

The symbol for an element is being changed to “Ah.”  
 If the valence electron configuration for its homonuclear diatomic molecule ( $Ah_2$ ) is  $(\sigma 2s)^2(\sigma 2s^*)^2 \pi 2p_x \pi 2p_y$   
 the element's current symbol is:

1. Li
2. Be
3. B
4. C
5. N
6. O
7. F

## Periodic Table of Elements

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																
1	<b>H</b> Hydrogen 1.00794																		2	<b>He</b> Helium 4.002602															
3	<b>Li</b> Lithium 6.941	4	<b>Be</b> Beryllium 9.012182																	10	<b>Ne</b> Neon 20.1797														
5	<b>Na</b> Sodium 22.98976928	6	<b>Mg</b> Magnesium 24.3050																	18	<b>Ar</b> Argon 39.948														
7	<b>K</b> Potassium 39.0983	8	<b>Ca</b> Calcium 40.078	21	<b>Sc</b> Scandium 44.955912	22	<b>Ti</b> Titanium 47.887	23	<b>V</b> Vanadium 50.9415	24	<b>Cr</b> Chromium 51.9961	25	<b>Mn</b> Manganese 54.938045	26	<b>Fe</b> Iron 55.845	27	<b>Co</b> Cobalt 58.933195	28	<b>Ni</b> Nickel 58.6934	29	<b>Cu</b> Copper 63.546	30	<b>Zn</b> Zinc 65.39	31	<b>Ga</b> Gallium 69.723	32	<b>Ge</b> Germanium 72.64	33	<b>As</b> Arsenic 74.92160	34	<b>Se</b> Selenium 78.96	35	<b>Br</b> Bromine 79.904	36	<b>Kr</b> Krypton 83.798
9	<b>Rb</b> Rubidium 85.4678	10	<b>Sr</b> Strontium 87.62	39	<b>Y</b> Yttrium 88.90585	40	<b>Zr</b> Zirconium 91.224	41	<b>Nb</b> Niobium 92.90638	42	<b>Mo</b> Molybdenum 95.94	43	<b>Tc</b> Technetium (97.9072)	44	<b>Ru</b> Ruthenium 101.07	45	<b>Rh</b> Rhodium 102.90550	46	<b>Pd</b> Palladium 106.42	47	<b>Ag</b> Silver 107.8682	48	<b>Cd</b> Cadmium 112.411	49	<b>In</b> Indium 114.818	50	<b>Sn</b> Tin 118.710	51	<b>Sb</b> Antimony 121.760	52	<b>Te</b> Tellurium 127.60	53	<b>I</b> Iodine 126.90447	54	<b>Xe</b> Xenon 131.293
11	<b>Cs</b> Cesium 132.9054519	12	<b>Ba</b> Barium 137.327	57-71	<b>Hf</b> Hafnium 178.49	72	<b>Ta</b> Tantalum 180.94788	73	<b>W</b> Tungsten 183.84	74	<b>Re</b> Rhenium 186.207	75	<b>Os</b> Osmium 190.23	76	<b>Ir</b> Iridium 192.222	77	<b>Pt</b> Platinum 195.084	78	<b>Au</b> Gold 196.966569	79	<b>Hg</b> Mercury 200.59	80	<b>Tl</b> Thallium 204.3833	81	<b>Pb</b> Lead 207.2	82	<b>Bi</b> Bismuth 208.98040	83	<b>Po</b> Polonium (209)	84	<b>At</b> Astatine (210)	85	<b>Rn</b> Radon (222)	86	<b>Rn</b> Radon (222)
13	<b>Fr</b> Francium (223)	14	<b>Ra</b> Radium (226)	89-103	<b>Rf</b> Rutherfordium (261)	104	<b>Db</b> Dubnium (262)	105	<b>Sg</b> Seaborgium (266)	106	<b>Bh</b> Bohrium (264)	107	<b>Hs</b> Hassium (277)	108	<b>Mt</b> Meitnerium (268)	109	<b>Ds</b> Darmstadtium (271)	110	<b>Rg</b> Roentgenium (272)	111	<b>Cn</b> Copernicium (285)	112	<b>Uub</b> Ununbium (284)	113	<b>Uut</b> Ununtrium (288)	114	<b>Uuq</b> Ununquadium (289)	115	<b>Uup</b> Ununpentium (288)	116	<b>Uuh</b> Ununhexium (289)	117	<b>Uus</b> Ununseptium (288)	118	<b>Uuo</b> Ununoctium (284)
																				For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.															
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		57	<b>La</b> Lanthanum 138.90547	58	<b>Ce</b> Cerium 140.118	59	<b>Pr</b> Praseodymium 140.90765	60	<b>Nd</b> Neodymium 144.242	61	<b>Pm</b> Promethium (145)	62	<b>Sm</b> Samarium 150.36	63	<b>Eu</b> Europium 151.964	64	<b>Gd</b> Gadolinium 157.25	65	<b>Tb</b> Terbium 158.92535	66	<b>Dy</b> Dysprosium 162.500	67	<b>Ho</b> Holmium 164.93032	68	<b>Er</b> Erbium 167.259	69	<b>Tm</b> Thulium 168.93421	70	<b>Yb</b> Ytterbium 173.054	71	<b>Lu</b> Lutetium 174.967				
		89	<b>Ac</b> Actinium (227)	90	<b>Th</b> Thorium 232.03806	91	<b>Pa</b> Protactinium 231.03688	92	<b>U</b> Uranium 238.02891	93	<b>Np</b> Neptunium (237)	94	<b>Pu</b> Plutonium (244)	95	<b>Am</b> Americium (243)	96	<b>Cm</b> Curium (247)	97	<b>Bk</b> Berkelium (247)	98	<b>Cf</b> Californium (251)	99	<b>Es</b> Einsteinium (252)	100	<b>Fm</b> Fermium (257)	101	<b>Md</b> Mendelevium (258)	102	<b>No</b> Nobelium (259)	103	<b>Lr</b> Lawrencium (262)				


