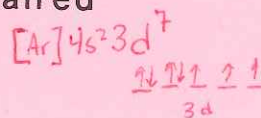


- E 1. Which of the following has 16 protons and 18 electrons?
A) S^{2+} B) Ar^{2-} C) Cl^- D) K^+ E) none of these
- B 2. If an element has several isotopes, all of them have:
A) the same mass D) the same number of p and n
B) the same number of p E) both A and B are correct
C) the same number of n
- D 3. At room temperature, which of the following elements would be the most ductile?
A) Antimony B) Boron C) Sulfur D) Silver E) Iodine
- A 4. Elements whose atoms gain electrons readily are said to function as 'oxidizing agents'. Which of the following should be the best 'oxidizing agent'?
A) F B) Cu C) Ba D) Kr E) O
- A 5. Aluminum forms a compound with oxygen that has the formula Al_2O_3 . Which of the following pairs of elements would form a compound having the same general type formula (M_2X_3)?
A) In and S D) Zn and N
B) B and F E) Ba and S
C) Si and O
- A 6. In the ground state of a cobalt atom there are ___ unpaired electrons and the atom is _____.
A) 3, paramagnetic D) 0, diamagnetic
B) 5, paramagnetic E) 2, paramagnetic
C) 2, diamagnetic
- A 7. A possible set of quantum numbers for the last electron added to a gallium atom ($Z=31$) in its ground state is:
n l m s
A) 4 1 -1 -1/2
B) 4 0 0 -1/2
C) 3 2 2 +1/2
D) 3 1 1 +1/2
E) 3 0 0 -1/2



AP CHEMISTRY
OBJECTIVE QUESTIONS

NAME _____

Atomic Theory, Periodic Table, Bonding NO CALCULATORS ARE ALLOWED.

- B 8. Given the following atoms: Ca, K, Be, Na, Li. The one with the lowest ionization energy (ionization potential) is:
A) Ca B) K C) Be D) Na E) Li
- E 9. The yet-undiscovered element $Z = 117$ should:
A) be a halogen
B) have 7 valence electrons
C) have the valence-shell configuration $s^2 p^5$
D) be in the seventh period
E) have all of the above properties
- E 10. Which of the series of elements listed below would have most nearly the same atomic radius?
A) F, Cl, Br, I D) B, Si, As, Te
B) Li, Be, B, C E) Mn, Fe, Co, Ni
C) He, Ne, Ar, Kr
- C 11. The reason why the atomic weight of Cl is 35.453 rather than almost exactly 35 is because:
A) every chlorine atom contains 17 protons
B) all chlorine atoms have identical chemical properties
C) there are at least 2 naturally occurring isotopes of Cl
D) protons and neutrons do not have exactly a mass of 1 amu
E) every chlorine atom has a mass of 35.453 amu
- C 12. Which of the following has the largest radius?
A) K^+ B) Cl^- C) S^{2-} D) F^- E) O^{2-}
- D 13. Which of the following is least likely to show ionic bonding?
A) KF B) $BaCl_2$ C) $ZnCl_2$ D) S_2Cl_2 E) $ScCl_2$
- E 14. The bonding order in the carbonate ion is: CO_3^{2-}
A) 0 B) 2 C) $1/2$ D) $1 - 1/2$ E) $4/3$
- C 15. Which of the following contains a triple bond?
A) SO_3^{2-} B) SO_2 C) CN^- D) ClF_3 E) NO_2^+



OBJECTIVE QUESTIONS

Atomic Theory, Periodic Table, Bonding NO CALCULATORS ARE ALLOWED.

A 16. If the triatomic molecule XY_2 is non-polar and has each Y atom bonded to the X atom by a σ and a π bond, what hybrid combination of X orbitals are used?

- A) sp B) sp^2 C) sp^3 D) sp^3d E) sp^3d^2

$$4 = X = 4$$

B 17. The molecule AX_3 is polar and obeys the octet rule; therefore

- A) the central atom (A) has no lone pairs
B) the central atom (A) has one lone pair
C) the central atom (A) has two lone pairs
D) the central atom (A) has three lone pairs
E) the central atom (A) has four lone pairs

B 18. The shape of the phosphate ion is: PO_4^{-3}

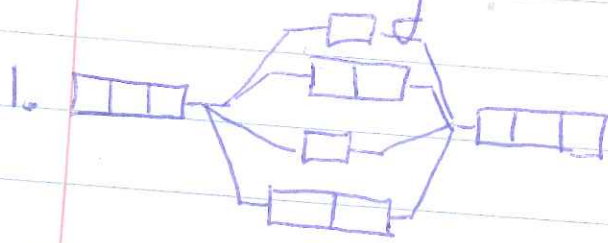
- A) angular (bent) D) trigonal pyramidal
B) tetrahedral E) none of the above
C) octahedral



