

**INTERNATIONAL INDIAN SCHOOL-DAMMAM**  
**FIRST TERMINAL EXAMINATION-JUNE2015**  
**CLASS -XI CHEMISTRY- SET-A**

TIME:3 Hours

MAX.MARKS:70

General Instructions:

1. All questions are compulsory.
  2. Questions 1 to 5 are very short answer questions and carry 1 mark each.
  3. Questions 6 to 10 are short answer questions and carry 2 marks each.
  4. Questions 11 to 22 are short answer questions and carry 3 marks each.
  5. Question no.23 is value based and carries 4 marks.
  6. Questions 24, 25 and 26 are long answer questions and carry 5 marks each
  7. Use log tables if necessary.
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|-----|---|---|
| 1.  | State Pauli exclusion principle.  | 1 |
| 2.  | Write the Lewis dot structure of CO .   | 1 |
| 3.  | How many significant figures are there in the following:<br>a)0.00368<br>b)3.653 x 10 <sup>4</sup>  | 1 |
| 4.  | Find the number of sigma and pi bonds<br>a)CH <sub>3</sub> CH=CH <sub>2</sub> b)C <sub>3</sub> H <sub>4</sub>   | 1 |
| 5.  | Justify the presence of 32 elements in the sixth period of the periodic table.  | 1 |
| 6.  | Define dipole moment .Why is the dipole moment of NF <sub>3</sub> less than that of NH <sub>3</sub> ?   | 2 |
| 7.  | An oxide of nitrogen contains 30.43% of nitrogen. The molecular weight of the compound is equal to 92.Calculate the molecular formula of the compound.[Atomic mass of N=14 ,O=16]                                   | 2 |
| 8.  | What are isoelectronic species ?Arrange the following species in the increasing order of their size;Mg <sup>2+</sup> ,Al <sup>3+</sup> ,Na <sup>+</sup> ,O <sup>2-</sup> ,F <sup>-</sup>                            | 2 |
| 9.  | What are the possible values of l and m <sub>l</sub> for an electron in a 4f orbital? Why4s is orbital filled before 3d orbital?  | 2 |
| 10. | Mention the shape and hybridization of PCl <sub>5</sub> and SF <sub>6</sub> .   | 2 |
| 11. | Give reasons:<br>a) Noble gases have large positive electron gain enthalpies.<br>b) Ionization enthalpy of nitrogen is more than that of oxygen.<br>c) The size of anion is always larger than that of parent atom. | 3 |
| 12. | What is meant by bond order? Calculate the bond orders of O <sub>2</sub> <sup>-</sup> and O <sub>2</sub> <sup>2-</sup> ions.  | 3 |
| 13. | a) Define Octet rule and mention its limitations.<br>b)Write the resonating structures of CO <sub>3</sub> <sup>2-</sup> .   | 3 |

14. a) What is a limiting reagent? 3  
 b) Nitrogen and hydrogen react to produce ammonia according to the equation  $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ . Calculate the mass of ammonia produced if  $2.00 \times 10^3$  g of nitrogen reacts with  $1.00 \times 10^3$  g of hydrogen.
15. Calculate the number of atoms of each element present in 5.3g of  $Na_2CO_3$ . 3  
 [atomic mass of Na=23, C=12, O=16]
16. a) Explain the formation of hydrogen molecule on the basis of valence bond theory. 3  
 b) Predict the shapes of  $NH_3$  and  $ClF_3$  molecules using VSEPR theory.
17. i) What is meant by 3  
 a) Stark effect b) Emission spectrum?  
 ii) List two main differences between orbit and orbital.
18. a) What is the basic difference between electron gain enthalpy and electronegativity? 3  
 b) Write the IUPAC name and symbol for the element with atomic number 117.
19. Yellow light emitted from a sodium lamp has a wavelength of 580nm. Calculate the frequency and wavenumber of the yellow light. 3
20. Although both  $CO_2$  and  $H_2O$  are triatomic molecules, the shape of  $H_2O$  molecule is bent while that of  $CO_2$  is linear. Explain on the basis of dipole moment. 3

OR

Besides tetrahedral geometry, another possible geometry of  $CH_4$  is square planar with four hydrogen atoms at the corner of the square and C atom at the centre. Why  $CH_4$  can't adopt square planar geometry?

