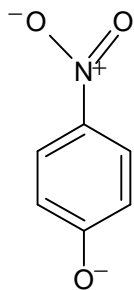
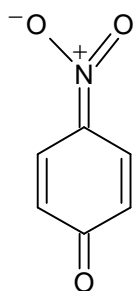


Single Correct Answer Type:

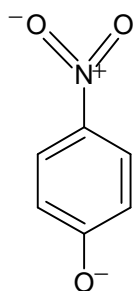
- The geometry & the type of hybrid orbitals present about the central atom in BF_3 is
 (A) linear, sp (B) trigonal planar, sp^2
 (C) tetrahedral, sp^3 (D) pyramidal, sp^3
- The correct order of increasing C – O bond length of, CO , CO_3^{2-} , CO_2 is
 (A) $\text{CO}_3^{2-} < \text{CO}_2 < \text{CO}$ (B) $\text{CO}_2 < \text{CO}_3^{2-} < \text{CO}$
 (C) $\text{CO} < \text{CO}_3^{2-} < \text{CO}_2$ (D) $\text{CO} < \text{CO}_2 < \text{CO}_3^{2-}$
- In the dichromate anion
 (A) 4 Cr – O bonds are equivalent (B) 6 Cr – O bonds are equivalent
 (C) all Cr – O bonds are equivalent (D) all Cr – O bonds are non equivalent
- The geometry of H_2S and its dipole moment are
 (A) angular & non zero (B) angular & zero
 (C) linear & non zero (D) linear & zero
- In compounds of type ECl_3 , where $\text{E} = \text{B}, \text{P}, \text{As}$ or Bi , the angles $\text{Cl} - \text{E} - \text{Cl}$ for different E are in the order
 (A) $\text{B} > \text{P} = \text{As} = \text{Bi}$ (B) $\text{B} > \text{P} > \text{As} > \text{Bi}$ (C) $\text{B} < \text{P} = \text{As} = \text{Bi}$ (D) $\text{B} < \text{P} < \text{As} < \text{Bi}$
- The most likely representation of resonance structure of p-nitrophenoxide is:



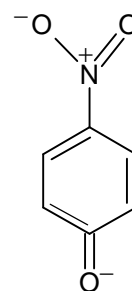
(A)



(B)



(C)



(D)

- Amongst H_2O , H_2S , H_2Se and H_2Te , the one with the highest boiling point is
 (A) H_2O because of hydrogen bonding
 (B) H_2Te because of higher molecular weight
 (C) H_2S because of hydrogen bonding
 (D) H_2Se because of lower molecular weight
- The hybridization of atomic orbitals of nitrogen in NO_2^+ , NO_3^- , and NH_4^+ are
 (A) sp^2 , sp^3 and sp^2 respectively (B) sp , sp^2 and sp^3 respectively
 (C) sp^2 , sp and sp^3 respectively (D) sp^2 , sp^3 and sp respectively
- The correct order of hybridization of the central atom in the following species NH_3 , PtCl_4^{2-} , PCl_5 and BCl_3 is
 (A) dsp^2, sp^3d, sp^2 and sp^3 (B) sp^3, dsp^2, sp^3d and sp^2
 (C) dsp^2, sp^2, sp^3, sp^3d (D) dsp^2, sp^3, sp^2 and sp^3d

10. The common features among the species CN^- , CO and NO^+ are
 (A) Bond order three and isoelectronic (B) Bond other three and weak field ligands
 (C) Bond order two and π -acceptors (D) Isoelectronic and weak field ligands
11. Specify hybridization of N and B atoms in a 1 : 1 complex of BF_3 and NH_3
 (A) N : tetrahedral, sp^3 ; B: tetrahedral, sp^3 (B) N : pyramidal, sp^3 ; B: pyramidal, sp^3
 (C) N : pyramidal, sp^3 ; B: planar, sp^2 (D) N : pyramidal, sp^3 ; B: tetrahedral, sp^3
12. Intramolecular hydrogen bonding is found in
 (A) Salicylaldehyde (B) Water (C) Acetaldehyde (D) Phenol
13. Identify the least stable ion amongst the following:
 (A) Li^- (B) Be^- (C) B^- (D) C^-
14. Which of the following molecular species has unpaired electron(s)?
 (A) N_2 (B) F_2 (C) O_2^- (D) O_2^{2-}
15. Which of the following are isoelectronic and isostructural? NO_3^- , CO_3^{2-} , ClO_3^- , SO_3
 (A) NO_3^- , CO_3^{2-} (B) SO_3 , NO_3^- (C) ClO_3^- , CO_3^{2-} (D) CO_3^{2-} , SO_3
16. According to molecular orbital theory which of the following statement about the magnetic character and bond order is correct regarding O_2^+
 (A) Paramagnetic and Bond order $< \text{O}_2$ (B) Paramagnetic and Bond order $> \text{O}_2$
 (C) Diamagnetic and Bond order $< \text{O}_2$ (D) Diamagnetic and Bond order $> \text{O}_2$
17. Which species has the maximum number of lone pair of electrons on the central atom?
 (A) ClO_3^- (B) XeF_4 (C) SF_4 (D) I_3^-
18. The percentage of p-character in the orbitals forming P – P bonds in P_4 is
 (A) 25 (B) 33 (C) 50 (D) 75
19. Among the following, the paramagnetic compound is
 (A) Na_2O_2 (B) O_3 (C) N_2O (D) KO_2
20. The species having bond order different from that in CO is
 (A) NO^- (B) NO^+ (C) CN^- (D) N_2

Numerical Based:

21. Write the number of $\angle\text{FIF}$ angles which are less than 90° in IF_5
22. The number of corner or O-atom shared per tetrahedron in 2D-silicate is _____
23. The ratio of lone pairs in XeF_2 molecule and the lone pairs on its central atom is _____
24. Based on VSEPR theory, the number of 90 degree F – Br – F angles in BrF_5 is
25. In ICl_4^0 , the shape is square planar. The number of bond pair-lone pair repulsion at 90° are:

KEY

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|-------|-------|-------|-------|-------|
| 1. B | 2. D | 3. B | 4. A | 5. B |
| 6. A | 7. A | 8. B | 9. B | 10. A |
| 11. A | 12. A | 13. B | 14. C | 15. A |
| 16. B | 17. D | 18. D | 19. D | 20. A |
| 21. 8 | 22. 3 | 23. 3 | 24. 0 | 25. 8 |