ضع إجابتك في الجدول الموجود في صفحة الغلاف

1. Calculate the change in internal energy (ΔE or ΔU) in kJ/mol, when 2 moles of CO are converted to 2 moles of CO_2 at 1 atm and 25 °C.

$$2CO\,(g) + O_2\,(g) \longrightarrow 2CO_2\,(g) \qquad \Delta H = -566.0 \text{ kJ/mol}$$

A) 563.5 B) 281.8 C) -281.8 D) -563.5

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2. A 466 g sample of water is heated from 8.50 °C to 74.60 °C. Calculate the amount of heat absorbed (in kilojoules) by the water. Given the specific heat of water as 4.184 J/g °C.

A) 107 B) 129 C) 258 D) 65

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3. The combustion of 1 g of benzoic acid (C_6H_5COOH) in a constant-volume bomb calorimeter releases 26.42 kJ of heat. If the temperature rise is 4.673 °C. What is the heat capacity (C_{cal}) of the calorimeter in kJ/ °C?

A) 5.65 B) 61.73 C) 123.46 D) 2.83

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4. From the enthalpies of reaction

$$H_2\,(g) + F_2\,(g) \longrightarrow 2\,HF\,(g) \qquad \Delta H = -537 \text{ kJ}$$

$$C\,(s) + 2\,F_2\,(g) \longrightarrow CF_4\,(g) \qquad \Delta H = -680 \text{ kJ}$$

$$2\,C\,(s) + 2\,H_2\,(g) \longrightarrow C_2H_4\,(g) \qquad \Delta H = +52.3 \text{ kJ}$$

Calculate ΔH (in kJ)for the reaction of ethylene C_2H_4 with F_2:

$$C_2H_4\,(g) + 6\,F_2\,(g) \longrightarrow 2\,CF_4\,(g) + 4\,HF\,(g)$$

A) -1.25×10^3 B) 2.49×10^3 C) -2.49×10^3 D) 1.25×10^3

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5. From the following data:

$$2\,Al\,(s) + \frac{3}{2}\,O_2\,(g) \longrightarrow Al_2O_3\,(s) \qquad \Delta H_f^o = -1669.8 \text{ kJ/mol}$$

$$2\,Fe\,(s) + \frac{3}{2}\,O_2\,(g) \longrightarrow Fe_2O_3\,(s) \qquad \Delta H_f^o = -822.2 \text{ kJ/mol}$$

Calculate the enthalpy change for the reaction (in kJ/mol):

$$2\,Al\,(s) + Fe_2O_3\,(s) \longrightarrow 2\,Fe\,(s) + Al_2O_3\,(s)$$

A) -2492 B) 847.6 C) -847.6 D) 2492

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6. Calculate the concentration (in mol L^{-1}) of CO_2 in a soft drink that is bottled with a partial pressure of 4.0 atm over the liquid at 25 °C. (The henry's law constant for CO_2 in water at this temperature is 3.4×10^{-2} mol L^{-1} atm^{-1})

A) 0.14 B) 0.56 C) 117.65 D) 8.5×10^{-5}

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7. What is the vapor pressure (in mmHg) of a solution made by dissolving 218 g of glucose ($C_6H_{12}O_6$) in 460 mL of water at 30 °C? (The vapor pressure of water at 30 °C is 31.82 mmHg)

A) 30.4 B) 46.5 C) 52.3 D) 24.8

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8. An aqueous solution contains the amino acid glycine (NH_2CH_2COOH). Assuming that the acid does not ionize in water. Calculate the molality of the solution if it freezes at -1.1 °C. (K_f of water = 1.86 °C/m)

A) 0.35 B) 0.44 C) 0.59 D) 0.22

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9. A solution containing 0.8330 g of a polymer of unknown structure in 0.17 L of an organic solvent was found to have an osmotic pressure of 6.84×10^{-3} atm at 25 °C. What is the molar mass (in g/mol) of the polymer?

A) 3.5×10^4 B) 7×10^4 C) 1.4×10^5 D) 1.75×10^4

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10. The osmotic pressure of a 0.010 M aqueous solution of $CaCl_2$ is found to be 0.674 atm at 25 °C. Calculate the van't Hoff factor, *i*, for the solution.

A) 1.75 B) 2.75 C) 3.0 D) 1.0

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11. The reaction:

$$2\ N_2O_5\ (g) \longrightarrow 4\ NO_2\ (g) + O_2\ (g)$$

If the rate of decomposition of N_2O_5 is $\left(-\frac{\Delta[N_2O_5]}{\Delta t} = 4.2 \times 10^{-7}\right)$. What is the rate of appearance of NO_2? (in M/s)

A) 8.4×10^{-7} B) 16.2×10^{-7} C) 3.3×10^{-6} D) 4.2×10^{-7}

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12. The following data were measured for the reaction of nitric oxide with hydrogen:

$$2\ NO\ (g) + 2\ H_2\ (g) \longrightarrow N_2\ (g) + 2\ H_2O\ (g)$$

Experiment	[NO] (M)	[H_2] (M)	Initial Rate (M/s)
1	0.10	0.10	1.23×10^{-3}
2	0.10	0.20	2.46×10^{-3}
3	0.20	0.10	4.92×10^{-3}

The rate law for this reaction is Rate =

A) $k[NO]^2[H_2]$ B) $k[NO]^2[H_2]^2$ C) $k[NO]^2$ D) $k[NO][H_2]$

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13. A first order reaction has a rate constant of 3×10^{-3} s^{-1}. What is the time (in s) for the reaction to be 75% complete?

A) 426 B) 462 C) 495 D)96

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14. The isomerization of cyclopropane follows first order kinetics. The rate constant at 700 K is 8.2×10^{-4} min^{-1}, and at 789 K the rate constant is 3.2×10^{-2} min^{-1}. Calculate (in kJ) the activation energy for this reaction.

A) 189.05 B) 207.25 C) 228.79 D) 165.12

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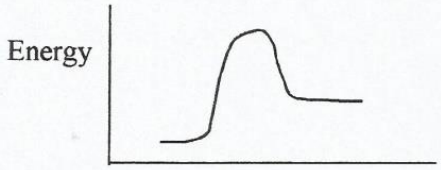
15. For the chemical reaction system described by the diagram below, which statement is true?



A) The activation energy for the forward reaction is greater than the activation energy for the reverse reaction.

B) The activation energy for the reverse reaction is greater than the activation energy for the forward reaction.

C) The activation energy for the forward reaction and the activation energy for the reverse reaction are equal.

D) The forward reaction is exothermic.

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