**C** Solid  
**Hg** Liquid  
**H** Gas  
**Rf** Unknown

**Metals**

Alkali metals  
Alkaline earth metals  
Lanthanoids  
Actinoids

**Nonmetals**

Transition metals  
Poor metals  
Other nonmetals  
Noble gases



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 If the valence electron configuration for its homonuclear diatomic molecule ( $Ah_2$ ) is  $(\sigma 2s)^2(\sigma 2s^*)^2 \pi 2p_x \pi 2p_y$   
 the element’s current symbol is:

- 10% 1. Li
- 8% 2. Be
- 55%  3. B
- 14% 4. C
- 5% 5. N
- 6% 6. O
- 1% 7. F

## Periodic Table of Elements

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18										
		Atomic #																											
		Gas																		2 He 4.002602									
		Unknown																		10 Ne 18.9984032									
11 Na 22.98976928	12 Mg 24.3050																	9 F 18.9984032	18 Ar 39.948										
19 K 39.0983	20 Ca 40.078	21 Sc 44.955912	22 Ti 47.887	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938045	26 Fe 55.845	27 Co 58.933195	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.64	33 As 74.92160	34 Se 78.96	35 Br 79.904	36 Kr 83.798												
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (97.9072)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.293												
55 Cs 132.9054519	56 Ba 137.327	57-71		72 Hf 178.49	73 Ta 180.94788	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.222	78 Pt 195.084	79 Au 196.966569	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.98040	84 Po (209)	85 At (209)	86 Rn (222)											
87 Fr (223)	88 Ra (226)	89-103		104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111 Rg (272)	112 Uub (285)	113 Uut (284)	114 Uuq (289)	115 Uup (288)	116 Uuh (289)	117 Uus (289)	118 Uuo (284)											
For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.																													
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57 La 138.90547	58 Ce 140.118	59 Pr 140.90765	60 Nd 144.242	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92535	66 Dy 162.500	67 Ho 164.93032	68 Er 167.259	69 Tm 168.93421	70 Yb 173.054	71 Lu 174.967	89 Ac (227)	90 Th 232.03806	91 Pa 231.03688	92 U 238.02891	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