Answer Key

1. B
2. D
3. D
4. ~~D~~ E
5. C
6. B
7. C
8. B
9. ~~A~~ E
10. B
11. C
12. D
13. ~~B~~ 4 D
14. B
15. D
16. B
17. C
18. C *but D!?*
19. C
20. a)
21. a)
22. a)
23. B
24. C
25. a) CH_3CHO
26. d) C_2H_6
27. A
28. ~~A~~ E

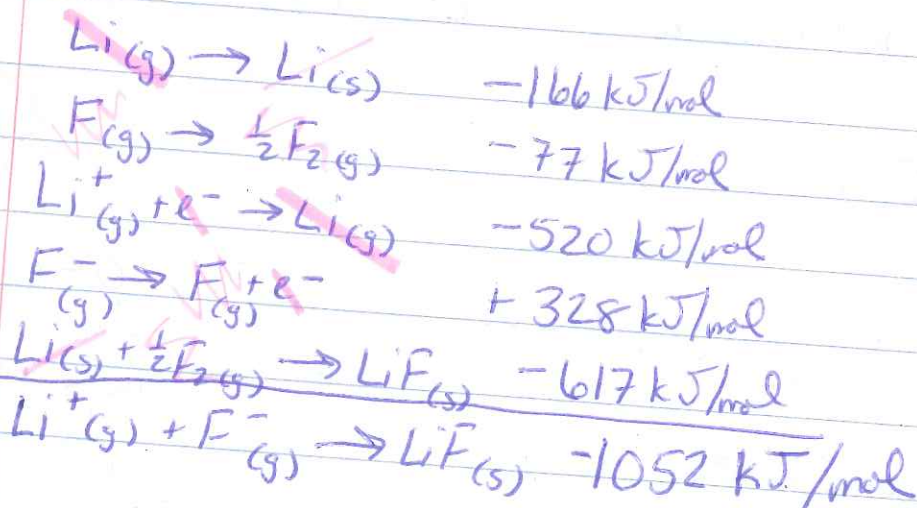
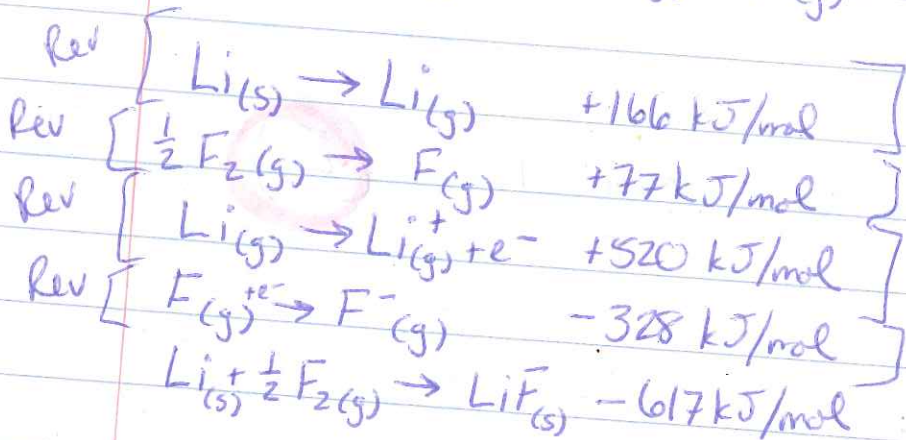
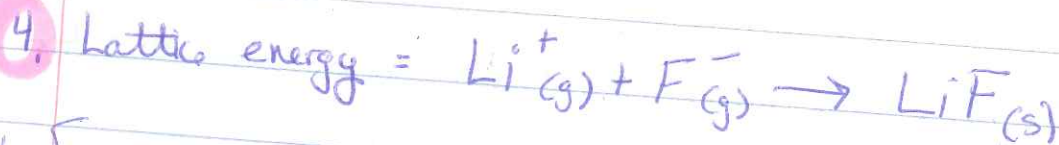
Obj. Qs - Bonding