21. a) Mention four properties of cathode rays. 3  
 b) Write the electronic configuration of copper.
22. Give the IUPAC name of the following compounds: 3  
 i)  $CH_2=CH-CH_2-CH_3$  ii)  $CH_3-CH(CH_3)_2-CH_2-CH(CH_3)-CH_3$
23. Mendeleev was a versatile genius. He worked on many problems connected with natural resources. He invented an accurate barometer. Mendeleev had a most important contribution in periodic table and discovery of new elements by predicting their properties. 4  
 a) In terms of period and group where would you locate the element with  $Z=114$ ?  
 b) Why should we conserve our natural resources?  
 c) What values were possessed by Mendeleev?

24. a) Define photo electric effect? Explain this effect on the basis of quantum theory of electromagnetic radiation.  
b) What is the wavelength of light emitted when the electron in a hydrogen atom undergoes a transition from an energy level with  $n=4$  to  $n=2$ ?  
( OR)  
a) Describe the series of hydrogen spectrum and the region to which they belong with a diagram. 5  
b) The threshold frequency for a metal is  $7.0 \times 10^{14} \text{ s}^{-1}$ . Calculate the kinetic energy of an electron emitted when radiation of frequency  $1.0 \times 10^{15} \text{ s}^{-1}$  hits the metal.
25. i) What are bonding and anti-bonding molecular orbitals? Mention the conditions for the combination of atomic orbitals. 5  
ii) Discuss the shape of  $\text{C}_2\text{H}_2$  on the basis of hybridization.  
iii) Write any two differences between sigma and pi bonds.

OR

- i) Write any four salient features of molecular orbital theory. Using molecular orbital theory explain why  $\text{He}_2$  molecule does not exist?  
ii) What is a hydrogen bond? Explain with examples.
26. i) Define molality. Why molality is preferred over molarity for expressing the concentration of a solution 5  
ii) A sugar syrup of weight 214.2g contains 34.2g of sugar ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ). Calculate  
a) Molal concentration  
b) Mole fraction of sugar in the syrup [atomic mass of C=12, H=1 and O=16]

OR

Define molarity. Concentrated HCl is 38% by mass. What is the molarity of this solution if density equals  $1.19 \text{ g cm}^{-3}$ ?

b) What volume of conc. HCl is required to make 1.00L of 0.10M HCl? [atomic mass of H=1u, Cl=35.5u]

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1. How many significant figures are there in the following: 1  
a)0.00368  
b) $3.653 \times 10^4$
2. Justify the presence of 32 elements in the sixth period of the periodic table. 1
3. Write the Lewis dot structure of CO. 1
4. Find the number of sigma and pi bonds 1  
a) $\text{CH}_3\text{CH}=\text{CH}_2$  b) $\text{C}_3\text{H}_4$
5. State Pauli exclusion principle. 1
6. An oxide of nitrogen contains 30.43% of nitrogen. The molecular weight of the compound is equal to 92. Calculate the molecular formula of the compound.[Atomic mass of N=14 ,O=16] 2
7. Mention the shape and hybridization of  $\text{PCl}_5$  and  $\text{SF}_6$ . 2
8. Define dipole moment .Why is the dipole moment of  $\text{NF}_3$  less than that of  $\text{NH}_3$ ? 2
9. What are isoelectronic species ?Arrange the following species in the increasing order of their size; $\text{Mg}^{2+}$ , $\text{Al}^{3+}$ , $\text{Na}^+$ , $\text{O}^{2-}$ , $\text{F}^-$  2
10. What are the possible values of l and  $m_l$  for an electron in a 4f orbital? Why is 4s orbital filled before 3d orbital? 2
11. a) Define Octet rule and mention its limitations. 3  
b) Write the resonating structures of  $\text{CO}_3^{2-}$ .
12. Give reasons: 3  
a) Noble gases have large positive electron gain enthalpies.  
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13. Calculate the number of atoms of each element present in 5.3g of  $\text{Na}_2\text{CO}_3$ . [atomic mass of Na=23,C=12,O=16] 3

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15. What is meant by bond order? Calculate the bond orders of  $O_2^+$  and  $O_2^{2-}$  ions. 3
16. a) Explain the formation of hydrogen molecule on the basis of valence bond theory. 3  
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