 تركيزه 0.0322 M ومحلول NaOH تركيزه 0.0145 M يُتوقع أن يتكون راسب من Ca(OH)_2 . أي مما يأتي صحيح؟

Solubility Product Constants at 298 K for the compound Ca(OH)_2 ($K_{sp} = 5.0 \times 10^{-6}$)

ثابت حاصل الإذابة عند 298 K للمركب Ca(OH)_2 هو ($K_{sp} = 5.0 \times 10^{-6}$)

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	$Q_{sp} = 8.5 \times 10^{-7}$ and a precipitate will not form	63.08% [7254]
2	$Q_{sp} = 2.6 \times 10^{-5}$ and a precipitate will form	17.93% [2062]
3	$Q_{sp} = 4.9 \times 10^{-10}$ and a precipitate will form	6.98% [803]
4	$Q_{sp} = 2.5 \times 10^{-4}$ and a precipitate will not form	11.76% [1352]

Which of the following statements is true about the two figures in the table below?

أي العبارات التالية صحيحة فيما يتعلق بالشكلين في الجدول أدناه؟

	
150 Cal	$5.0 \times 10^5 \text{ J}$
Y	X

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis

#	Answer Option	Responses
1	The energy in X is greater than in Y الطاقة في X أكبر منها في Y	19.57% [2251]
2	The energy in Y is greater than in X الطاقة في Y أكبر منها في X	76.19% [8762]
3	The energy in X is 355 Cal الطاقة في X تساوي 355 Cal	1.45% [167]
4	The energy in Y is $3.6 \times 10^5 \text{ J}$ الطاقة في Y تساوي $3.6 \times 10^5 \text{ J}$	2.71% [312]
5	No Response	0.07% [8]

اختلاف طاقة الوضع عن الطاقة الحركية Difference between potential and kinetic energy

Which of the following statements is true about the two figures in the table below?

أي العبارات التالية صحيحة فيما يتعلق بالشكلين في الجدول أدناه؟

	
150 Cal	$5.0 \times 10^5 \text{ J}$
Y	X

The energy in X is greater than in Y

الطاقة في X أكبر منها في Y



The energy in Y is greater than in X

الطاقة في Y أكبر منها في X



The energy in Y is $3.6 \times 10^5 \text{ J}$

الطاقة في Y تساوي $3.6 \times 10^5 \text{ J}$



The energy in X is 355 Cal

الطاقة في X تساوي 355 Cal



Question Description:

If 250 g of ethanol at 75.0°C loses 4655 J of heat,
what is the final temperature of ethanol?
(Specific Heat of ethanol = 2.44 J/ (g. °C)

إذا فقد 250 g من الإيثانول درجة حرارته 75.0°C كمية من الحرارة
مقدارها 4655 J . فما درجة الحرارة النهائية للإيثانول؟
(الحرارة النوعية للإيثانول هي 2.44 J/ (g. °C)

