Time left 0:06:11

A 110.0-g sample of metal at 82.00°C is added to 110.0 g of $H_2O(l)$ at 27.00°C in an insulated container. The temperature rises to 30.56°C. Neglecting the heat capacity of the container, what is the specific heat of the metal? The specific heat of $H_2O(l)$ is 4.18 J/(g . °C).

- a. 14.4 J/(g . °C)
- b. 4.18 J/(g . °C)
- c. 5.61 J/(g . °C)
- d. 0.289 J/(g . °C)
- e. 60.4 J/(g . °C)

Clear my choice

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[1] $Q_{gaind} = -Q_{lost}$

$S_{mAt} = -S_{mAt}$

$4.18 * 110.0 (30.56 - 27) = -S * 110 (30.56 - 82)$

$S = 0.289 \, J/(g \cdot C^\circ)$ #d

What is the hybridization of Br in BrF_3?

- a. sp^3
- b. sp^3d
- c. sp^3d^2
- d. sp^2
- e. sp

Clear my choice

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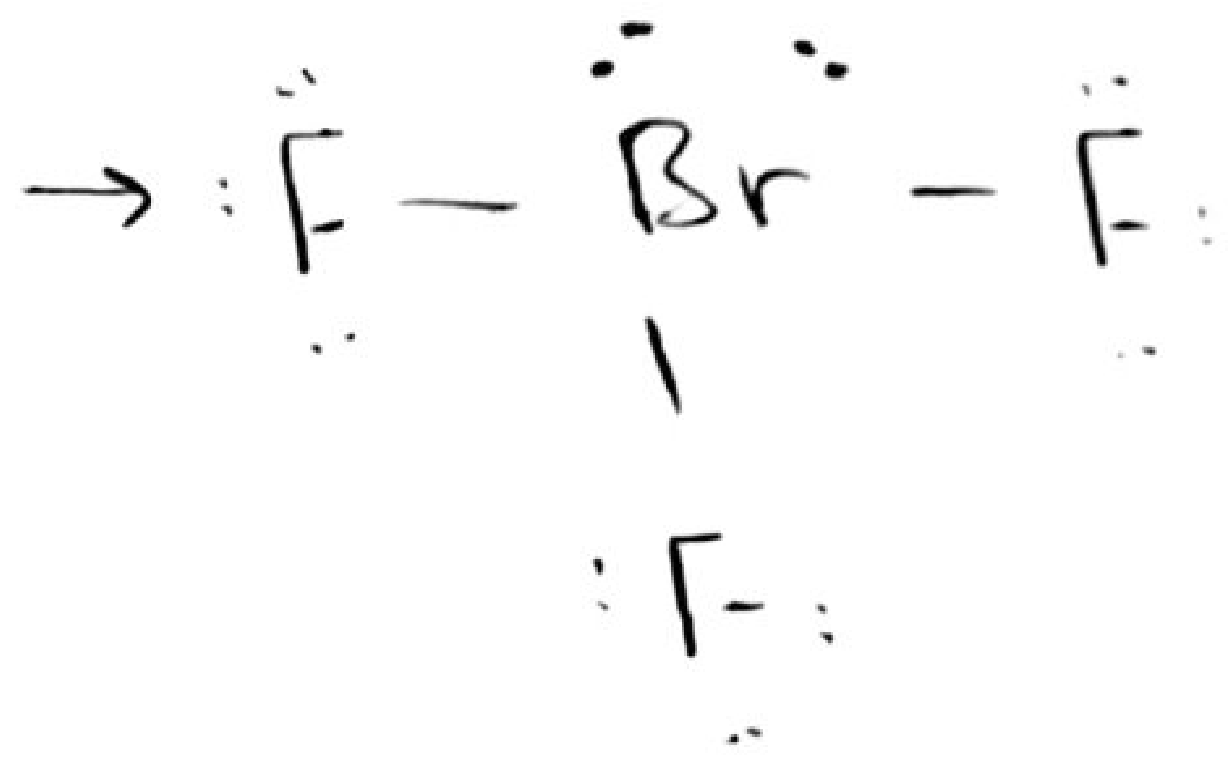
[2] BrF_3 : $v.e^- = 7 + 7 \times 3$

