



CHEMISTRY

BOOKS - DISHA CHEMISTRY (HINGLISH)

CHEMICAL BONDING AND MOLECULAR STRUCTURE

Mcqs

1. The electronic configuration of metal M is

$1s^2 2s^2 2p^6 3s^1$. The formula of its oxide will

A. MO

B. M_2O

C. SO_3

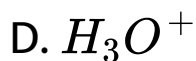
D. all of these

Answer: B



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2. Which of the following does not contain coordinate bond?



Answer: C



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3. Which of the following statement is incorrect?

A. The formation of ionic compounds depend upon the ease of formation of the positive and negative ions from the respective neutral atoms.

B. Formation of ionic compounds depend upon arrangement of the positive and negative ions in the solid.

C. Formation of positive ion involves addition of electron(s) while that of negative ion involves removal of electron(s)

D. none of these

Answer: C



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4. Hybridisation of the underline atom changes in

A. Al H_3 changes of AlH_4^-

B. H_2 O changes to H_3O^+

C. N H_3 changes to NH_4^+

D. in all cases

Answer: A



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5. The decreasing value of bond angles from $NH_3(106^\circ)$ to $SbH_3(101^\circ)$ down group-15 of the periodic table is due to

- A. decreasing ip-bp repulsion
- B. decreasing electronegativity
- C. increasing bp-bp repulsion
- D. increasing p-orbital character in sp^3

Answer: B



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

A. $-0.75, 0.6$

B. $-0.75, 1.0$

C. $-0.75, 1.25$

D. $-3, 1.25$

Answer: C



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7. KF combines with HF to form KHF_2 . The compound contains the species

- A. K^+ , F^- and H^+
- B. K^+ , F^- and HF
- C. K^+ , and $[HF_2]^-$
- D. $[KHF]^+$ and F_2

Answer: C



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8. An ether is more volatile than an alcohol having the same molecular formula. This is due to

A. dipolar character of ethers

B. alcohols having resonance structures

C. inter-molecular hydrogen bonding in ethers

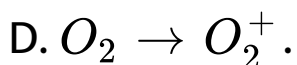
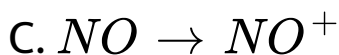
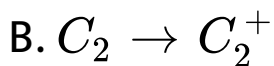
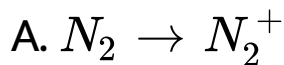
D. inter-molecular hydrogen bonding in alcohols

Answer: D



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9. In which of the following ionization processes, the bond order has increased and the magnetic behaviour has changed?



Answer: C



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10. The maximum number 90° angles between bond pair-bond pair of electrons is observed in

A. dsp^2 hybridization

B. sp^3d hybridization

C. dsp^3 hybridization

D. sp^3d^2 hybridization

Answer: D



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11. Two ice cubes are pressed over each other until they unit to form one block. Which one of the following forces dominate for honding them together?

- A. Dipole-dipole interaction
- B. Van der waals' forces
- C. Hydrogen bond formation
- D. Covalent attraction

Answer: C



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12. In XeF_2 , XeF_4 and XeF_6 , the number of lone pairson Xe are respectively

A. 2,3,1

B. 1,2,3

C. 4,1,2

D. 3,2,1

Answer: D



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13. The hybridization of atomic orbitals of nitrogen in NO_2^+ , NO_2^- 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

Answer: B



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14. Match column-I with column-II and column-III and choose the correct option from the given codes.



A. A-iv,q,B-ii,p,C-i,r,D-iii,s

B. A-iv,q,B-i,p,C-ii,s,D-iii,r

C. A-i,p, B-iii,s, C-iv,r, D-ii,q

D. A-iv,p, B-i,r, C-iii,q, D-ii,s

Answer: B



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15. Which of the following statements is/are not correct for combination of atomic orbitals?

(i) The combining atomic orbitals must have the same or nearly the same energy.

(ii) Greater the extent of overlap, the greater

will be the electron density between the nuclei of a molecular orbital.

(iii) $2p_z$ orbital of one atom can combine with either of $2p_x$, $2p_y$ or $2p_z$ orbital of other atom as these orbitals have same energy.

