

Technology Enhanced Questions

Directions: On your school issued laptop/Chromebook, log into TestNav. Do not sign into TestNav. Click on *SOL Practice Items*. Select *Science*. Select *Chemistry*. Click *Start*. Check the *I agree* box. Click *Continue*. Click *Start*.

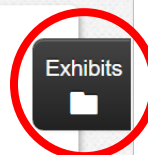
Toolbar

← → Review Bookmark [Mouse cursor] [Eraser] [Pencil] [Calculator] A. Guest [User icon]

CHEMISTRY PRACTICE ITEMS / SECTION 1 / 1 OF 27

Calculated Density Values for $\text{Ca}(\text{CHO}_2)_2$

Trial	Density (g/mL)
1	1.87
2	1.94
3	1.92



Click  to Access the Periodic Table

***Note you must click on the element symbol to see its information.**

Exhibits x

Periodic Table

Atomic Mass: 1.00794
Symbol: H
Atomic Number: 1
Name: Hydrogen

Group	1	2	Transition Elements										13	14	15	16	17	18
1	H 1																He 2	
2	Li 3	Be 4										B 5	C 6	N 7	O 8	F 9	Ne 10	
3	Na 11	Mg 12										Al 13	Si 14	P 15	S 16	Cl 17	Ar 18	
4	K 19	Ca 20	Sc 21	Ti 22	V 23	Cr 24	Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30	Ga 31	Ge 32	As 33	Se 34	Br 35	Kr 36
5	Rb 37	Sr 38	Y 39	Zr 40	Nb 41	Mo 42	Tc 43	Ru 44	Rh 45	Pd 46	Ag 47	Cd 48	In 49	Sn 50	Sb 51	Te 52	I 53	Xe 54
6	Cs 55	Ba 56	La 57	Hf 72	Ta 73	W 74	Re 75	Os 76	Ir 77	Pt 78	Au 79	Hg 80	Tl 81	Pb 82	Bi 83	Po 84	At 85	Rn 86
7	Fr 87	Ra 88	Ac 89	Rf 104	Db 105	Sg 106	Bh 107	Hs 108	Mt 109	110								

Lanthanoid Series: Ce 58, Pr 59, Nd 60, Pm 61, Sm 62, Eu 63, Gd 64, Tb 65, Dy 66, Ho 67, Er 68, Tm 69, Yb 70, Lu 71

Metals ← Nonmetals

1. **Directions: Type your answer in the box.**

Calculate the atomic mass of the theoretical element using the data in the table. Your answer must be rounded to the nearest tenth.

Isotope Data for a Theoretical Element

Naturally Occurring Isotope	Mass Number	Relative Abundance
1	10	92%
2	11	6.5%
3	13	1.5%

2. **Directions: Drag each electron spin arrow to the appropriate box. You must place all spins in the correct order. Each arrow may be used more than one time.**

Write the orbital notation for silicon (Si) at the ground state.

4s

3p

3s

2p

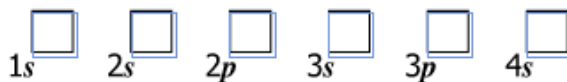
2s

1s

Electron Spins

3. **Directions: Drag a superscripts to the correct box. Each superscript may be used more than one time. Some boxes may be empty.**

Complete the electron configuration for argon (Ar) at the ground state.

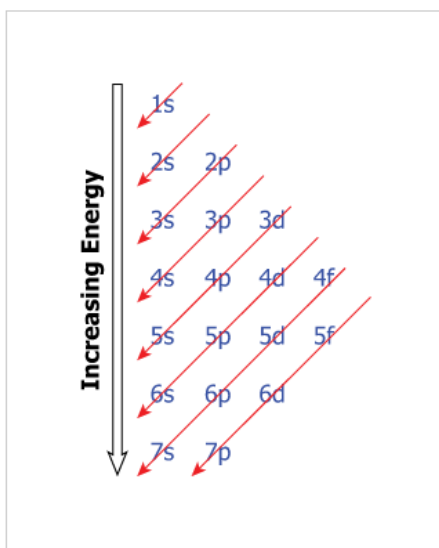


4. **Directions: Type your answer in the box. Use “+” or “-” for the electrical charge.**

What is the oxidation number of a fluoride ion?

5. **Directions: Type your answer in the box.**

How many electrons are needed to completely fill the orbitals from 1s to 4p?
Your answer must be a whole number.



Electrons

6. What is the electron configuration of scandium (Sc) in $\text{Sc}(\text{NO}_3)_3$?

- A. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$
- B. $1s^2 2s^2 2p^6 3s^2 3p^6$
- C. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
- D. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$

7. **Directions: Select the correct answer.**

Select the column in which all elements exist as diatomic molecules at room temperature.

