

س١٢ ما قال Satisfied ما مغرور الجواب صفر (9) Test bank chapter

7. Which compound below contains an atom that is surrounded by more than an octet of electrons?

- a) PF_5 *او 5 سوسو الکترون ال octet*
 b) CH_4
 c) NBr_3
 d) OF_2

8. Which choice below correctly lists the elements in order of increasing electronegativity?

- a) $\text{C} < \text{N} < \text{O} < \text{F}$
 b) $\text{N} < \text{C} < \text{O} < \text{F}$
 c) $\text{N} < \text{C} < \text{F} < \text{O}$
 d) $\text{C} < \text{N} < \text{F} < \text{O}$
- in*
 $\text{C} \rightarrow \text{N} \rightarrow \text{O} \rightarrow \text{F}$

9. Which atom sometimes violates the octet rule?

- a) C
 b) N
 c) O
 d) S

10. How many resonance structures can be drawn for NO_3^- ?

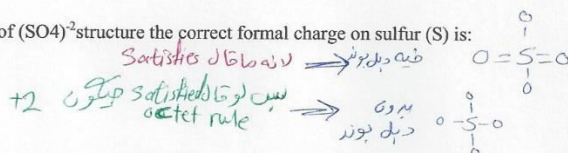
- a) 1
 b) 2
 c) 3
 d) 4
- A) = 3 x 6 + 5 + 1 = 24 e*
- NO₃⁻*
- $\text{:}\ddot{\text{O}}\text{--}\text{N}=\ddot{\text{O}}\text{:} \leftrightarrow \ddot{\text{O}}=\text{N--}\ddot{\text{O}}\text{:} \leftrightarrow \text{:}\ddot{\text{O}}\text{--}\text{N}=\ddot{\text{O}}\text{:}$

11. Considering formal charge, what is the preferred Lewis structure of NCO ? **ANS. 1**

1. $\text{:}\ddot{\text{N}}\equiv\text{C--}\ddot{\text{O}}\text{:}^-$ 4. $\text{:}\ddot{\text{N}}\text{--}\text{C--}\ddot{\text{O}}\text{:}^-$
 2. $\text{:}\ddot{\text{N}}\text{--}\text{C}=\ddot{\text{O}}\text{:}^-$ 5. $\text{:}\ddot{\text{N}}\equiv\text{C}=\ddot{\text{O}}\text{:}^-$
 3. $\text{:}\ddot{\text{N}}\text{--}\text{C}\equiv\text{O}\text{:}^-$

12. In Lewis structure of $(\text{SO}_4)^{2-}$ structure the correct formal charge on sulfur (S) is:

- a) ~~+3~~
 b) -2
 c) +1
 d) 0



13. Which of these pairs of elements would be most likely to form an ionic compound?

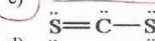
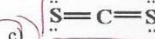
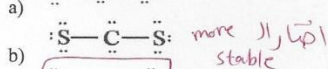
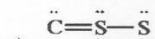
- a) Cl and I \rightarrow non, non
 b) Al and K \rightarrow metal, metal
 c) **Cl and Mg** \rightarrow metal, nonmetal
 d) C and S \rightarrow non, non
- metal, non metal*

14. Which of these covalent bonds is the most polar (i.e., highest percent ionic character)?

- a) $\text{Al}-\text{I}$
b) $\text{Si}-\text{I}$
c) $\text{Al}-\text{Cl}$
d) $\text{Si}-\text{Cl}$



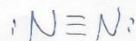
15. The Lewis structure for CS_2 is: **ANS. c**



$S = 6 - (4 + 2) = 0$
 $C = 4 - (4 + 0) = 0$

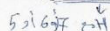
16. The number of lone electron pairs in the N_2 molecule is ____.

- a) 1
b) 2
c) 3
d) 4



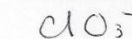
17. Classify the $\text{O}-\text{H}$ bond in CH_3OH as ionic, polar covalent, or nonpolar covalent.

- a) Ionic
b) polar covalent
c) nonpolar covalent
d) none of the above



18. The Lewis structure for a chlorate ion, ClO_3^- , should show ____ single bond(s), ____ double bond(s), and ____ lone pair(s).

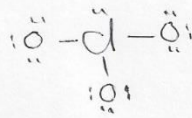
- a) 2, 1, 10
b) 3, 0, 9
c) 2, 1, 8
d) 3, 0, 10



A) $(1 \times 7) + (3 \times 6) + 1 = 26e$

B) $(1 \times 8) + (3 \times 8) = 32e$

C) $B - A = 32 - 26 = \frac{6e}{2} = 3 \text{ bond}$



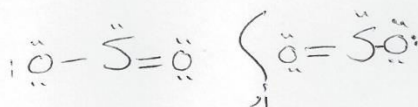
D) $A - C = 26 - 6 = 20e$
non bonding e or lone pair

19. The number of resonance structures for the sulfur dioxide (SO_2) molecule that satisfy the octet rule is

- a) 1
b) 2
c) 3
d) None of these.

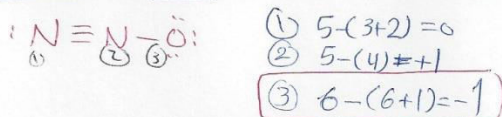


A) $6 + 2 \times 6 = 18e$



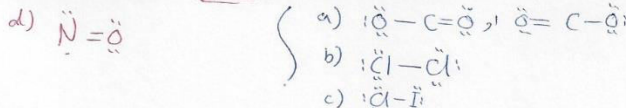
20. What is the formal charge on the oxygen atom in N_2O (the atomic order is N-N-O)?