$= 28e^-$

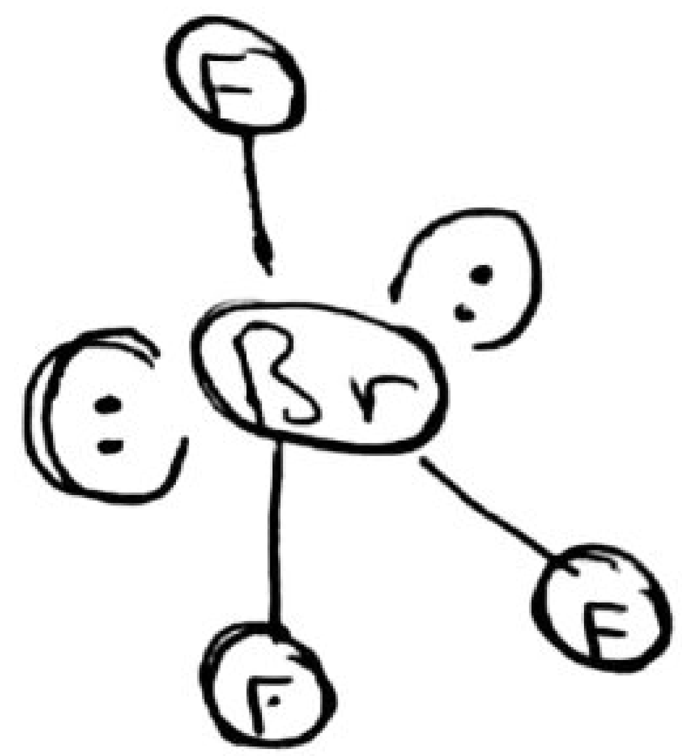
→ 

5 electron pairs :

→ 3 - bonding

→ 2 - lone

T-shape



\# Hybridization :

[sp^3d]

RAL CHEMISTRY I /جميع الشعب

Time left 0:12:50

Consider thiocyanate ion, SCN^-. The formal charges on the sulfur, carbon, and nitrogen atoms are, respectively,

- a. –2, 0, +1.
- b. –1, +1, –1.
- c. –2, +1, 0.
- d. –1, 0, 0.
- e. 0, 0, –1.

Clear my choice

Next page

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[3] SCN^- : $V.\bar{e} = 4+6+5+1e^- = 16e^-$

$\left[:\ddot{S}-C\equiv N: \right]$, $\left[\ddot{S}=C=\ddot{N} \right]$ → more likely

S: $6-6-1/2*2 = -1$

C: $4-0-\frac{1}{2}\times 8 = 0$

N: $5-2-\frac{1}{2}\times 6 = 0$

[ev 0, 0, -1]

S: $6-4-\frac{1}{2}\times 4 = 0$

C: $4-0-\frac{1}{2}\times 8 = 0$

N: $5-4-\frac{1}{2}\times 4 = -1$

* negative formal charge on the more electronegative atom.

L CHEMISTRY I /جميع الشعب

Given the following thermochemical data at 25°C and 1 atm pressure,

$3/2\ O_2(g) + 2B(s) \rightarrow B_2O_3(s)$; $\Delta H^\circ = -1264$ kJ;

$O_3(g) + 2B(s) \rightarrow B_2O_3(s)$; $\Delta H^\circ = -1406$ kJ;

determine ΔH° for the following reaction at 25°C and 1 atm pressure. $3O_2(g) \rightarrow 2O_3(g)$

- a. +284 kJ/mol
- b. –284 kJ/mol
- c. –980 kJ/mol
- d. +980 kJ/mol
- e. –2670 kJ/mol

Clear my choice

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[4]

$$\left(\tfrac{3}{2}O_2 + 2B \longrightarrow B_2O_3 \;,\; \Delta H = -1264\,kJ\right) \times 2$$

$$\left(O_3 + 2B \longrightarrow B_2O_3,\; \Delta H = -1406\,kJ\right) \times -2$$

$$3O_2 \longrightarrow 2O_3 \;,\; \Delta H = 284\,kJ$$

ERAL CHEMISTRY I /جميع الشعب

Time left 0:32:11

One step in the isolation of pure rhodium metal (Rh) is the precipitation of rhodium(III) hydroxide from a solution containing rhodium(III) sulfate according to the following balanced chemical equation: $Rh_2(SO_4)_3(aq) + 6NaOH(aq) \rightarrow 2Rh(OH)_3(s) + 3Na_2SO_4(aq)$. What is the theoretical yield of rhodium(III) hydroxide from the reaction of 0.540 g of rhodium(III) sulfate with 0.209 g of sodium hydroxide?