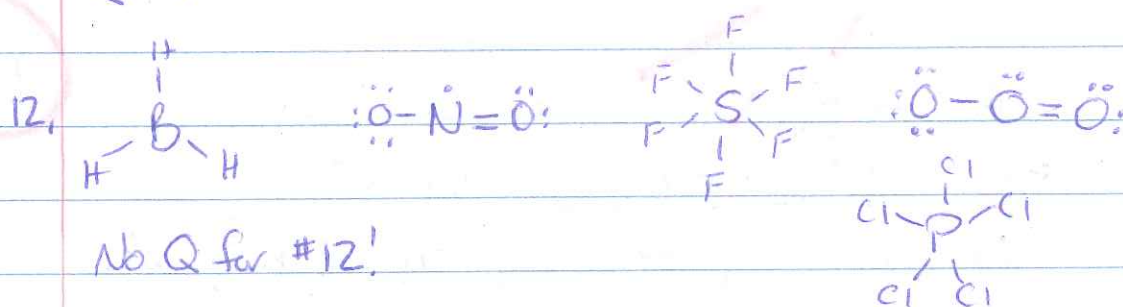
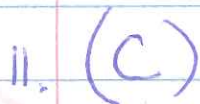
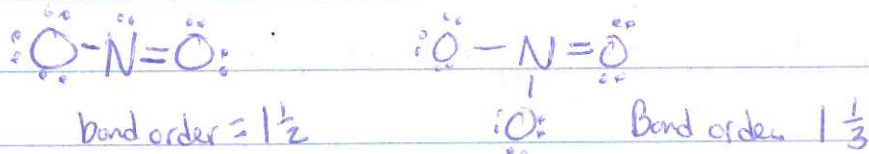
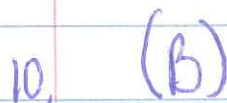
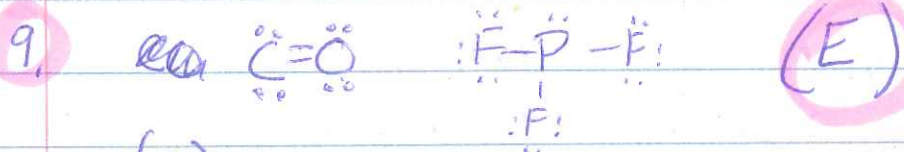
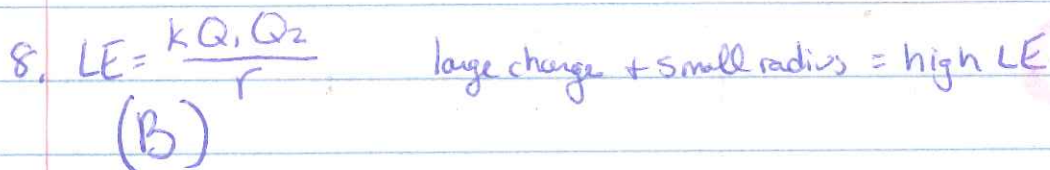
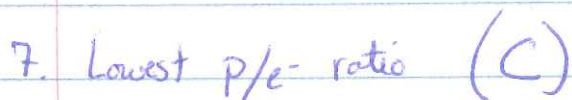
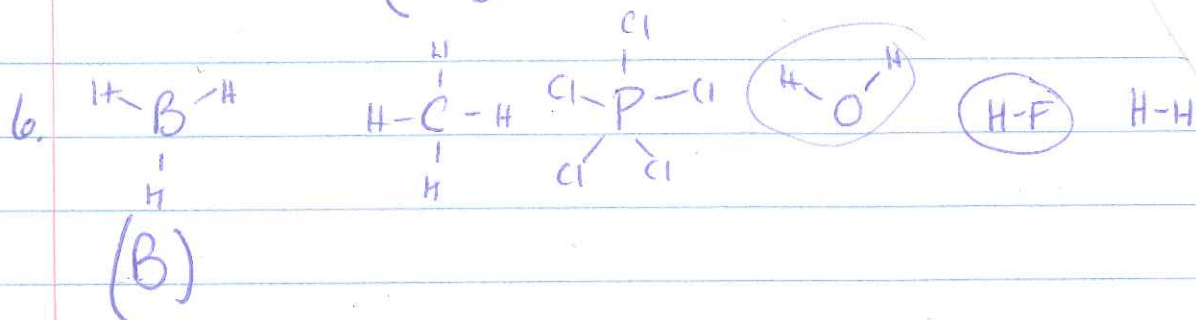
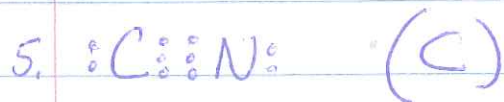
(B) B_2 is paramagnetic

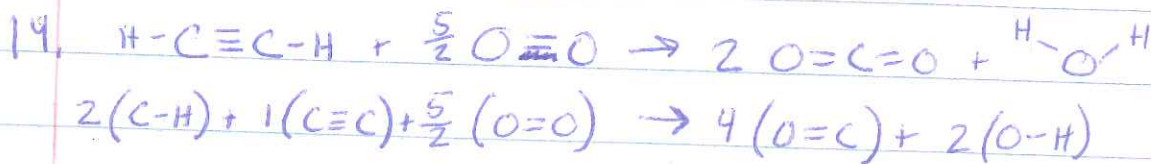
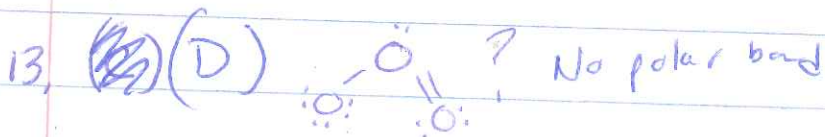


