Molecular orbital theory

61. How many bonding electron pairs are there in white phosphorous

(a) 6 (b) 12

(c) 4 (d) 8

62. The atomicity of phosphorus is *X* and the $P\hat{P}P$ bond angle in the molecule is *Y*. What are *X* and *Y*

(a) *X* = 4, *Y* = 90^o

(b) *X* = 4, *Y* = 60^o

(c) *X* = 3, *Y* = 120^o

(d) *X* = 2, *Y* = 180^o

63. From elementary molecular orbital theory we can give the electronic configuration of the singly positive nitrogen molecular ion N_2^+ as

(a) $\sigma(1s)^2\sigma^*(1s)^2\sigma(2s)^2\sigma^*(2s)^2\pi(2p)^4\sigma(2p)^1$

(b) $\sigma(1s)^2\sigma^*(1s)^2\sigma(2s)^2\sigma^*(2s)^2\sigma(2p)^1\pi(2p)^3$

(c) $\sigma(1s)^2\sigma^*(1s)^2\sigma(2s)^2\sigma^*(2p)^2\pi(2p)^4$

(d) $\sigma(1s)^2\sigma^*(1s)^2\sigma(2s)^2\sigma^*(2s)^2\sigma(2p)^2\pi(2p)^2$

64. The paramagnetic property of the oxygen molecule due to the presence of unpaired electorns present in

(a) $(\sigma 2p_x)^1$ and $(\sigma^* 2p_x)^1$

(b) $(\sigma 2p_x)^1$and $(\pi 2p_y)^1$

(c) $(\pi * 2p_y)^1$ and $(\pi * 2p_z)^1$

(d) $(\pi * 2p_y)^1$and $(\pi 2p_y)^1$

(e) $(\pi * 2p_z)^1$ and $(\pi 2p_z)^1$

65. In PO_4^{3-}ion, the formal charge on each oxygen atom and $P-O$ bond order respectively are

(a) $-0.75,\ 1.25$ (b) $-0.75,\ 1.0$

(c) $-0.75,\ 0.6$ (d) $-3,\ 1.25$

66. The bond order in CO_3^{2-}ion between $C-O$ is

(a) Zero (b) 0.88

(c) 1.33 (d) 2

67. The bond order of O_2^+ is the same as in

(a) N_2^+ (b) CN^-

(c) CO (d) NO^+

68. Bond order of $O_2$is

(a) 2 (b) 1.5

(c) 3 (d) 3.5

69. The total number of electron that takes part in forming bonds in $N_2$is

(a) 2 (b) 4

(c) 6 (d) 10

70. The bond length the species $O_2, O_2^+$and O_2^- are in the order of

(a) $O_2^+ > O_2 > O_2^-$

(b) $O_2^+ > O_2^- > O_2$

(c) $O_2 > O_2^+ > O_2^-$

(d) $O_2^- > O_2 > O_2^+$

71. 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<O_2

(b) Paramagnetic and bond order>O_2

(c) Dimagnetic and bond order<O_2

(d) Dimagnetic and bond order>O_2

72. The bond order in *NO* is 2.5 while that in NO^+ is 3. Which of the following statements is true for these two species

(a) Bond length in $NO^+$is equal to that in NO

(b) Bond length in $NO$is greater than in NO^+

(c) Bond length in $NO^+$is greater than in NO

(d) Bond length is unpredictable

73. Which of the following is diamagnetic

(a) Oxygen molecule

(b) Boron molecule

(c) N_2^+

(d) None

74. Bond energies in NO, NO^+ and NO^- are such as

(a) $NO^- > NO > NO^+$

(b) $NO > NO^- > NO^+$

(c) $NO^+ > NO > NO^-$

(d) $NO^+ > NO^- > NO$

75. Which of the following is paramagnetic

(a) B_2 (b) $\boldsymbol{C_2}$

(c) N_2 (d) F_2

76. The paramagnetic molecule at ground state among the following is

(a) H_2 (b) O_2

(c) N_2 (d) CO

77. Which has the highest bond energy

(a) F_2 (b) Cl_2

(c) Br_2 (d) I_2

78. In O_2^-, O_2 and O_2^{-2} molecular species, the total number of antibonding electrons respectively are

(a) 7, 6, 8 (b) 1, 0, 2

(c) 6, 6, 6 (d) 8, 6, 8

79. Which of the following is not paramagnetic

(a) O_2 (b) O_2^{2+}

(c) O_2^{2-} (d) O_2^-

80. Which of the following species have maximum number of unpaired electrons

(a) O_2 (b) O_2^+

(c) O_2^- (d) O_2^{2-}

81. The correct order in which the $O - O$ bond length increases in the following is

(a) $H_2O_2 < O_2 < O_3$

(b) $O_2 < H_2O_2 < O_3$

(c) $O_2 < O_3 < H_2O_2$

(d) $O_3 < H_2O_2 < O_2$

82. Correct order of bond length is

(a) $CO_3^{2-} > CO_2 > CO$

(b) $CO_2 > CO > CO_3^{2-}$

(c) $CO > CO_2 > CO_3^{2-}$

(d) None of these

83. Which of the following is paramagnetic

(a) N_2 (b) C_2

(c) N_2^+ (d) O_2^{2-}

84. Among the following molecules which one have smallest bond angle

(a) NH_3 (b) PH_3

(c) H_2O (d) H_2Sc

(e) H_2S