If  $\Delta G_f^\circ < 0$ , a compound is  

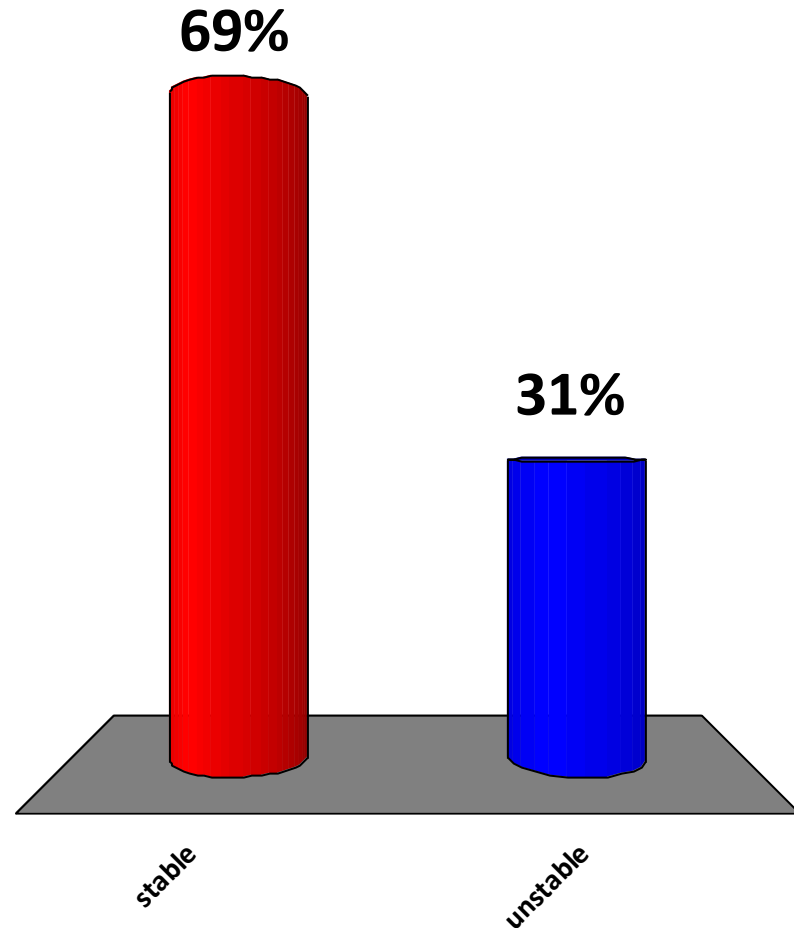
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relative to its elements.

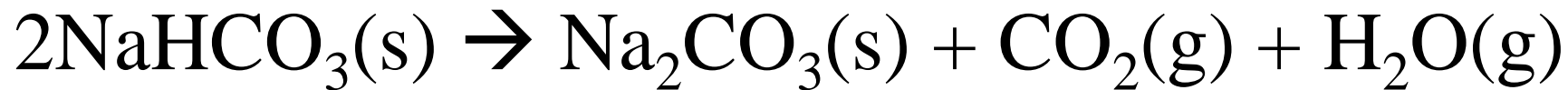
1. stable
2. unstable

If  $\Delta G_f^\circ < 0$ , a compound is  
\_\_\_\_\_ relative to its elements.

- ✓ 1. stable
- 2. unstable

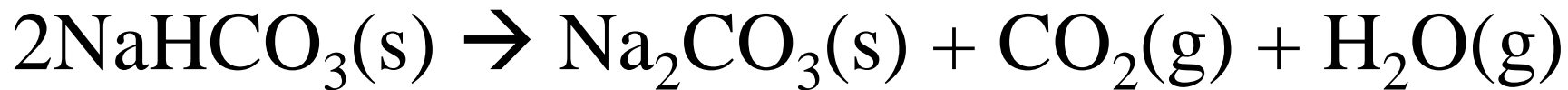


Predict the  $\Delta S$  value for



1.  $\Delta S = 0 \text{ kJ/ K mol}$
2.  $\Delta S = +0.334 \text{ kJ/K mol}$
3.  $\Delta S = -334 \text{ kJ/K mol}$

Predict the  $\Delta S$  value for



4%

1.  $\Delta S = 0 \text{ kJ/ K mol}$

87%



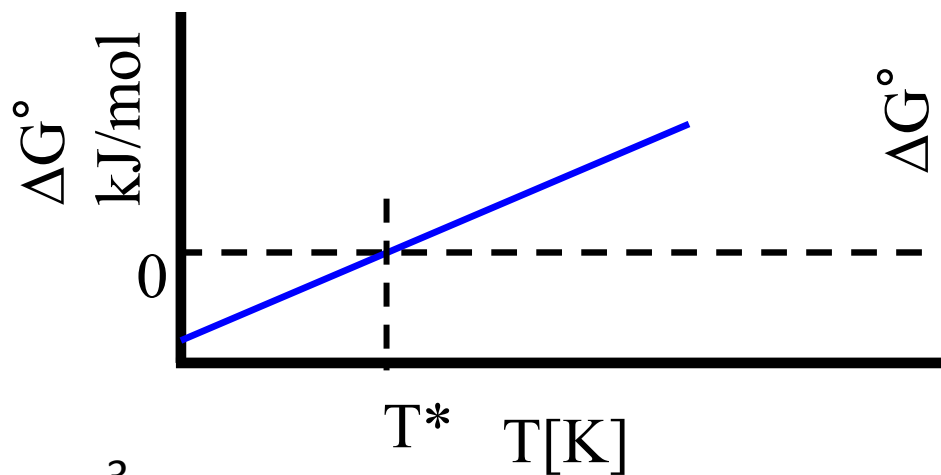
2.  $\Delta S = +0.334 \text{ kJ/K mol}$

