1.

Which one of the following is not paramagnetic ?

(a) NO

(b) N_2^+

(c) CO

(d) O_2^-

2.

The angular shape of ozone molecule (O_3) consists of

(a) 1 sigma and 2 pi-bonds

(b) 2 sigma and 2 pi-bonds

(c) 1 sigma and 1 pi-bonds

(d) 2 sigma and 1 pi-bonds

3.

In which of the following molecules are all the bonds not equal ?

[2006]

(a) ClF_3

(b) BF_3

(c) AlF_3

(d) NF_3

4.

According to molecular orbital theory which of the following lists rank the nitrogen species in terms of increasing bond order ?

(a) $N_2^- < N_2 < N_2^{2-}$

(b) $N_2^{2-} < N_2^- < N_2$

(c) $N_2 < N_2^{2-} < N_2^-$

(d) $N_2^- < N_2^{2-} < N_2$

5.

Which one of the following is planar ?

(a) XeF_4

(b) XeO_4

(c) XeO_3F

(d) XeO_3F_2

6.

The dielectric constant of H_2O is 80. The electrostatic force of attraction between Na^+ and Cl^- will be

(a) reduced to $\frac{1}{40}$ in water than in air

(b) reduced to $\frac{1}{80}$ in water than in air

(c) will be increased to 80 in water than in air

(d) will remain unchanged

7.

Which of the following is isoelectronic ?

(a) $CO_2,\ NO_2$

(b) $NO_2^-,\ CO_2$

(c) $CN^-,\ CO$

(d) $SO_2,\ CO_2$

8.

In an octahedral structure, the pair of d orbitals involved in d^2sp^3-hybridisation is

(a) $d_{x^2-y^2},\ d_{z^2}$

(b) $d_{xy},\ d_{x^2-y^2}$

(c) $d_{z^2},\ d_{xz}$

(d) $d_{xy},\ d_{yz}$

9.

Equilateral shape has

(a) sp hybridisation

(b) sp^2 hybridisation

(c) sp^3 hybridisation

(d) dsp^2 hybridisation

10.

Overlap of which of the following atomic orbitals would be maximum to form the strongest
covalent bond.

(1) 1s-2s (σ)

(2) 1s-2p (σ)

(3) 2p-2p (π)

(4) 2p-2p (σ)

11.

Among LiCl, $BeCl_2$, BCl_3 and CCl_4

, the covalent bond character varies as

(1) $LiCl < BeCl_2 > BCl_3 > CCl_4$

(2) $LiCl > BeCl_2 < BCl_3 < CCl_4$

(3) $LiCl < BeCl_2 < BCl_3 < CCl_4$

(4) $LiCl > BeCl_2 > BCl_3 > CCl_4$

12.

Which of the following statement is not correct from the view point of molecular orbital theory ?

(1) Be_2 is not a stable molecule

(2) He_2 is not a stable but He_2^+ is expected to exist.

(3) Bond strength of N_2 is maximum amongst the homonuclear diatomic molecules belonging to the second period.

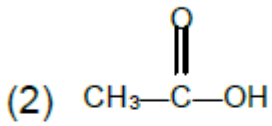
(4) The order of energies of molecular orbitals in N_2 molecule is

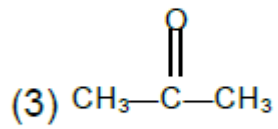
$s2s < s^*2s < s2p_z < (p2p_x = p2p_y) < (p^*2p_x = p^*2p_y) < s^*2p_z$

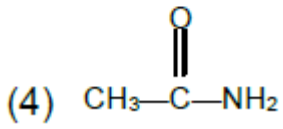
13.

Which of the following compound does not exhibit Hydrogen bonding ?

(1) CH_3CH_2OH

(2) 

(3) 

(4) 

14.

PCl_5 is highly unstable and in solid state it exists as into $[PCl_4]^+$ and $[PCl_6]^-$ ions.

The geometry of $[PCl_6]^-$ is

(1) octahedral

(2) tetrahedral

(3) square pyramidal

(4) square planar

15.

Which of the following species has maximum number of lone-pair of electrons on the central atom ?

(1) XeF_2

(2) H_3O^+

(3) XeF_4

(4) XeF_6

16.

which of the following gas is least polarizable ?

(1) He

(2) Ne

(3) Kr

(4) Xe

17.

The correct order of increasing bond angle order is

(1) $NH_2^- > NH_3 > NH_4^+$

(2) $NH_4^+ > NH_3 > NH_2^-$

(3) $NH_3 > NH_2^- > NH_4^+$

(4) $NH_3 > NH_4^+ > NH_2^-$

18.

The number of sigma bonds in P_4O_{10} is

(1) 6

(2) 16

(3) 20

(4) 7

19.

Among the following isostructural compounds, which one has highest lattice energy ?

(1) LiCl

(2) MgO

(3) NaCl

(4) LiF

20.

A sbonded molecule MX_3 is T-shaped. The number of non-bonding pairs of electrons is :

(1) 0

(2) 2

(3) 1

(4) Can be predicted only if atomic number of M is known,

21.

In a chemical change from $PCl_3 \longrightarrow PCl_5$ the hybrid state of P changes from:

(1) sp^2 to sp^3

(2) sp^3 to sp^2

(3) sp^3 to sp^3d

(4) sp^3 to dsp

22.

Which molecules/ions are most paramagnetic?