A. (i) and (ii)

B. only

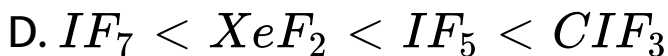
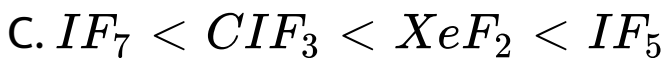
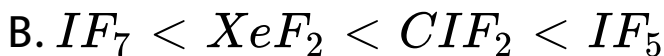
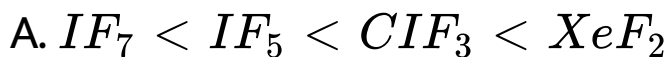
C. (i) only

D. (ii) and (iii)

Answer: B




16. Which of the following is the correct increasing order of lone pair of electron on the central atom?



Answer: A



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17. The dipole moment of chlorobenzene  is

1.5 D. The dipole moment of 

A. 2.86 D

B. 2.25 D

C. 1.5 D

D. 0D

Answer: C



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18. In compounds of type ECl_3 , where E=B, P, As or Bi, the angles Cl-E-Cl for different E are in the order.

A. $B > P = As = Bi$

B. $B > P > As > Bi$

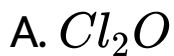
C. $B < P = As = Bi$

D. $B < P < As < Bi$

Answer: B



19. Which of the following substances has the greatest ionic character?



Answer: D

20. If an organic compound contain 92.3% C and 7.7% H, then number of sp^3 , sp^2 and sp hybridized carbon atoms in all possible structures of compound respectively are (molecular mass=52g/mol)

A. 1,2,5

B. 0,4,4

C. 0,8,4

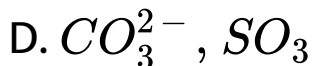
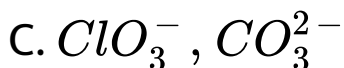
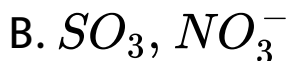
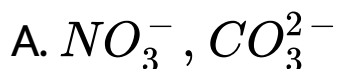
D. none of these

Answer: C



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21. Which of the following are isoelectronic and isostructural? NO_3^- , CO_3^{2-} , ClO_3^- , SO_3



Answer: A



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22. Consider the chemical species NO_3^- , NO_2^+ and NO_2^- and point out the correct statement given below

A. The hybrid state of N in NO_2^+ is sp^2

B. The hybrid state of N in all the species is the same

C. The shape of both NO_2^+ and NO_2^- is bent while NO_3^- is planar

D. The hybrid state of N in NO_3^- and NO_2^- is the same

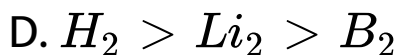
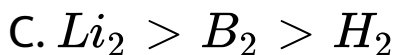
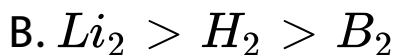
Answer: D



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23. Bond order normally gives idea of stability of a molecular species. All the molecules H_2 , Li_2 and B_2 have the same bond order yet

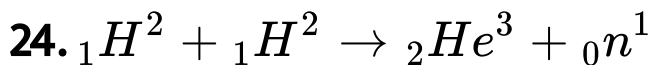
they are not equally stable. Their stability order is



Answer: D



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The above nuclear reaction is called

- A. nuclear fission
- B. nuclear fusion
- C. artificial transmutation
- D. spontaneous disintegration

Answer: B



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25. Hydrogen chloride molecule contains

A. polar covalent bond

B. double bond

C. co-ordinate bond

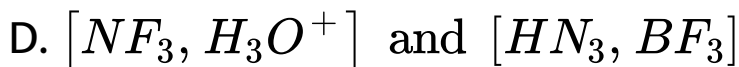
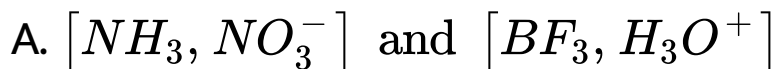
D. electrovalent bond

Answer: A



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26. Among the following species, identify the isostructural pairs.



Answer: C



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27. In the anion HCOO^- the two carbon-oxygen bonds are found to be of equal length.

What is the reason for it?

A. Electronic orbital of carbon atom are hybridisation

B. The C=O bond is weaker than the C-O bond

C. The anion HCOO^- has two resonating structures

D. The anion is obtained by removal of a proton from the acid molecule

Answer: C



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28. Which of the following is/are not essential condition(s) for hybridisation?

(i) The orbitals present in the valence shell of the atom are hybridisation.

(ii) The orbital undergoing hybridisation

should have almost equal energy.

(iii) Promotion of electron is essential prior to hybridisation

(iv) Only half filled orbital participial in hybridisation

A. (i) only

B. (iii) only

C. (iv) only

D. (iii) and (iv)

Answer: D



29. The molecule XY_2 contains two σ and two π -bond and one lone pair of electrons in valence shell of X. the arrangement of lone pair and bond pairs is

- A. linear
- B. trigonal planar
- C. square pyramidal
- D. unpredictable

Answer: B



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30. The molecules BF_3 and NF_3 are both covalent compounds, but BF_3 is non polar whereas NF_3 is polar. The reason for this is

A. atomic size of boron is larger than nitrogen

B. Boron is metal while nitrogen is gas

C. B-F bonds are non-polar while N-F bonds are polar

D. BF_3 is planar but NF_3 is pyramidal

Answer: D

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31. Amongst LiCl, RbCl, $BeCl_2$ and $MgCl_2$ the compounds with the greatest and the least ionic character, respectively are:

A. $LiCl$ and $RbCl$

B. $RbCl$ and $BeCl_2$

C. $MgCl_2$ and $BeCl_2$

D. $RbCl$ and $MgCl_2$

Answer: B



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32. Which of the following is the wrong statement?

