RAL CHEMISTRY I /جميع الشعب

Time left 0:54:45

Which of the following molecules has a dipole moment?

- a. SO_2
- b. ClCCCCCl
- c. CS_2
- d. HCCH
- e. CCl_4

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(9) S_{O_2}

Time left 0:05:07

Which of the following diatomic molecules has the greatest bond energy?

- a. HCl
- b. Cl_2
- c. CO
- d. HF
- e. H_2

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[2] → C: $\ddot{C}=\ddot{O}$

↳ double bond

Time left 0:33:58

Which of the following is a correct description of lattice energy?

- a. The energy change that occurs when a liquid freezes.
- b. The energy change that occurs when electrons are removed from a lattice.
- c. The energy change that occurs when a gas condenses to a liquid.
- d. The lattice energy of a substance is identical to the ionic bond energy determined from coulombs law.
- e. The energy change that occurs when an ionic solid is separated into its ions in the gas phase.

✔ e

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Time left 0:12:05

How many atoms are present in 495 g of KPF_6?

- a. 1.29×10^{25}
- b. 1.21×10^{26}
- c. 2.69×10^{21}
- d. 1.62×10^{21}
- e. 2.38×10^{25}

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[4] mole = $\frac{495\ g}{184.06\ g/mol}$ = 2.69 mol

no. of atoms = $2.69 \times 6.022 \times 10^{23}$

= 1.62×10^{24}

ERAL CHEMISTRY I /جميع الشعب

Time left 0:49:51

What is the molecular geometry around an atom in a molecule or ion which is surrounded by two lone pairs of electrons and four single bonds.

- a. square pyramidal
- b. bent
- c. square planar
- d. octahedral
- e. linear

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[5] 2 - lone
4 - bonding] → 6 electron pairs

c. Square planar

Time left 0:59:52

A clear colorless liquid in an open beaker was heated to boiling. The liquid began to boil at 110°C, and as vapors escaped, the temperature of boiling gradually increased to 115°C, at which point the heating was stopped. On the basis of this information, we can say that the material in the beaker was a

- a. pure element.
- b. homogeneous solution. ✔ b
- c. heterogeneous solution.
- d. pure compound.
- e. pure substance

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Time left 0:04:22

The following equation represents the oxidation of ammonia, NH_3.
$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$; At the same temperature and pressure, what is the maximum volume of nitrogen monoxide that can be obtained from 7.55×10^2 L of ammonia and 7.55×10^2 L of oxygen?

- a. 6.04×10^2 L
- b. 1.7×10^3 L
- c. 7.55×10^2 L
- d. 1.51×10^3 L
- e. 3.36×10^2 L

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[7] $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$

NH_3: $7.55\times10^{2} \times \frac{4mol}{4mol} = 7.55\times10^{2}$ L of NO

O_2: $7.55\times10^{2} \times \frac{4mol}{5mol} = \underline{\underline{6.04\times10^{2}}}$ L of NO ✓ (a)

Time left 0

Under conditions of constant pressure, for which of the following reactions is the magnitude of pressure-volume work going to be smallest?

- a. $2NO(g) + O_2(g) \rightarrow 2NO_2(g)$
- b. $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$
- c. $2H_2O_2(l) \rightarrow 2H_2O(l) + O_2(g)$
- d. $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$
- e. $BaO(s) + SO_3(g) \rightarrow BaSO_4(s)$

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[8] b: $H_{2(g)} + Cl_{2(g)} \longrightarrow 2\,HCl_{(g)}$

ΔH = zero → no work done

Time left 0:35:35

Which of the following statements is false concerning the reaction of hydrogen gas and oxygen gas given below?

$H_2(g) + 1/2\ O_2(g) \rightarrow H_2O(l)$; $\Delta H = -285.8$ kJ

of

- a. For the reaction $H_2(g) + 1/2\ O_2(g) \rightarrow H_2O(g)$, ΔH is not equal to –285.8 kJ.
- b. The value –571.6 kJ pertains to 1 mol of liquid water.
- c. If the equation is reversed, ΔH becomes +285.8 kJ.
- d. Per mole of O_2, the change in enthalpy is –571.6 kJ.
- e. If the equation is multiplied by 2, ΔH becomes –571.6 kJ.

