

## Unit 8: Redox reactions

- Reduction is a process which involves
  - Electronation
  - Addition of hydrogen or removal of oxygen
  - Addition of metal or removal of non metal
  - All of these
- Oxidation number of carbon in  $C_3O_2$ ,  $Mg_2C_3$  are respectively
  - $-4/3$ ,  $+4/3$
  - $+4/3$ ,  $-4/3$
  - $-2/3$ ,  $+2/3$
  - $-2/3$ ,  $+4/3$
- In the reaction  $NaH + H_2O \rightarrow NaOH + H_2$ 
  - $H^-$  is oxidized
  - $Na^+$  is reduced
  - Both  $NaH$  and  $H_2O$  are reduced
  - None of these
- The violent reaction between sodium and water is an example of
  - Reduction
  - Oxidation
  - Redox reaction
  - Neutralization reaction
- In acid solutions the reaction  $MnO_4^{1-} \rightarrow Mn^{2+}$  involves
  - Oxidation by 3 electrons
  - Reduction by 3 electrons
  - Oxidation by 5 electrons
  - Reduction by 5 electrons
- Which statement is incorrect?
  - Oxidation of a substance is followed by reduction of another
  - Reduction of a substance is following by oxidation of another
  - Oxidation and reduction are complementary reactions
  - It is not necessary that both oxidation and reduction should take place in the same reaction
- In the reaction  $Cr_2O_7^{2-} + 14 H^+ + 6I^- \rightarrow 2Cr^{3+} + 7H_2O + 3I_2$ , which element is reduced?
  - I
  - O
  - H
  - Cr
- In the reaction  $C + 4HNO_3 \rightarrow CO_2 + 2H_2O + 4NO_2$ ,  $HNO_3$  acts as



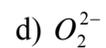
## Unit 4 Chemical bonding and molecular structure

- Which of the following is having strongest covalent bonds?  
a) H – Cl                      b) Cl – Cl                      c) C – Cl                      d) Na – Cl
- Which of the following contains both ionic and covalent bonds?  
a) H<sub>2</sub>O                      b) NaOH                      c) C<sub>6</sub>H<sub>5</sub>Cl                      d) CO<sub>2</sub>
- In a double bond connecting two atoms there is a sharing of  
a) 2 electrons                      b) 4 electrons                      c) 1 electrons                      d) All electrons
- Which of the following bond is the most ionic?  
a) Cs – Cl                      b) Al – Cl                      c) C – Cl                      d) H – Cl
- Which of the following combination is best explained by the coordinate covalent bond?  
a) H<sub>2</sub> + I<sub>2</sub>                      b) Mg + ½ O<sub>2</sub>                      c) Cl + Cl                      d) H<sup>+</sup> + H<sub>2</sub>O
- The bonds in K<sub>4</sub>[Fe(CN)<sub>6</sub>] are  
a) All ionic                      b) All covalent                      c) Ionic and Covalent  
d) Ionic covalent and coordinate covalent
- On hybridization of one s and p orbitals we get  
a) Two mutually perpendicular orbitals                      b) Two orbitals are 180°  
c) Four orbitals directed tetrahedrally                      d) Three orbitals in a plane.
- A sp<sup>3</sup> hybrid orbitals contain  
a) 1/4 s character                      b) ½ s character                      c) 2/3 character                      d) ¾ character
- The mode of hybridization of carbon in CO<sub>2</sub> is  
a) sp                      b) sp<sup>2</sup>                      c) sp<sup>3</sup>                      d) None
- Which of the following geometrical configurations correspond to dsp<sup>2</sup> hybridisation?  
a) Tetrahedral                      b) Pentagonal bipyramid                      c) Square planar                      d) Octahedral
- Carbon atoms in diamond are bonded each other in which configuration?  
a) Planar                      b) Tetrahedral                      c) Linear                      d) octahedral
- Structure of ammonia is  
a) Pyramidal                      b) Tetrahedral                      c) Trigonal                      d) Trigonalbipyramidal
- In diborane, the H – B – H bond angle is 120°. The hybridization of borane is likely to be  
a) sp                      b) sp<sup>2</sup>                      c) sp<sup>3</sup>                      d) dsp<sup>2</sup>