- A. ONCl and ONO^- are not isoelectronic.
- B. O_3 molecule is bent
- C. Ozone is violet-black in solid state
- D. Ozone is paramagnetic gas.

Answer: D

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33. For which of the following molecule significant $\mu \neq 0$?



A. Only (i)

B. (i) and (ii)

C. Only (iii)

D. (iii) and (iv)

Answer: D



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34. The bond dissociation energy of B-F in BF_3 is 646 kJ mol^{-1} whereas that C-F in CF_4 is 515 kJ mol^{-1} . The correct reason for higher B-F

bond dissociation energy is compared to that of C-F is

A. Stronger σ bond between B and F in BF_3 as compared to that between C and F in CF_4 .

B. Significant $p\pi - p\pi$ interaction between B and F in BF_3 whereas there is no possibility of such interaction between C and F in CF_4 .

C. Lower degree of $p\pi - p\pi$ interaction

between B and F in BF_3 than that

between C and F in CF_4 .

D. smaller size of B atom as compared to

that of C-atom.

Answer: B



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35. Dipole-induced dipole interactions are present in which of the following pairs:

A. Cl_2 and CCl_4

B. HCl and Hc atoms

C. SiF_4 and He atoms

D. H_2O and alcohols

Answer: B



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36. The number of type of bonds in C_2^{2-} ion
in CaC_2 are

- A. one σ bond and one π -bond
- B. one σ bond and two π -bond
- C. two σ bond and two π -bond
- D. two σ bond are one π -bond

Answer: D



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37. Which of the following methods is used for measuring bond length?

- A. X-ray diffraction
- B. Electron-diffraction
- C. Spectroscopic techniques
- D. all of these

Answer: D



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38. Which of the following molecules have same bond order?



Choose the correct option.

A. I, II and IV have same bond order

B. III and V have same bond order

C. Both (a) and (b) are correct

D. none of these

Answer: C



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39. Which of the following is/are misconception(s) associated with resonance?

(i) The molecules exists for a certain fraction of time in one canonical form and for other fractions of time in other canonical forms.

(ii) The canonical forms have no real existence.

(iii) There is no such equilibrium between the canonical forms

A. (i) only

B. (ii) and (iii)

C. (i) and (iii)

D. (iii) only

Answer: A



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40. A neutral molecule XF_3 has a zero dipole moment. The element X is most likely

A. chlorine

B. boron

C. nitrogen

D. carbon

Answer: B



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41. The species having pyramidal shape is

A. SO_3

B. BrF_3

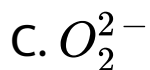
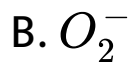


Answer: D



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42. Bond order of 1.5 is shown by:



D. O_2

Answer: B



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43. Which one of the following properties is not shown by NO?

A. It is diamagnetic in gaseous state

B. it is neutral oxide

C. it combines with oxygen to form nitrogen dioxide

D. it's bond order is 2.5

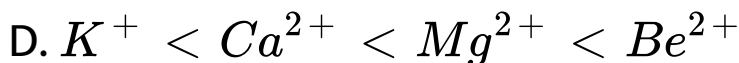
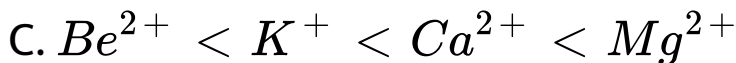
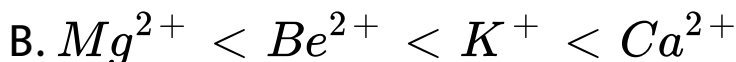
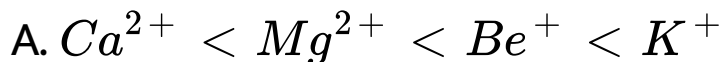
Answer: A

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44. The charge/size ratio of a cation determines its polarizing power. Which one of the following sequences represents the increasing order of the polarizing power of

the cationic species,

K^+ , Ca^{2+} , Mg^{2+} , Be^{2+} ?



Answer: D



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45. In which of the following pairs of molecules/ions, both the species are not likely to exist?



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