- a. 0.336 g
- b. 0.168 g
- c. 0.209 g
- d. 0.268 g
- e. 0.749 g

Clear my choice

Next page

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[5] $Rh_2(SO_4)_3 + 6\,NaOH \rightarrow 2\,Rh(OH)_3 + 3\,Na_2SO_4$

$$\frac{0.540}{494} \times \frac{2\,mol}{1\,mol} = 0.00219\ mol\ Rh(OH)_3$$

$$\frac{6.209}{40} \times \frac{2\,mol}{6\,mol} = 0.00174\ mol\ Rh(OH)_3 \rightarrow \text{1.R}$$

$$mass\ of\ Rh(OH)_3 = 0.00174 \times 153.93 = 0.268\ g$$

RAL CHEMISTRY I /جميع الشعب

Time left 0:33:15

What is the mass of NH_3 in a 80.0-cm^3 sample that has a density of 0.92 g/cm^3 and consists of 20% (by mass) NH_3?

- a. 45 g
- b. 20 g
- c. 25 g
- d. 15 g
- e. 74 g

Clear my choice

Next page

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[6] The mass of the Sample = 80 × 0.92

= 73.6 g

$$73.6 * \frac{20}{100} = 14.72 \text{ g of } NH_3$$

RAL CHEMISTRY I /جميع الشعب

Time left 0:40:

An impure sample of benzoic acid is titrated with 0.9855 M NaOH. A 3.412-g sample requires 24.43 mL of titrant to reach the endpoint. What is the percent by mass of benzoic acid in the sample? $C_6H_5COOH(aq) + NaOH(aq) \rightarrow NaC_6H_5COO(aq) + H_2O(l)$

- a. 86.18 %
- b. 2.407 %
- c. 19.71 %
- d. 100 %
- e. 0.01971 %

Clear my choice

Next page

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7] mol of C_6H_5COOH = mol of NaOH

$$M_a V_a = M_b V_b$$

mol of C_6H_5COOH = 0.0241 mol

mass = 0.0241 × 122.12

= 2.94 g

$$\%\, C_6H_5COOH = \frac{2.94}{3.412} \times 100\%$$

= 86.17%

RAL CHEMISTRY I /جميع الشعب

An atom of which of the following elements has the largest ionization energy?

- a. Po
- b. Pb
- c. Cs
- d. At
- e. Bi

✔ d

Clear my choice

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AL CHEMISTRY I /جميع الشعب

Time

Which of the following statements is false?

- a. A sulfide ion has a total of 18 e^-.
- b. A potassium ion has a total of 18 e^-.
- c. The charge on a neutral chlorine atom is zero.
- d. A sodium atom is most likely to ionize to form a cation of charge +1.
- e. A crystal of calcium fluoride has equal numbers of calcium ions and fluoride ions.

✔ e

Clear my choice

Nex

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Time left

Which of the following statements is false?

✔ e

- a. A sulfide ion has a total of 18 e^-.
- b. A potassium ion has a total of 18 e^-.
- c. The charge on a neutral chlorine atom is zero.
- d. A sodium atom is most likely to ionize to form a cation of charge +1.
- e. A crystal of calcium fluoride has equal numbers of calcium ions and fluoride ions.

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ENERAL CHEMISTRY I /عب

Question **4**

Not yet answered

Marked out of 1.0

Flag question

The number of orbitals in a p subshell is

- a. 2.
- b. 3.
- c. 1.
- d. 7.
- e. 5.

Clear my choice

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III

P Sub shell :

P: — — —

[3orbitals]

RAL CHEMISTRY I /جميع الشعب

In ClF_3, the electron pairs are arranged about the chlorine atom in

- a. an octahedron.
- b. a trigonal bipyramid.
- c. a square plane.
- d. a tetrahedron.
- e. a trigonal pyramid.

