



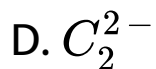
# CHEMISTRY

## BOOKS - SAI CHEMISTRY (TELUGU ENGLISH)

### CHEMICAL BONDING AND STRUCTURE OF MOLECULES

Mcq

1. Which of the following does not have triple bond between the atoms?

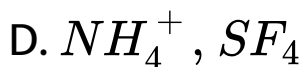
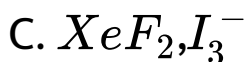
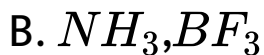
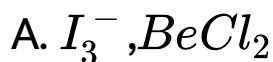


**Answer: ( c )**



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2. In which of the following pairs, the two species have identical shape but differ in hybridization?



**Answer: (a)**



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3. An element in +2 oxidation state has 24 electrons. The atomic number of the element and the number of unpaired electrons present in it respectively are

A. 24,4

B. 26,4

C. 24,2

D. 26,5

**Answer: (b)**



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4. Number of bonding electron pairs and number of lone pairs of electrons in  $ClF_3$ ,  $SF_4$ ,  $BrF_5$ , respectively are

A. 3, 2, 4, 2, 5, 2

B. 3, 1, 4, 1, 5, 2

C. 3, 1, 4, 2, 5, 1

D. 3, 2, 4, 1, 5, 1

**Answer: (d)**



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5. What is meant by the term bond order ?

Calculate the bond order ? Calculate the bond

order of :  $N_2$ ,  $O_2$ ,  $O_2^-$  and  $O_2^{2-}$

A. 3

B. 4

C. 2

D. 1

**Answer: (a)**



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6. Match the following



A. a(v) b(ii) c(iv) d(ii)

B. a(ii) b(iii) c(iv) d(v)

C. a(ii) b(iii) c(iv) (di)

D. a(iii) b(ii) c(iv) d(i)

**Answer: (b)**



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7. Which one of the following has longest covalent bond distance?

A. C-C

B. C-H

C. C-N

D. C-O

**Answer: (a)**



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8. The molecular interaction responsible for hydrogen bonding in HF.

A. Ion-induced dipole

B. Dipole-dipole

C. Dipole-induced dipole

D. Ion-dipole

**Answer: (b)**



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9. Identify the correct set.



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10. Which one of the following statements is correct?

A. Hybrid orbitals do not form  $\sigma$  bonds

B. Lateral overlap of p-orbitals or p-and d-orbitals produces  $\pi$ -bonds

C. order  $\sigma_{p-p} < \sigma_{s-s} < \pi_{p-p}$

D. s-orbitals do not form  $\sigma$  bonds

**Answer: (b)**



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**11.** The formal charges of C and O atoms in



A. 1,-1

B. -1, 1

C. 2,-2

D. 0,0

**Answer: (d)**



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**12.** According to molecular orbital theory, the total number of bonding electron pairs in  $O_2$ , is

A. 2

B. 3

C. 5

D. 4

**Answer: ( c )**



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**13.** The formal charges of  $N_1N_2$  and O atoms

in  $:\ddot{N}_1 = N_2 = \overset{\cdot}{O}:$  are respectively

A. + 1, - 1, 0

B. - 1, + 1, 0

C. +1, +1, 0

D. -1, -1, 0

**Answer: (b)**



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**14.** In which of the following pairs, the central atoms have the same number of lone pairs of electrons?

A.  $PCl_5, BrF_5$

B.  $XeF_2, ICl$

C.  $XeF_4, ClO_4$

D.  $SCl_4, CH_4$

**Answer: (b)**



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**15. Match the following**



A. A-5, B-1, C-3, D-2

B. A-3,B-1,C-2,D-5

C. A-5,B-1,C-2,D-3

D. A-1,B-5,C-3,D-4

**Answer: ( c )**



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**16.** Given that  $\Delta H_f(H) = 218KJ/mol$ ,

express the H-H bond energy in Kcal//mol.