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[a] $H_2 + 1/2 O_2 \longrightarrow H_2O$, $\Delta H = -285.8\ kJ$

→ For 1 mol of liquid water: $\underline{-285.8\ kJ}$

1 mol of $H_2O_{(L)}$

[b] $= -285.8\ kJ/mol$

Time left 0:17:06

Which molecule or ion has a trigonal pyramidal molecular geometry?

- a. C_2H_4
- b. CH_3^+
- c. CH_3^-
- d. H_2CCO
- e. H_2CO

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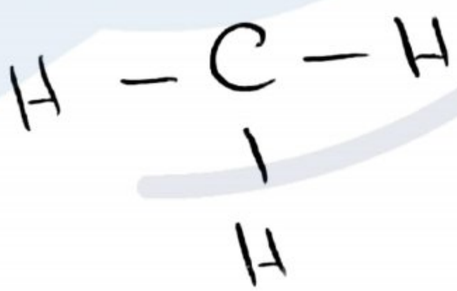
[10] trigonal pyramidal :

CH_3^- :



AL CHEMISTRY I /جميع الشعب

Time left 0:31:52

Which of the following statements is true?

- a. The triple bond in N_2 has a larger bond order and a larger bond length than the single bond in F_2.
- b. The triple bond in N_2 has a smaller bond order and a smaller bond length than the single bond in F_2.
- c. The triple bond in N_2 and the single bond in F_2 have the same bond order and the same bond length.
- d. The triple bond in N_2 has a smaller bond order and a larger bond length than the single bond in F_2.
- e. The triple bond in N_2 has a larger bond order and a smaller bond length than the single bond in F_2.

✔ e

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جميع الشعب/

Time left 0:28:54

Which of the following sets of quantum numbers (n, l, ml, ms) refers to a 3d orbital?

- a. 2 0 0 –1/2
- b. 3 2 1 –1/2
- c. 4 2 –2 +1/2
- d. 5 4 1 –1/2
- e. 4 3 1 –1/2

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[13] 3d → $u = 3$, $L[0, \frac{2}{\vec{J}}]$, $m1[-2, 2]$

$\frac{d}{=}$

b ⌐

Time left 0:24:10

A 5.95 g sample of $AgNO_3$ is reacted with $BaCl_2$ according to the equation; $2AgNO_3(aq) + BaCl_2(aq) \rightarrow 2AgCl(s) + Ba(NO_3)_2(aq)$; to give 4.37 g of AgCl. What is the percent yield of AgCl?

- a. 73.4 %
- b. 87.1 %
- c. 100 %
- d. 58.0 %
- e. 43.5 %

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[14] $2AgNO_3 + BaCl_2 \longrightarrow 2AgCl + Ba(NO_3)_2$

5.95 g 4.37 g

Theoritical yield $\rightarrow \frac{5.95}{169.87} * \frac{2\,mol}{2\,mol} * 143.32 = 5.02\,g$

percent yield $= \frac{4.37\,g}{5.02\,g} * 100\% = 87.05\%$

AL CHEMISTRY I/جميع الشعب

Time left 0:56:53

When the cations Na^+, $K+$, Rb^+, Cs^+ are combined with chloride ion in the gas phase to form ion pairs, which pair formation releases the greatest amount of energy?

- a. All release the same amount of energy.
- b. RbCl
- c. NaCl
- d. CsCl
- e. KCl

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15] Size : $Cs^+ > Rb^+ > Ic^+ > Na^+$

lattice energy : $\underline{\underline{NaCl}} > KCl > RbCl > CsCl$

CV

AL CHEMISTRY I /جميع الشعب

Time left 0:40:25

What volume of ammonia gas, measured at 547.9 mmHg and 27.6°C, is required to produce 8.98 g of ammonium sulfate according to the following balanced chemical equation?