10%

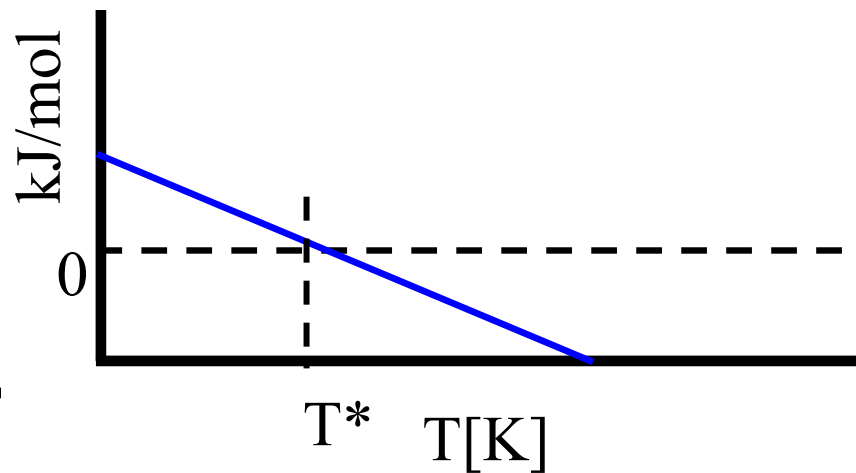
3.  $\Delta S = -334 \text{ kJ/K mol}$

Which is a possible plot if both  $\Delta H$  and  $\Delta S$  are negative?

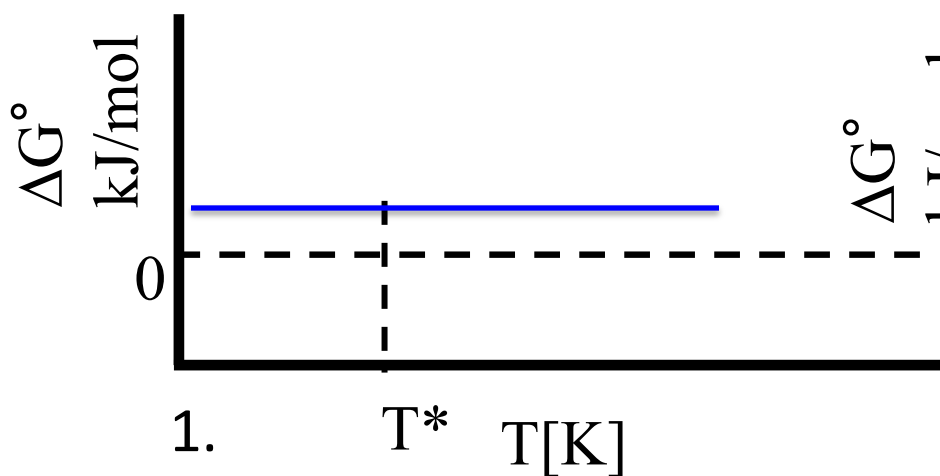
1.



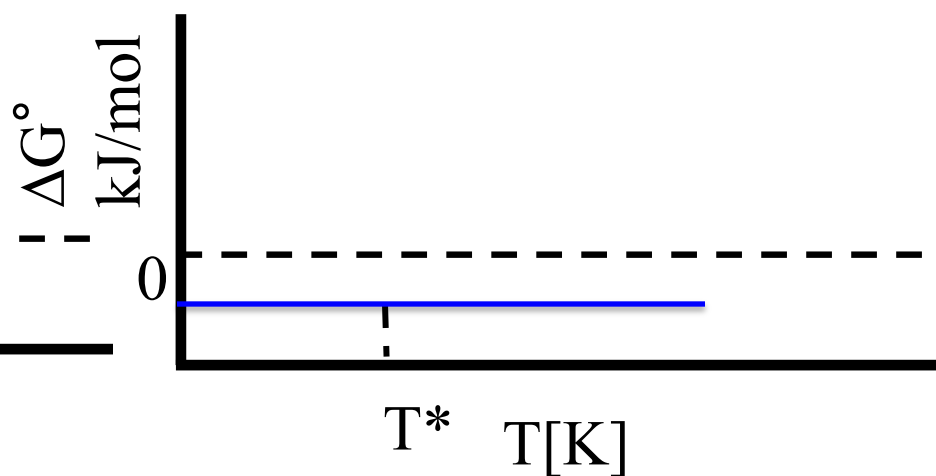
2.