3. (D)



(E)

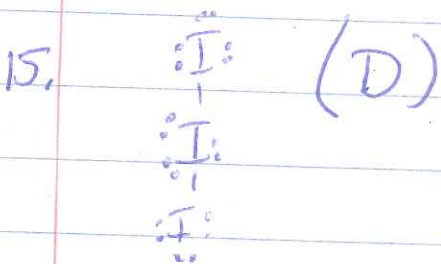




$$+ \left[2(413) + 839 + \frac{5}{2}(495) \right] - \left[4(799) + 2(467) \right]$$

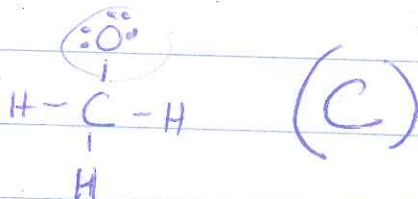
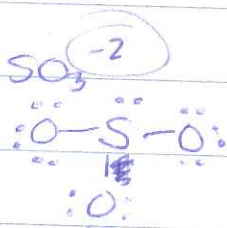
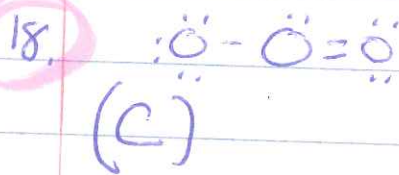
$$2902.5 \text{ kJ} - 4130 \text{ kJ} = -1227.5 \text{ kJ}$$

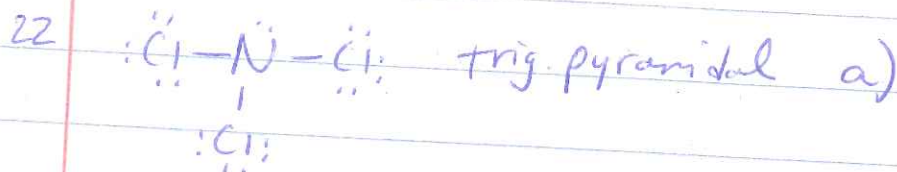
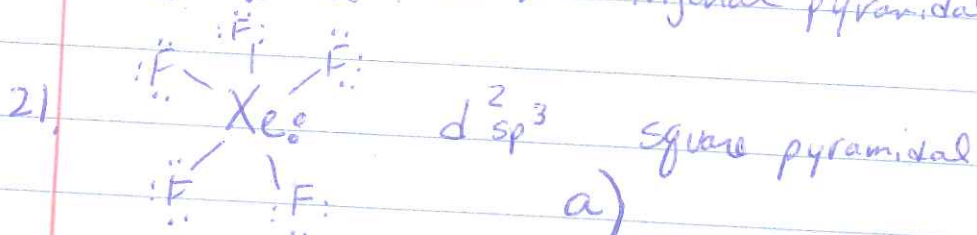
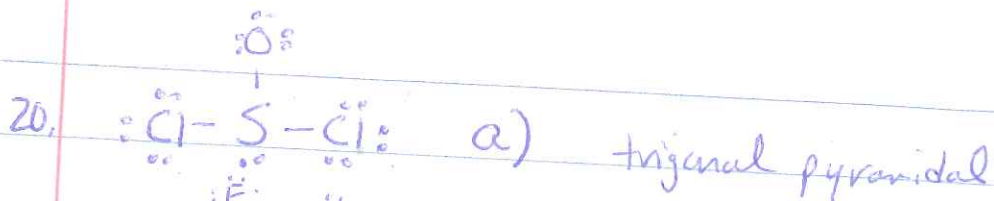
(B)



16. (B)

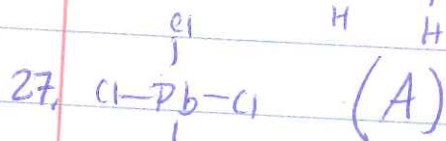
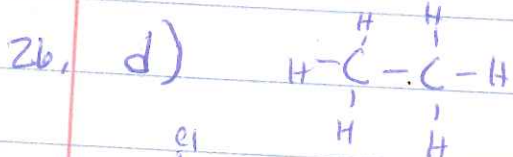
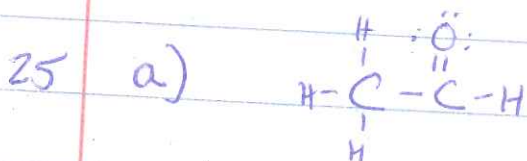
17. (C)





23, (B)

24, (C)



28, (E)