A. 52.15



B. 911

C. 104

D. 52153

**Answer: ( c )**



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**17.** Fluorine reacts with dilute NaOH and forms a gaseous product A. The bond angle in the molecule of A is

A.  $104^{\circ} 40$

B.  $130^{\circ}$

C.  $107^{\circ}$

D.  $109^{\circ} 28$

**Answer: (b)**



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**18.** Dipole moment of  $\text{HCl} = 1.03 \text{ D}$ ,  $\text{HI} = 0.38 \text{ D}$ .

Bond length of  $\text{HCl} = 1.3 \text{ \AA}$  and

$\text{HI} = 1.6 \text{ \AA}$  The ratio of fraction of electric

charge, delta, existing on each atom in HCl and

HI is

A. 12: 1

B. 27: 1

C. 3.3:1

D. 1: 3.3

**Answer: ( c)**



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19. The bond length of HCl molecule is  $1.275 \text{ \AA}$  and its dipole moment is 1.03 D. The ionic character of the molecule (in per cent) (charge of the electron  $-4.8 \times 10^{-10} \text{ esu}$ ) is

A. 100

B. 67.3

C. 33.66

D. 16.83

**Answer: (d)**



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20. Which one of the following is a correct set?

- A.  $H_2O, sp^3$ , angular
- B.  $BCl_3, Sp^3$ , angular
- C.  $NH_4^+, dsp^2$ , square planar
- D.  $CH_4, dsp^2$ , tetrahedral

**Answer: (a)**



21. The compound in which the number of dπ - pπ bonds are equal to those present in  $ClO_4^-$ , is



**Answer: (b)**



22. Which of the following statements is correct?

A. Silicon doped with boron is an i-type semiconductor

B. Silicon doped with arsenic is a p-type semiconductor

C. Metals are good conductors of electricity

D. Electrical conductivity of semiconductors

decreases with increase temperature

**Answer: ( c )**



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**23.** Which of the following is not a tetrahedral molecule?







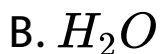
**Answer: ( c )**



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**24.** Which of the following is a linear molecule

?



C.  $SO_2$

D.  $C_2$

**Answer: (a)**



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**25.** Which of the following is correct?

A. The number of electrons present in the valence shell of S in  $SF_6$  is 12

B. The rates of ionic reactions are very slow

C. According to VSEPR theory,  $SnCl_2$  is a linear molecule

D. The correct order of ability to form ionic compounds among  $Na_+$ ,  $Mg_{2+}$  and  $Al_{3+}$  is  $Al_{3+} > Mg_{2+} > Na_+$

**Answer: (a)**



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**26.** Which of the following is not correct regarding the properties of ionic compounds ?

A. Ionic compounds have high melting and boiling points

B. Their reaction velocity in aqueous medium is very high

C. Ionic compounds in their molten and aqueous solutions do not conduct electricity

D. They are highly soluble in polar solvents

**Answer: ( c )**



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**27.** The oxidation state of Xe in  $XeO_3$  and the bond angle in it respectively, are

A. + 6,  $109^\circ$

B. + 8,  $103^\circ$

C. + 6,  $103^\circ$

D. + 8,  $120^\circ$

**Answer: ( c )**



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**28.** If the bond length and dipole moment of a diatomic molecule are  $1.25 \text{ \AA}$  and  $1.0 \text{ D}$  respectively, what is the percent ionic character of the bond ?

A. 10.66

B. 12.33

C. 16.66

D. 19.33

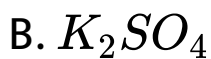
**Answer: ( c )**



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**29.** Which one of the following molecules contains both ionic and covalent bonds?

A.  $CH_2Cl_2$



**Answer: (b)**



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**30.** What is the hybridisation state of the central atom in  $NH_4^+$  ion?