3.



4.



1.

2.

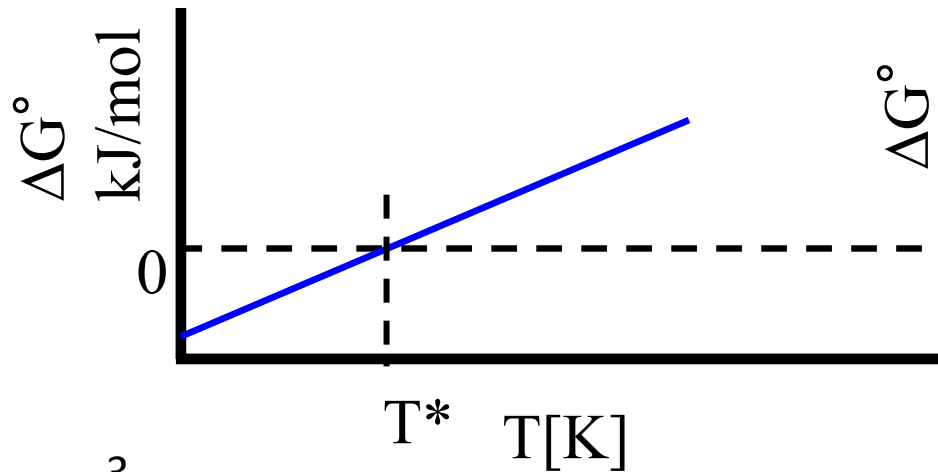
3.

4.

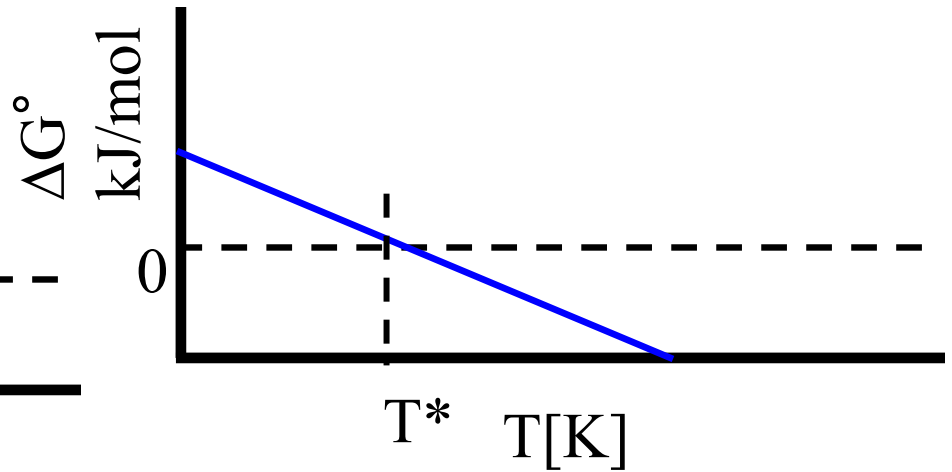
Which is a possible plot if both  $\Delta H$  and  $\Delta S$  are negative?



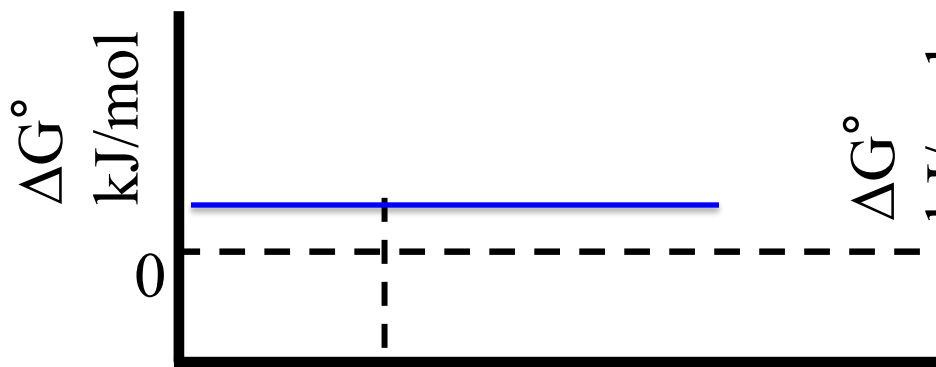
1.