$2NH_3(g) + H_2SO_4(aq) \rightarrow (NH_4)_2SO_4(s)$

- a. 0.000992 L
- b. 1.16 L
- c. 0.00397 L
- d. 18 L
- e. 4.65 L

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[16] $2NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$

$$\text{mol of } (NH_4)_2SO_4 = \frac{8.98}{132.14} = 0.0680 \text{ mol}$$

$$0.0680 \times \frac{2 \text{ mol}}{1 \text{ mol}} = 0.136 \text{ mol of } NH_3$$

$$V_{NH_3} = \frac{0.136 \times 0.0821 \times (27.6 + 273)}{\left(\frac{547.9}{760}\right)}$$

$$V_{NH_3} = 4.65 \text{ L}$$

AL CHEMISTRY I /جميع الشعب

Time left 0:47:50

The concentration of Pb^{2+} in a sample of wastewater is to be determined by using gravimetric analysis. To a 100.0-mL sample of the wastewater is added an excess of sodium carbonate, forming the insoluble lead (II) carbonate according to the balanced equation given below. The solid lead (II) carbonate is dried, and its mass is measured to be 0.1443 g. What was the concentration of Pb^{2+} in the original wastewater sample? Pb^{2+}

$(aq) + Na_2CO_3(aq) \rightarrow PbCO_3(s) + 2Na^+(aq)$

- a. 0.3855 M
- b. 0.001443 M
- c. 185.1 M
- d. 0.00054 M
- e. 0.0054 M

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[17] $Pb^{+2} + Na_2CO_3 \longrightarrow PbCO_3 + 2Na^+$

0.1443 g

$$\frac{0.1443\ g}{267.21\ g/mol} \times \frac{1\ mol}{1\ mol} = 0.000540\ mol\ of\ Pb^{+2}$$

$$M_{Pb^{+2}} = \frac{0.000540}{100 \times 10^{-3}} = 0.0054\ M$$

AL CHEMISTRY I /جميع الشعب

Time left 0:58:29

Which of the following electron configurations represents an excited state of the indicated atom?

- a. Na: $1s^2\ 2s^2\ 2p^6\ 3s^1$
- b. P: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2\ 4s^1$
- c. He: $1s^2$
- d. Ne: $1s^2\ 2s^2\ 2p^6$
- e. N: $1s^2\ 2s^2\ 2p^3$

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[18] $P: 1s^2 2s^2 2p^6 3s^2 3p^2 4s^1$

↳ Valence electron has moved from its ground state orbital (3p) to other higher energy orbital (4s)

Time left 0:27:01

What is the net ionic equation for the reaction that occurs between nitrous acid and barium hydroxide?

- a. $2H^+(aq) + 2NO_2^-(aq) + Ba^{2+}(aq) + 2OH^-(aq) \rightarrow Ba^{2+}(aq) + 2NO_2^-(aq) + 2H_2O(l)$
- b. $HNO_2(aq) + OH^-(aq) \rightarrow NO_2^-(aq) + H_2O(l)$
- c. $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
- d. $2HNO_2(aq) + Ba(OH)_2 \rightarrow Ba(NO_2)_2(aq) + H_2O(l)$
- e. $2H^+(aq) + 2NO_2^-(aq) + Ba^{2+}(aq) + 2OH^-(aq) \rightarrow Ba(NO_2)_2(aq) + H_2O(l)$

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[19] $2HNO_2 + Ba(OH)_2 \longrightarrow Ba(NO_2)_2 + 2H_2O$

$2H^+ + 2NO_2^- + Ba^{+2} + 2OH^- \longrightarrow Ba^{+2} + 2NO_2^- + 2H_2O_{(L)}$

$H^+ + OH^- \longrightarrow H_2O_{(L)}$

AL CHEMISTRY I /جميع الشعب

Time left 0:08:24

A reaction occurs between sodium carbonate and hydrochloric acid, producing sodium chloride, carbon dioxide, and water. Which is the correct set of coefficients, respectively, for the balanced reaction?

- a. 3 1 1 2 2
- b. 3 6 6 3 4
- c. 1 2 2 1 1
- d. 8 6 5 10 5
- e. 5 10 10 5 5

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[20] $Na_2CO_3 + 2HCl \longrightarrow 2NaCl + CO_2 + H_2O$

C : 1 2 2 1 1