- a) 0
- b) +1
- c) -1
- d) -2



21. Which of these substances will display an incomplete octet in its Lewis structure?

- a) CO_2
- b) Cl_2
- c) ICl
- d) NO



22. There are 2 paired and 3 unpaired electrons in the Lewis symbol for a phosphorus atom (P).

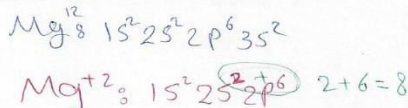
- a) 4, 2
- b) 2, 4
- c) 4, 3
- d) 2, 3

Explanation: Read the question carefully here, you are being asked for how many valence electrons are paired and how many are unpaired. The abbreviated electron configuration of the P atom is given by $[\text{Ne}] 3s^2 3p^3$. The outermost electrons would be arranged as 2 electrons paired and 3 electrons unpaired as shown below:



23. Based on the octet rule, magnesium (Mg) most likely forms a _____ ion.

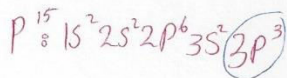
- a) Mg^{2-}
- b) Mg^{2+}
- c) Mg^{6-}
- d) Mg^{6+}



Explanation: According to the octet rule the Mg atom will achieve an octet by losing its 2 outermost electrons and thus gaining 2+ charges. Since Mg is located in the alkali metal group it will lose electrons rather than gaining them.

24. Based on the octet rule, phosphorus (P) most likely forms a P^{3-} ion.

- a) P^{3+}
- b) P^{5-}
- c) P^{5+}
- d) P^{3-}



Explanation: According to the octet rule the phosphorus atom should gain 3 electrons, thus gaining 3 negative charges and forming the phosphide ion.

25- The only noble gas without eight valence electrons is _____.

- a) Ar
- b) Ne
- c) He
- d) Kr

الهيليوم له ٢ إلكترونات فقط
موزن ١ إلكترونات

Explanation: The noble gases are characterized by the presence of eight electrons in their outermost shell with one notable exception of Helium. Since He has only 2 electrons it can never have 8 in its outermost shell.

26- What is the maximum number of double bonds that a hydrogen atom (H) can form?

- a) 0
- b) 1
- c) 2
- d) 3

بسي يشارك 2 إلكترونات
بسي Single بس

Explanation: Each hydrogen atom has a single electron in its valence shell and as a result can form only one bond. It cannot form a double bond as it does not have the necessary electrons to share.

28. What is the maximum number of double bonds that a carbon atom (C) can form?

- a) 4
- b) 1
- c) 2
- d) 0

$=C=$ $\equiv C-$
واحد متساوي ، واحد تين ، 2 دبل

Explanation: Each carbon atom has 4 valence electrons that it can share with other atoms. Since each double bond corresponds to a pair of electrons, the carbon atom can form only 2 double bonds.

29. Given the electronegativities below, which covalent single bond is most polar?

Atom	H	C	N	O
Electronegativity	2.1	2.5	3.0	3.5

- a) C-H $2.5 - 2.1 = 0.4$ Polar \Rightarrow Non
- b) N-H $3.0 - 2.1 = 0.9$ Polar
- c) O-H $3.5 - 2.1 = 1.4$ Polar \Rightarrow أكبر فرق
- d) O-N $3.5 - 3.0 = 0.5$ Polar

Explanation: Bond polarity can be judged based on the differences between the electronegativities of the atoms involved. Of the available choices, the bond between O and H will have the largest electronegativity difference making it the most polar bond in this group.

30. The ion ICl_4^- has _____ valence electrons.

- a) 34
- b) 36
- c) 35
- d) 28

ICl_4^-
 $(1 \times 7) + (4 \times 7) + 1 = 36e$

Explanation: valence electrons $A = (7 \times 1) + (7 \times 1) + 1 = 36$

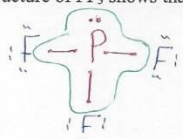
31- Electronegativity _____ from left to right within a period and _____ from top to bottom within a group.

- a) decreases, increases
- b) increases, increases
- c) stays the same, increases
- d) **increases, decreases**

Explanation: Atomic size decreases from the left to the right in a period thus making it easier for the nuclei to attract electrons towards themselves resulting in an increase in the electronegativity. On the other hand atomic size increases down a group making it harder for the nuclei to attract the valence electrons towards themselves resulting in a decrease in electronegativity.

32. The Lewis structure of PF_3 shows that the central phosphorus atom has ___ nonbonding and ___ bonding electron pairs.

- a) 2, 2
- b) 1, 3
- c) 3, 1
- d) 1, 2



$$\textcircled{A} = (1 \times 5) + (3 \times 7) = 26e$$

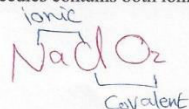
$$\textcircled{B} = (1 \times 8) + (3 \times 8) = 32e$$

$$\textcircled{C} \quad B - A = 32 - 26 = \frac{6e}{2} = 3 \text{ bonds}$$

$$\textcircled{D} = A - C = 26 - 6 = 20 \text{ nonbonding } e$$

33. Which of the following molecules contains both ionic and covalent bonds?

- a) C_3H_{12} non, non
- b) **NaClO_4**
- c) CaCl_2 non, metal
- d) H_2O non, non



34. The ability of an atom in a molecule to attract electron density to itself is termed

- a) **Electronegativity**
- b) Electron affinity
- c) Diamagnetism
- d) Ionization energy

35- the most polar bond is

- a) Br-H
- b) I-H
- c) **Cl-H**
- d) H-H