6 C	7 N	8 O	9 F	10 Ne
14 Si	15 P	16 S	17 Cl	18 Ar
32 Ge	33 As	34 Se	35 Br	36 Kr
50 Sn	51 Sb	52 Te	53 I	54 Xe

8. Directions: Drag the correct answers to the box.

What is the name of the compound PbO_2 according to IUPAC rules?

The chemical name is .

dilead

oxide

tetralead

oxygen

lead(II)

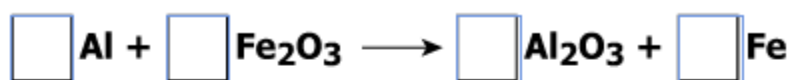
dioxide

lead(IV)

tetraoxide

9. Directions: Drag a coefficient to each box. Each box must have a coefficient. Each coefficient may be used more than one time.

Use the lowest possible coefficients to balance this chemical equation.



1

2

3

4

5

6

7

8

9

10. Directions: Select all the correct answers.

A change in which of these could affect the chemical equilibrium of a closed system?

Concentration

Pressure

Catalyst

Volume

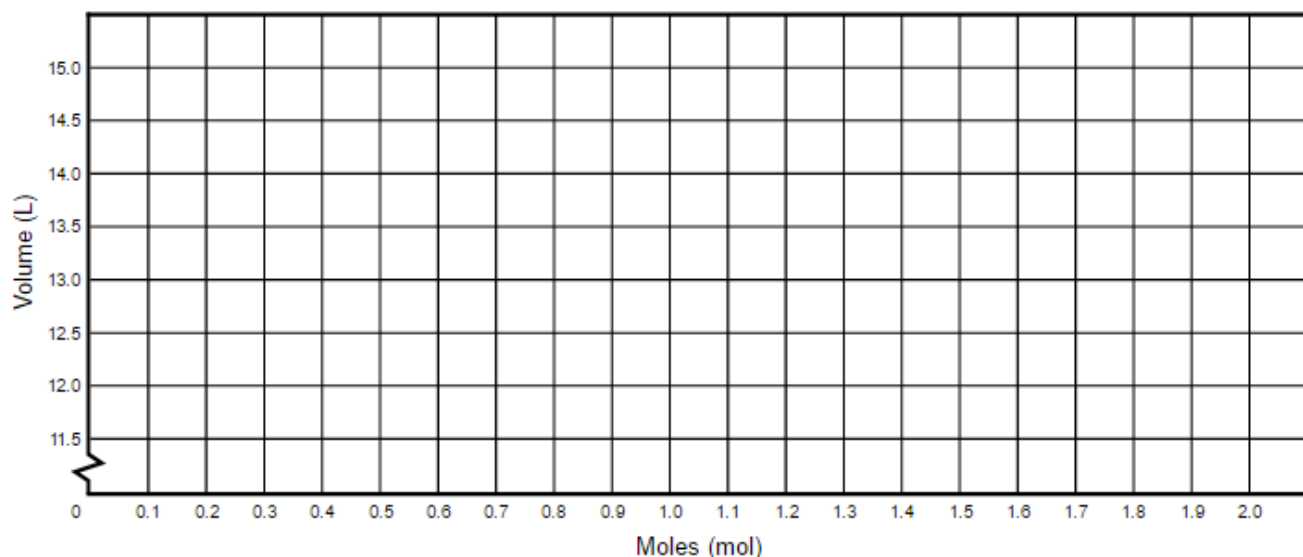
Temperature

Directions: Plot a point on the grid. Line segments will connect the points.

Plot two points to form a line from the data set that correctly shows the relationship between volume and moles of an ideal gas at STP.

11.

Relationship Between Volume and Moles of an Ideal Gas at STP



Data Set A

Volume (L)	Approximate Moles (mol)
12	1.1
15	1.3

Data Set B

Volume (L)	Approximate Moles (mol)
12	1.9
15	1.5

Data Set C

Volume (L)	Approximate Moles (mol)
12	0.5
15	0.7

Properties of CH₂Cl₂

Heat of Fusion	Heat of Vaporization
4.60 $\frac{\text{kJ}}{\text{mol}}$	28.06 $\frac{\text{kJ}}{\text{mol}}$

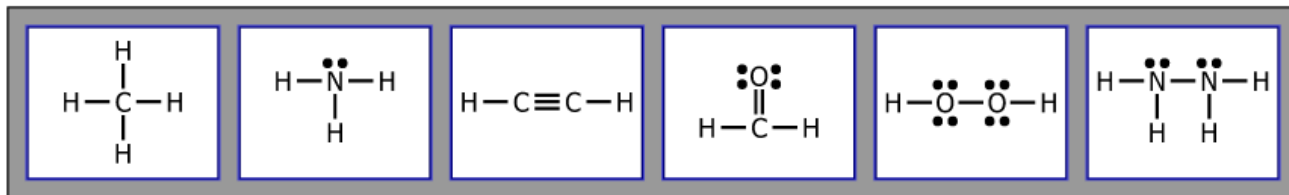
12.