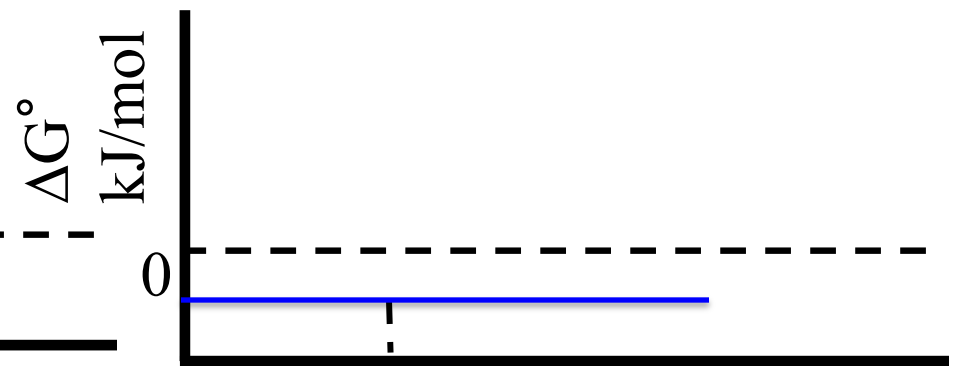
2.



3.



4.



90%

1.

 $T^*$  T[K] $T^*$ 

T[K]

4%

2.

2%

3.

4%

4.



For a reaction with  $\Delta H < 0$  and  $\Delta S > 0$ ,  
the reaction will

1. Never be spontaneous
2. Always be spontaneous
3. Sometimes be spontaneous (depending on reaction temperature)

For a reaction with  $\Delta H < 0$  and  $\Delta S > 0$ ,  
the reaction will

5%

1. Never be spontaneous

89%



2. Always be spontaneous

6%

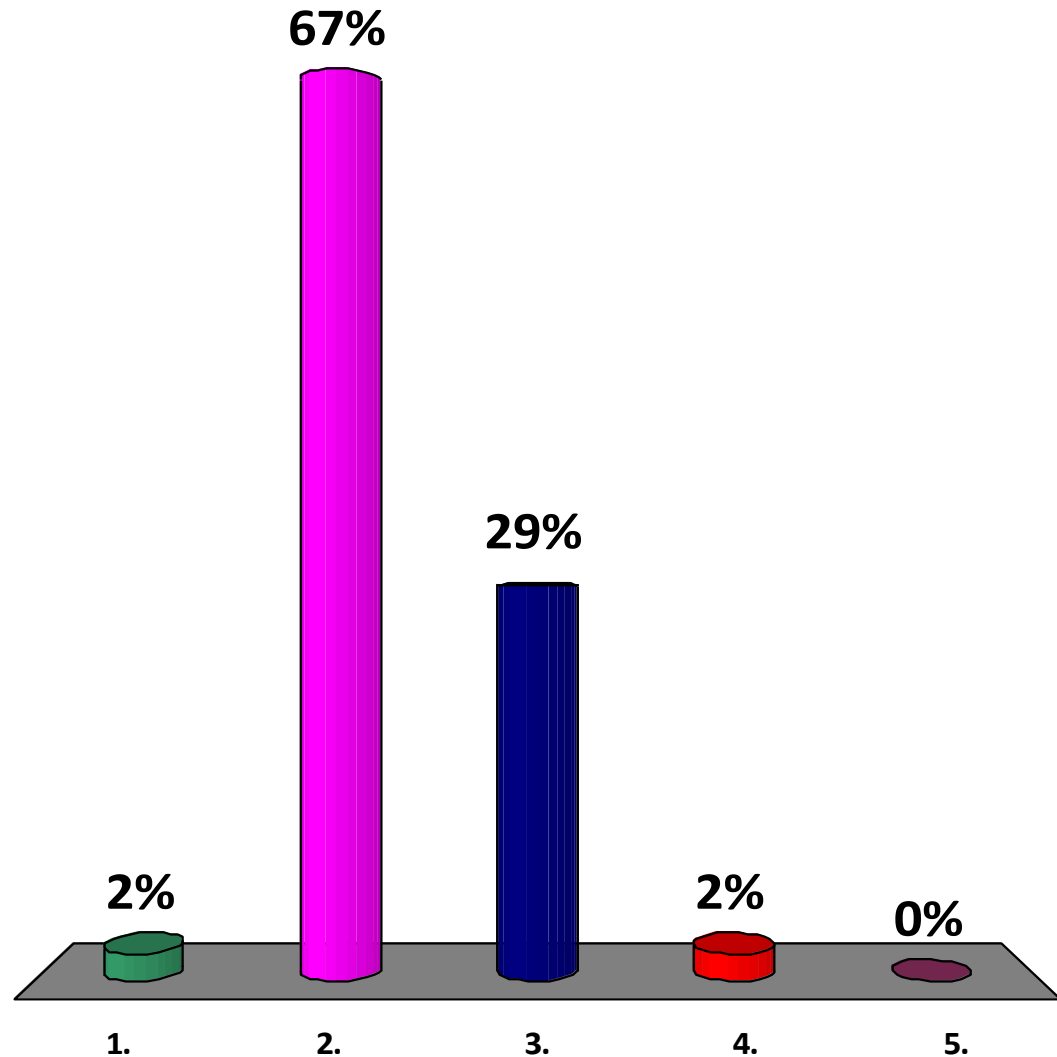
3. Sometimes be spontaneous (depending on  
reaction temperature)