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

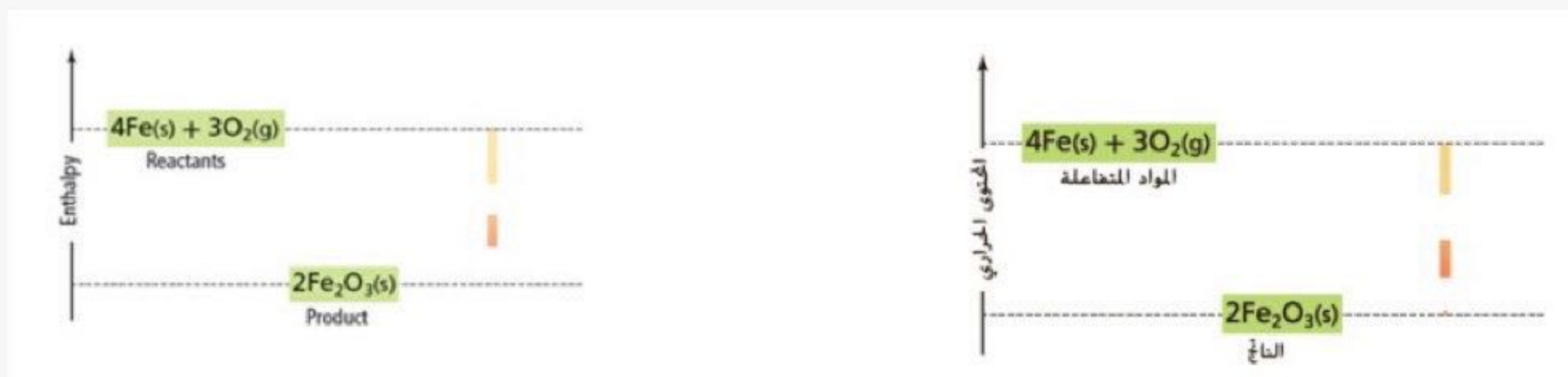
Question Outcome Analysis



#	Answer Option	Responses
1	82.6°C	45.61% [5245]
2	67.4°C	46.48% [5345]
3	59.5°C	2.41% [277]
4	45.8°C	5.43% [624]
5	No Response	0.08% [9]

Which of the following is true regarding the figure below?

أي مما يأتي صحيح فيما يتعلق بالشكل أدناه؟



Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	The reaction is endothermic التفاعل ماص للحرارة	8.7% [1001]
2	This reaction is used in the Cold-Pack يُستخدم هذا التفاعل في الكمادة الباردة	10.77% [1239]
3	This reaction is used in the Heat-Pack يُستخدم هذا التفاعل في الكمادة الساخنة	75.85% [8723]
4	The sign of enthalpy change is positive إشارة التغير في المحتوى الحراري موجبة	4.55% [523]
5	No Response	0.12% [14]

Two pieces of aluminum and iron were left to sit in the Sun at the same time and for the same length of time. What is the mass of the piece of iron (g) whose temperature increases by the same amount as the piece of aluminum?

ثُرِكت قطعتان من الألمنيوم والحديد في الشمس في نفس الوقت ولنفس المدة الزمنية، ما كتلة قطعة الحديد (g) التي تزداد درجة حرارتها بنفس مقدار زيادة درجة حرارة قطعة الألمنيوم؟

المادة Substance	الألمنيوم Aluminium	الحديد Iron
الكتلة Mass	47.0 g	
الحرارة النوعية Specific Heat J/(g. °C)	0.897	0.449
ΔT	30.0° C	30.0° C

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis

#	Answer Option	Responses
1	93.9	83.9% [9648]
2	45.6	5.97% [686]
3	35.5	4.98% [573]
4	53.5	5.08% [584]
5	No Response	0.08% [9]

Which of the data in the following table is correct?

أي من البيانات الواردة في الجدول التالي صحيحة؟

الرقم Number	العملية Process	التغير في المحتوى الحراري The change in enthalpy	إشارة التغير في المحتوى الحراري The sign of the enthalpy change
1	$C_2H_5OH(s) \rightarrow C_2H_5OH(l)$	طاردة للحرارة exothermic	موجبة positive
2	$NH_3(l) \rightarrow NH_3(s)$	ماصة للحرارة endothermic	موجبة positive
3	$CH_3OH(l) \rightarrow CH_3OH(g)$	ماصة للحرارة endothermic	سالبة negative
4	$H_2O(g) \rightarrow H_2O(l)$	طاردة للحرارة exothermic	سالبة negative

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis

#	Answer Option	Responses
1	1 only	5.47% [629]
2	4 only	79.36% [9126]
3	1 , 2	5.14% [591]
4	3 , 4	9.93% [1142]
5	No Response	0.1% [12]

What mass of propane (C₃H₈) in unit (g) is burned to release 9985.5 kJ of heat?

ما كتلة البروبان (C₃H₈) بوحدة (g) التي يتم حرقها لإنتاج 9985.5 kJ من الحرارة؟



The enthalpy (heat) of combustion of propane

(حرارة احتراق البروبان $\Delta H_{\text{comb}}^\circ$ هي -2219 kJ/mol

$$\Delta H_{\text{comb}}^\circ = -2219 \text{ kJ/mol}$$

والكتلة المولية للبروبان 44.097 g/mol)

(Molar mass of propane is 44.097 g/mol)