Clear my choice

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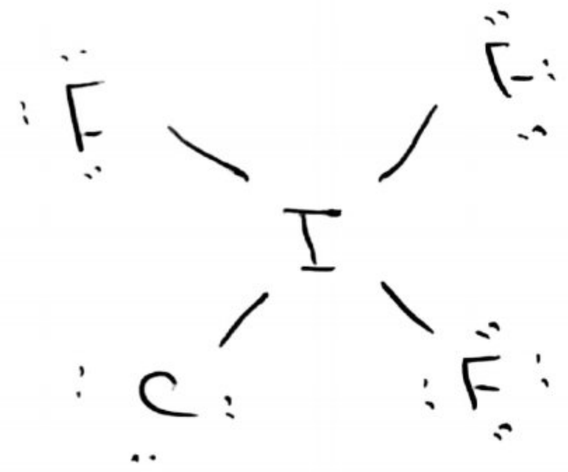
[2] ClF_3: V.e^- = 4 + 7×4
= 32e^- →



4 electron pairs:

4 → bonding → Tetrahedron

RAL CHEMISTRY I /جميع الشعب

Time le

Assign oxidation numbers to each atom in nitrous acid

- a. H = +1, N = +5, O = –1
- b. H = +1, N = +5, O = –2
- c. H = +1, N = +3, O = –1
- d. H = +1, N = +3, O = –2
- e. H = +1, N = +3, O = 0

Clear my choice

Next

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[13] HVO_2

H : +1

O : -2

N : $\therefore = 1 + 2(-2) + X$

d $\qquad X = +3$

RAL CHEMISTRY I /جميع الشعب

Time left 0:43

Based on the following data, what is the bond energy of the C=C bond in 1,1-difluoroethylene, CF_2CH_2?

$CH_4(g) \rightarrow C(g) + 4H(g)$, $\Delta H = 1656$ kJ

$CF_4(g) \rightarrow C(g) + 4F(g)$, $\Delta H = 1756$ kJ

$CF_2CH_2(g) \rightarrow 2C(g) + 2H(g) + 2F(g)$, $\Delta H = 2317$ kJ

- a. 820 kJ/mol
- b. 1703 kJ/mol
- c. 1910 kJ/mol
- d. 845 kJ/mol
- e. 611 kJ/mol

Clear my choice

Next page

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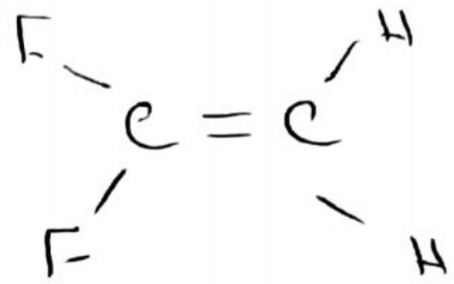
[14] CF_2CH_2



$CF_2CH_2 \longrightarrow 2C + 2H + 2F \quad , \Delta H = 2317$

$\xrightarrow{BE:} (C-H) = \frac{1}{4} * 1656\ kJ = 414$

$BE: (C-F) = \frac{1}{4} * 1756\ kJ = 439$

$\longrightarrow 2 * 439 + 2 * 414 + BE(C=C) = 2317$

$[\ BE(C=C) = 611\ kJ/mol\ ]$

RAL CHEMISTRY I /جميع الشعب

How many valence electrons does a carbonate ion have?

- a. 32
- b. 22
- c. 28
- d. 30
- e. 24

Clear my choice

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15] CO_3^{-2}

C: $[He]\,2s^2\,2p^2 \rightarrow 4\ V.\bar{e}$

O: $[He]\,2s^2\,2p^4 \rightarrow 6\ V.\bar{e}$

$2\bar{e}$: For the -2 charge

[4 + 3×6 + 2 = 24 valance electrons]

Time left 0:27:01

If 49.0 g of O_2 is mixed with 49.0 g of H_2 and the mixture is ignited, what is the maximum mass of water that may be produced?

- a. 98 g
- b. 49.0 g
- c. 55.1 g
- d. 441 g
- e. 87.1 g

Clear my choice

Next page

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17 $H_2 + 1/2\,O_2 \longrightarrow H_2O$

$$\frac{49.0}{2} \times \frac{1\,mol}{1\,mol} = 24.5\ mol\ of\ H_2O$$

$$\frac{49.0}{32} \times \frac{1\,mol}{1/2\,mol} = 3.06\ mol\ of\ H_2O \longrightarrow 1.R$$

$$mass\ of\ H_2O = 3.06 \times 18$$

$$= 55.1\ g \qquad \subseteq$$

Time left 0:21:23

An atom of which of the following elements has the highest fourth ionization energy?

- a. Si
- b. Se
- c. As
- d. Ga
- e. Al

Clear my choice

Next page

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18] Al : [Ne] $3s^2\ 3p^1$

X

→ You need a huge energy to remove the fourth electron, because this electron is coming from the electron core.