Based on the orientation shown, how many hydrogen bonds form between A and T bases?

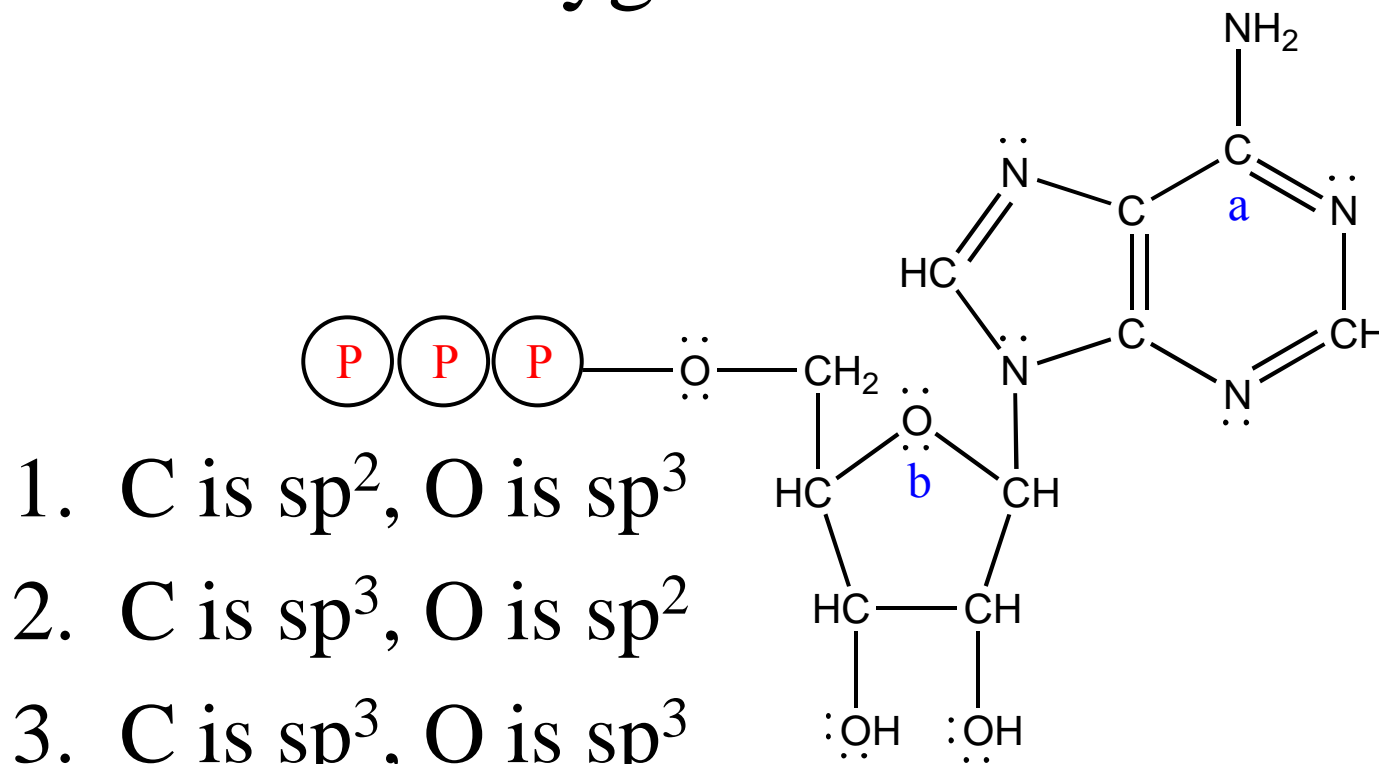
1. 1
2. 2
3. 3
4. 4
5. 0

Based on the orientation shown, how many hydrogen bonds form between A and T bases?