A. sp



B.  $sp^3$

C.  $sp^2$

D.  $dsp^2$

**Answer: B**



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**31.** The number of lone pairs of electrons present on Xe in  $XeF_4$  is

A. 3

B. 4

C. 1

D. 2

**Answer: (d)**



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**32.** Which of the following statements is true

?

A. Hybridisation of the central atom in

$NH_3$  and  $CH_4$  is  $sp^2$

B.  $BeCl_2$  has V shape while  $SO_2$  is linear

C.  $SF_6$  is octahedral and F-S-F bond angle

is  $90^\circ$

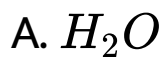
D.  $CO_2$  has dipole moment

**Answer: ( c )**



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33. Which of the following has lowest bond angle?



**Answer: ( c )**



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34. Which of the following is the correct pair?

A.  $BeCl_2$ -linear

B.  $NH_3$ -linear

C.  $CO_3$ -tetrahedral

D.  $BF_3$ -octahedral

**Answer: (a)**



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35. The molecule having zero dipole moment is

A.  $CHCl_3$

B.  $H_2O$

C.  $CCl_4$

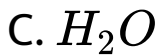
D.  $HCl$

**Answer: ( c )**



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**36.** Which of the following covalent molecules is an exception of octet rule?



**Answer: (a)**



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**37.** Which one of the following statements is true for ammonium ion ?

A. All bonds are ionic

B. ) All bonds are coordinate covalent

C. ) H-atoms are situated at the corners of  
a square

D. ) H-atoms are situated at the corners of  
tetrahedron

**Answer: (d)**



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38. The state of hybridisation of boron in

$BCl_3$  is

A.  $sp^3$

B.  $sp^2$

C.  $sp$

D.  $sp^3d$

**Answer: (b)**



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**39.** The effect of repulsion between the two lone pair of electrons present on oxygen in water molecule is

- A. No change in H-O-H bond angle
- B. Increase in H-O-H bond angle
- C. Decrease in H-O-H bond angle
- D. All atoms will be in one plane

**Answer: ( c )**



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40. Which of the following molecules has the highest dipole moment?



**Answer: ( c )**



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41. In which of the following compounds is hydrogen bonding strongest in liquid phase ?

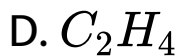


**Answer: (a)**



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42. Which of the following contains a coordinate covalent bond ?



**Answer: ( c )**



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**43.** . Valence bond theory of L. Pauling and J.C. Slater accounts for ..... characteristics of covalent bond.

- A. Directional
- B. Non-directional
- C. Sharing
- D. None of these

**Answer: (a)**



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**44.** When hydrogen bond is formed between two molecules, it is called

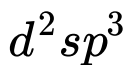
- A. Intramolecular H-bond
- B. Intermolecular H-bond
- C. Directional H-bond
- D. Both (b) and (c)

**Answer: (b)**



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45.



hybridisation

represents \_\_\_\_\_ configuration.

- A. Tetrahedral
- B. Square planar
- C. Linear
- D. Octahedral

**Answer: (d)**



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46. The bonds in  $K_4[Fe(CN_6)]$  are

A. ) Ionic

B. Covalent

C. Ionic and covalent

D. Ionic, covalent and coordinate covalent  
bond

**Answer: (d)**



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47. The normal boiling point of  $CS_2$ ,  $H_2O$  and  $CCl_4$ , are  $41.3^\circ C$ ,  $100^\circ C$  and  $77^\circ C$  respectively. The liquid in which the intermolecular forces are the weakest is

A.  $CS_2$

B.  $H_2O$

C.  $CCl_4$

D. All have similar forces

**Answer: (a)**

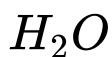


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48. Water has a higher boiling point than corresponding hydrides  $H_2S$ ,  $H_2Se$  and  $H_2Te$ . This is because of

A. Angular structure of water

B. Presence of lone pair of electrons in



C. Presence of intramolecular H-bonding in  
water

D. Presence of intermolecular H-bonding in  
water

**Answer: (d)**



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