Applying 7.80 kJ of heat melts what mass of solid CH₂Cl₂ at its melting point?

- A. 23.6 g
- B. 50.1 g
- C. 144 g
- D. 306 g

13. **Directions: Select all the correct answers.**

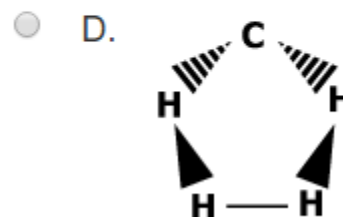
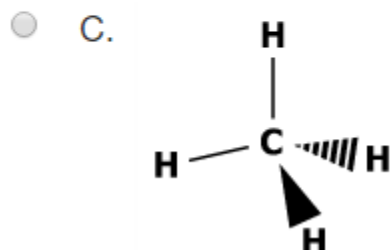
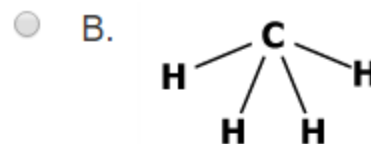
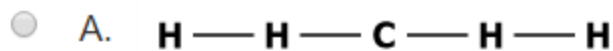
Which of these are organic compounds?



14. Which formula represents a molecule with fully saturated carbon (C) atoms?

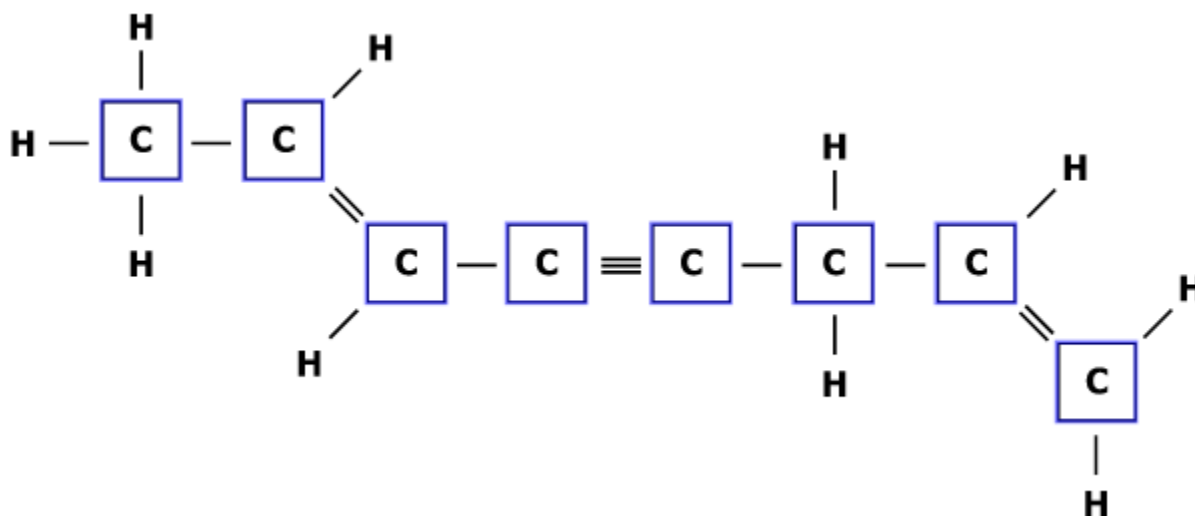
- A. $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \\ \text{H}-\text{C}-\text{C}=\text{C} \\ | \quad | \\ \text{H} \quad \text{H} \end{array}$
- B. $\begin{array}{c} \text{H} \quad \text{H} \quad \text{O} \\ | \quad | \quad || \\ \text{H}-\text{C}-\text{C}-\text{C} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
- C. $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
- D. $\begin{array}{c} \text{H} \quad \text{H} \quad \text{O} \\ | \quad | \quad || \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{H} \\ | \quad | \\ \text{H} \quad \text{H} \end{array}$

15. Which geometric structure most accurately illustrates the shape of a molecule of CH₄?



16. Directions: Select the correct answers.

Select three of the carbon (C) atoms that make this theoretical molecule unsaturated.



17. Directions: Select all the correct answers.

Which of these polymers are naturally occurring?

Nylon	Protein	Polyester	Teflon	DNA
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18. Which statement describes how plastics differ from nucleic acids?

- A. Plastics are synthetic polymers, but nucleic acids are natural polymers.
- B. Plastics are formed from repeated subunits, but nucleic acids are not.
- C. Plastics are formed from organic compounds, but nucleic acids are not.
- D. Plastics are polymers, but nucleic acids are monomers.