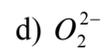
14. In which of the following molecules can the central atom said to adopt  $sp^2$  hybridization?  
a)  $BeF_2$                                       b)  $BF_3$                                       c)  $C_2H_2$                                       d)  $N_4^+$
15. Octahedral molecular shape exists in ..... hybridization  
a)  $sp^3d$                                       b)  $sp^3d^2$                                       c)  $sp^3d^3$                                       d)  
None of these.
16. Which of the following molecules contain one lone pair of electrons on the central atom?  
a)  $CH_4$                                       b)  $NH_3$                                       c)  $CCl_4$                                       d)  $H_2O$
17. The H - O - H angle in water molecule is about  
a)  $90^\circ$                                       b)  $180^\circ$                                       c)  $104.5^\circ$                                       d)  $75^\circ$
18. Which is not a linear molecule?  
a)  $CO_2$                                       b)  $C_2H_2$                                       c)  $HCN$                                       d)  $H_2O$
19. The angle between two covalent bonds is maximum in  
a)  $H_2O$                                       b)  $CO_2$                                       c)  $NH_3$                                       d)  $CH_4$
20. As the s-character of hybridized orbital increases, the bond angle  
a) Increases                                      b) Decreases                                      c) Does not change                                      d) Becomes zero
21. Strongest bond is  
a)  $C - C$                                       b)  $C = C$                                       c)  $C \equiv C$                                       d) All are equally strong
22. The unequal sharing of bonded pair of electrons between two atoms in a molecule causes  
a) Dipole                                      b) Radical formation  
c) Covalent bond                                      d) Decomposition. Of molecule
23. The bond angle in water is  $104.5^\circ$  instead of the expected tetrahedral angle of  $109.5^\circ$  this is due to  
a) Presence of two hydrogen atoms  
b) Presence of two lone pairs  
c) Presence of hydrogen bonding in the molecule  
d) None of these
24. O- Nitrophenol is more volatile than p - nitrophenol because of  
a) Resonance in the molecule                                      b) Hyperconjugation  
c) Presence of intermolecular hydrogen bonding in the o-isomer  
d) Absence of intermolecular hydrogen bonding in the o-isomer

25. The molecule  $\text{BF}_3$  and  $\text{NF}_3$  both are covalent compounds. But  $\text{BF}_3$  is non-polar and  $\text{NF}_3$  is polar. The reason is that.
- Boron is a metal and nitrogen is a gas in uncombined state
  - B – F bonds have no dipole moment whereas N- F bonds have dipole moment.
  - Atomic size of boron is smaller than that of nitrogen
  - $\text{BF}_3$  is planar but  $\text{NF}_3$  is pyramidal in shape.
26. The compound in which  $\text{C}^*$  used  $\text{sp}^3$  hybrids for bond formation is
- $\text{HC}^*\text{OOH}$
  - $(\text{NH}_2)_2\text{C}^*\text{O}$
  - $(\text{CH}_3)_3\text{C}^*\text{OH}$
  - $\text{CH}_3\text{C}^*\text{HO}$
27. Which of the following is not correct?
- A sigma bond is weaker than a  $\pi$  bond
  - A sigma bond is stronger than a  $\pi$  bond
  - A double bond is stronger than a single bond
  - A double is shorter than a single bond.
28. Increasing order (lower first) of size of hybrid orbitals is
- $\text{sp}, \text{sp}^2, \text{sp}^3$
  - $\text{sp}^3\text{sp}^2, \text{sp}$
  - $\text{sp}^2, \text{sp}^3, \text{sp}$
  - $\text{sp}^2\text{sp}, \text{sp}^3$
29. The number of  $\sigma$  and  $\pi$  bonds in but-1-en-3 – yne are
- $5\sigma$  and  $5\pi$
  - $7\sigma$  and  $3\pi$
  - $8\sigma$  and  $2\pi$
  - $6\sigma$  and  $4\pi$
30. The bond order of a molecule is given by
- The difference between the number of electrons in bonding and antibonding orbitals
  - Total number of electrons in bonding and antibonding orbitals
  - Twice the difference between the number of electrons in bonding and antibonding orbitals.
  - Half the difference number of electrons in bonding and antibonding orbitals.
31. Oxygen molecule is paramagnetic because
- Bonding electrons are more than antibonding electrons
  - It contains unpaired electrons
  - Bonding electrons are less than antibonding electrons
  - Bonding electrons are equal to antibonding electrons

32. Which of the following has the highest bond order?



33. Which of the following has minimum internuclear distance?



34. Which of the following is diamagnetic?

