Exercise # 4 PART - 2 PREVIOUS YEAR (AIIMS)

1. Which of the following compounds possesses the C–H bond with the lowest bond dissociation energy ? [2003]

(A) Toluene

(B) Benzene

(C) n-Pentane

(D) 2, 2 - Dimethylpropane

2. Which of the following are arranged in the decreasing order of dipole moment ? [2003]

(A) CH_3Cl, CH_3Br, CH_3F

(B) CH_3Cl, Ch_3F, CH_3Br

(C) CH_3Br, CH_3Cl, CH_3F

(D) CH_3Br, CH_3F, CH_3Cl

3. The ONO angle is maximum in [2004]

(A) NO_3^- **(B)** NO_2^-

(C) NO_2 **(D)** NO_2^+

4. Among the following, the species having squear planar geometry for central atom are [2006]

(i) XeF_4, (ii) SF_4, (iii) $[NiCl_4]^{2-}$, (iv) $[PdCl_4]^{2-}$

(A) (i) and (iv) **(B)** (i) and (ii)

(C) (ii) and (iii) **(D)** (iii) and (iv)

5. In $[Ag(CN)_2]^-$, the number of π bonds is [2006]

(A) 2 **(B)** 3

(C) 4 **(D)** 6

6. Bond length order is [2007]

(A) $O_2 < O_3 < O_2^{2-}$ **(B)** $O_2 < O_2^{2-} < O_3$

(C) $O_2^{2-} < O_3 < O_2$ **(D)** $O_2 = O_2^{2-} > O_3$

7. Which of the following does not contain any coordinate bond ?

(A) H_3O^+ **(B)** BF_4^-

(C) HF_2^- **(D)** NH_4^+

8. The correct order of diople moment is [2008]

(A) $CH_4 < NF_3 < NH_3 < H_2O$

(B) $NF_3 < CH_4 < NH_3 < H_2O$

(C) $NH_3 < NF_3 < CH_4 < H_2O$

(D) $H_2O < NH_3 < NF_3 < CH_4$

9. The molecule having the same hybridisation, shape and number of lone pairs of electrons are [2009]

(A) SeF_4, XeO_2F_2 **(B)** SF_4, XeF_2

(C) $XeOF_4, TeF_4$ **(D)** $SeCl_4, XeF_4$

10. Which of the following conditions is not correct for resonanting structures ? [2010]

(A) The contributing structures must have the same number of unpaired electrons.

(B) The contributing structures should have similar energies.

(C) The contributing structures should be so written that unlike charges reside on atoms that are far apart.

(D) The positive charge should be present on the electropositive element and the negative charge on the electronegative element.

11. CaO and NaCl have the same crystal structure and apporximately the same ionic radii. If U is the lattice energy of NaCl, the approximate lattice energy of CaO is [2010]

(A) U/2 **(B)** U

(C) 2U **(D)** 4U

12. Decreasing order of bond angle is [2011]

(A) $BeCl_2 > NO_2 > SO_2$ **(B)** $BeCl_2 > SO_2 > NO_2$

(C) $SO_2 > BeCl_2 > NO_2$ **(D)** $SO_2 > NO_2 > BeCl_2$

13. The dipole moment is minimum in [2012]

(A) NH_3 **(B)** NF_3

(C) SO_2 **(D)** BF_3

14. Total number of antibonding electrons present in O_2 will be [2013]

(A) 6 **(B)** 8

(C) 4 **(D)** 2

15. In BF_3, the B–F bond length is 1.30 Å, when BF3 is allowed to be treated with Me_3N, it form an adduct, $Me_3N \rightarrow BF_3$, the bond length of B–F in the adduct is [2013]

(A) greater than 1.30 Å **(B)** smaller than 1.30 Å

(C) equal to 1.30 Å **(D)** none of these

16. In O_3 molecule, the formal charge on the central O-atoms is [2014]
(A) 0 (B) –1
(C) –2 (D) +1

17. Which of the following represents the correct bond order ? [2014]
(A) $O_2^+ < O_2^- > O_2^{2-}$ (B) $O_2^- < O_2^{2-} > O_2^+$
(C) $O_2^{2-} > O_2^+ > O_2^-$ (D) $O_2^+ > O_2^- > O_2^{2-}$

18. Which of the following molecules has more than one lone pair ? [2016]
(A) SO_2 (B) XeF_2
(C) SiF_4 (D) CH_4

19. Four diatomic species are listed below in different sequences. Which of these represents the correct order of their increasing bond order ? [2016]
(A) $C_2^{2-} < He_2^+ < NO < O_2^-$
(B) $He_2^+ < O_2^- < NO < C_2^{2-}$
(C) $O_2^- < NO < C_2^{2-} < He_2^+$
(D) $NO < C_2^{2-} < O_2^- < He_2^+$

20. Hybridisation states of C in CH_3^+ and CH_4 are
(A) sp^2 & sp^3 (B) sp^3 & sp^2
(C) sp^2 & sp^2 (D) sp^3 & sp^3 [2017]

21. Which of the following cantain at least one lone pair in all of its halide
(A) Xe (B) Se
(C) Cl (D) N [2018]

22. Which is incorrect regarding S and P mixing (along Z –axis.)
(A) Nodal plane(s) present in ABMO
(B) Nodal plane is absent in BMO
(C) MO formed may have higher energy than parent AO
(D) MO formed are asymmetric [2018]

ASSERTION AND REASON

In each of the following questions, two statement are given one is assertion and the other is reason. Examine the statement carefully and mark the correct answer according to the instruction given below

(A) If both the assertion and reason are true and reason explains the assertion
(B) If both the assertion and reason are true but reason does not explain the assertion
(C) If assertion is true but reason is false
(D) If assertion is false but reason in true
(E) Both assertion & reason are false

23. **Assertion :** All F – S – F angle in SF_4 is greater than 90° but less than 180°.
Reason : The lone pair-bond pair repulsion is weaker than bond pair-bond pair repulsion. [2004]

24. **Assertion :** Molecular nitrogen is less reactive than molecular oxygen
Reason : The bond length of N_2 is shorter than that of oxygen. [2006, 2015]

25. **Assertion :** $SeCl_4$ does not have a tetrahedral structure.
Reason : Se in $SeCl_4$ has two lone pairs. [2008]

26. **Assertion :** Bond energy and bond dissociation energy have identical value for diatomic molecules.
Reason : Greater the bond dissociation energy, less reactive is the bond. [2010]

27. **Assertion :** ClF_3 has T-shape structure.
Reason : It has two lone pairs arranged at 180° angle. [2012]

28. **Assertion :** O_2 is paramagnetic.
Reason : It has one unpaired electron. [2012]

29. **Assertion :** Both rhombic and monoclinic sulphur exist as S_8 but oxygen exists as O_2. [2017]
Reason : Oxygen forms $p\pi - p\pi$ multiple bond due to small size and small bond length but $p\pi - p\pi$ bonding is not possible in sulphur.

30. **Assertion :** Lithium carbonate is not so stable to heat. [2017]
Reason : Lithium being very small in size polarizes large CO_3^{2-} ion leading to the formation of more stable Li_2O and CO_2