1. B_2

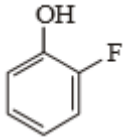
2. C_2

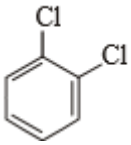
3. O_2^+

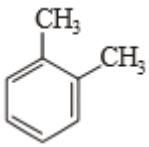
4. O_2^-

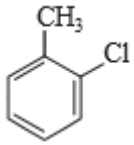
23.

In which case observed dipole moment is greater than theoretical dipole moment?

1. 

2. 

3. 

4. 

24.

Which has highest bond angle ?

(1) NH_3

(2) H_2O

(3) H_2S

(4) PH_3

25.

Select the correct order of solubility (in water) from the following:

(1) $SrSO_4 < CaSO_4 < MgSO_4 < BeSO_4$

(2) NaF < KF < RbF < CsF

(3) $Ba(OH)_2 > SR(OH)_2 > Ca(OH)_2 > Mg(OH)_2$

(4) All of these

26.

Amongst H_2O, H_2S, H_2Se and H_2Te the one with highest boiling point is:

1. H_2O because of H-bonding

2. H_2Te because of higher molecular weight

3. H_2S because of H-bonding

4. H_2Se because of lower molecular weight

27.

Which of the following is correct :-

(1) Extent of hydration is $PCl_5 > SiCl_4$ and $BCl_3 < CCl_4$

(2) K^+ ion will be more Hydrated than Li^+

(3) In BCl_3 there are no vacant d-orbitals but still it can undergo expansion

(4) None

28.

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

(1) $H_2O_2 < O_2 < O_3$

(2) $O_3 < H_2O < O_2$

(3) $O_2 < O_3 < H_2O_2$

(4) $O_2 < H_2O_2 < O_3$

29.

Carbon suboxide (C_3O_2) has

(1) Linear structure

(2) Bent structure

(3) Trigonal structure

(4) Disorted tetrahedral structure

30.

The pair of electron in the given carbanion, $CH_3C{\equiv}C^-$, is present in which orbitals?

(a) sp^3
(b) sp^2
(c) sp
(d)$2p$

31.

Which of the following species contains equal number of σ and π bonds?

(a) HCO_3^- (b) XeO_4

(c) $(CN)_2$ (d) $CH_2(CN)_2$

32.

The correct bond order in the following species is

(a) $O_2^{2+} > O_2^+ > O_2^-$ (b) $O_2^{2+} < O_2^- < O_2^+$

(c) $O_2^+ > O_2^- < O_2^{2+}$ (d) $O_2^- < O_2^+ > O_2^{2+}$

33.

XeF_2 is isostructural with

(a) TeF_2

(b) ICl_2^-

(c) $SbCl_3$

(d) BCl_3

34.

Which one of he following pairs is isostructural (i.e., having the same shape and hybridization)?
(a) [BCl_3 and $BrCl_3$]

(b) [NH_3 and NO_3^-]

(c) [NF_3 and BF_3]

(d) [BF_4^- and NH_4^+]

35.

Bond order of 1.5 is shown by

(a) O_2^+ (b) O_2^- (c) O_2^{2-} (d) O_2

36.

What is the dominant intermolecular force on bond that must be overcome in converting liquid CH_3OH to a gas?

(a) Hydrogen bonding

(b) Dipole-dipole interaction

(c) Covalent bonds

(d) London dispersion force

37.

The correct order of electronegativity of hybrid orbitals of carbon is:

(a) $sp > sp^2 < sp^3$ (b) $sp > sp^2 > sp^3$

(c) $sp < sp^2 > sp^3$ (d) $sp < sp^2 < sp^3$

38.

H_2O has a net dipole moment while BeF_2 has zero dipole moment because :

(a) F is more electronegativity than oxygen

(b) Be is more electronegativity than oxygen

(c) H_2O molecule is linear and BeF_2 is bent

(d) BeF_2 molecule is linear and H_2O is bent

39.

Which of the following compound have the same no. of lone pair with their central atom?

(a) XeF_5^- (b) BrF_3 (c) XeF_2
(d) H_3S^+

(e) Triple Methylene

options are as follows :

(a) (iv) and (v) (b) (i) and (iii)

(c) (i) and (ii) (d) (ii) (iv), (v)

40.

In which of the following species central atom is

NOT surrounded by exactly 8 valence electrons?

(a) BF_4^-

(b) NCl_3

(c) PCl_4^+

(d) SF_4

41.

Which bond is expected to be the least polar?

(a) O-F

(b) P-F

(c) Si-N

(d) B-F

42.

Which set contains only covalently bonded molecules?

(a) BCl_3 , $SiCl_4$, PCl_3

(b) NH_4Br , N_2H_4, HBr

(c) I_2 , H_2S , NAI

(d) Al_2, O_3 , AS_4

43.

NF_3 is:

(a) non-polar compound

(b) electrovalent compound

(c) having low value of dipole moment than NH_3

(d) having more dipole moment than NH_3

44.

Which of the following statement is true for $IO_2F_2^-$ according to VSEPR theory?

(A) The lone pair and two I-O double bonds occupy the equatorial positions of trigonal bipyramid.

(B) It has sp^3 hybridization and is T-shaped.

(C) Its structure is analogous to SF_4.

(D) (A) and (C) both

45.

Which of the following is most covalent-

1. AlF_3

2. $AlCl_3$

3. $AlBr_3$

4. AlI_3

Fill OMR Sheet