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

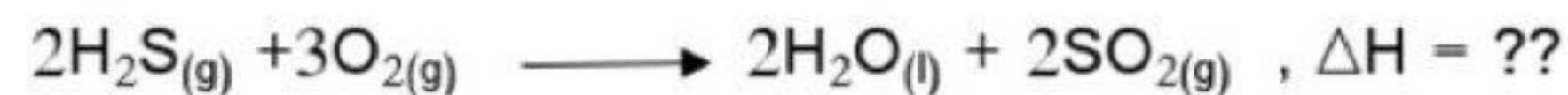
Question Outcome Analysis



#	Answer Option	Responses
1	198.0	81.75% [9401]
2	154.4	5.99% [689]
3	110.3	7.17% [824]
4	66.20	4.9% [564]
5	No Response	0.19% [22]

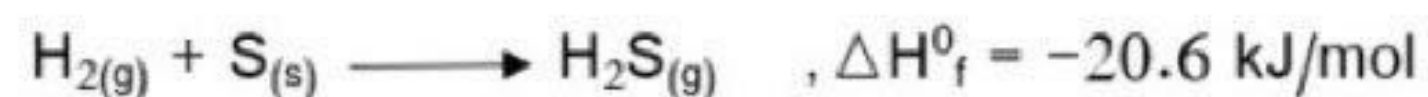
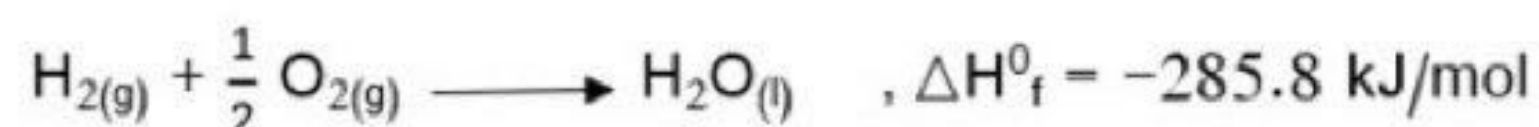
What is the enthalpy change ΔH for the reaction below?

ما مقدار التغير في المحتوى الحراري ΔH للتفاعل أدناه؟



using the following equations:

مُستخدماً المعادلات التالية:



Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	-603.2kJ	12.04% [1385]
2	-562.0kJ	6.4% [736]
3	-1206.4kJ	8.37% [962]
4	-1124 kJ	73.03% [8398]
5	No Response	0.17% [19]

If the enthalpy change of the following reaction
is -1368.4 kJ

إذا كان التغير في المحتوى الحراري للتفاعل التالي

-1368.4 kJ هو



What is the enthalpy of formation of $\text{C}_2\text{H}_5\text{OH}_{(l)}$

فما مقدار حرارة تكوين $\text{C}_2\text{H}_5\text{OH}_{(l)}$

$\text{H}_2\text{O}_{(l)}$	$\text{CO}_{2(g)}$	المادة Substance
-286	-394	ΔH_f° حرارة التكوين القياسية kJ/mol standard enthalpy of formation

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

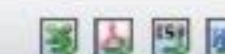
Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	-277.6 kJ/mol	76.3% [8775]
2	-102.1 kJ/mol	8.52% [980]
3	$+142.9 \text{ kJ/mol}$	7.36% [846]
4	$+173.8 \text{ kJ/mol}$	7.57% [871]
5	No Response	0.24% [28]

In which of the following cases does the random motion (entropy) of the particles of the substance increases?

في أي الحالات التالية تزداد الحركة العشوائية (الانتروبي) لجسيمات المادة؟

$\text{CO}_{2(g)} \longrightarrow \text{CO}_{2(aq)}$	1
$2\text{NO}_{2(g)} \longrightarrow \text{N}_2\text{O}_4(g)$	2
$\text{KNO}_{3(s)} \longrightarrow \text{K}^+_{(aq)} + \text{NO}_3^-_{(aq)}$	3
$\text{CH}_3\text{OH}(s) \rightarrow \text{CH}_3\text{OH}(l)$	4

Question Type:

Multiple Choice

Difficulty Level:

Intermediate

Question Lesson(s):

No specific lesson

Question Marks:

5

Question Outcome Analysis



#	Answer Option	Responses
1	1 only	1 فقط 3.76% [432]
2	2 only	2 فقط 7.91% [910]
3	2 , 3	2 و 3 7.92% [911]
4	3 , 4	3 و 4 80.29% [9233]