1. 1
- 😊 2. 2
3. 3
4. 4
5. 0

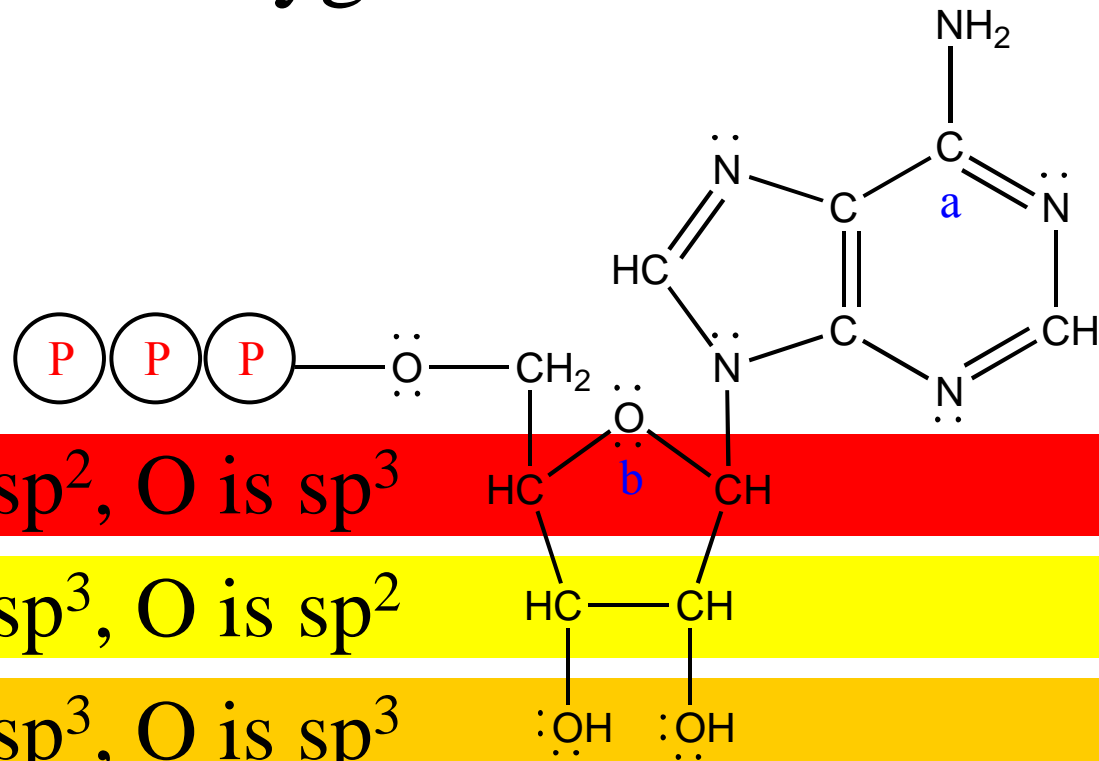


Name the hybridization of the specified carbon and oxygen atoms in ATP.



1. C is  $sp^2$ , O is  $sp^3$
2. C is  $sp^3$ , O is  $sp^2$
3. C is  $sp^3$ , O is  $sp^3$
4. C is  $sp^2$ , O is  $sp^2$
5. C is  $sp^2$ , O is not hybridized
6. C is  $sp^3$ , O is not hybridized

Name the hybridization of the specified carbon and oxygen atoms in ATP.



17% 😊 1. C is  $sp^2$ , O is  $sp^3$

17% 2. C is  $sp^3$ , O is  $sp^2$

17% 3. C is  $sp^3$ , O is  $sp^3$

17% 4. C is  $sp^2$ , O is  $sp^2$

17% 5. C is  $sp^2$ , O is not hybridized

17% 6. C is  $sp^3$ , O is not hybridized

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5.111 Principles of Chemical Science  
Fall 2014

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