



**INDIAN SCHOOL SOHAR**  
**UNIT TEST 2015-2016**  
**CHEMISTRY**

STD: XI  
Date: 12-05-2015

MARKS: 50  
TIME: 2 Hrs

**Instructions:**

1. All questions are compulsory.
  2. Question nos. 1-2 are very short answer questions and carry 1 mark each.
  3. Question nos. 3-6 are short answer questions and carry 2 marks each.
  4. Question nos. 7-16 are short answer questions and carry 3 marks each.
  5. Question nos. 17-18 are long answer questions and carry 5 marks each.
  6. Write serial no. of the question before attempting it.
  7. Use log tables for calculations.
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1. If the molecular formula of glucose is  $C_6H_{12}O_6$ , what is its empirical formula?
  2. What is the frequency of radiation if its wavelength is  $6000 \text{ \AA}$ ?
  3. Calculate the number of atoms present in each of the following:  
a) 0.5 mole atoms of nitrogen    b) 0.2 mole molecules of nitrogen
  4. How many moles and grams of NaOH are present in 250 mL of 0.5M solution?  
( Atomic mass of H=1, O=16, Na=23  $\text{gmol}^{-1}$ )
- OR
- a) If  $1.5055 \times 10^{23}$  atoms of an element weigh 4 gm, what is the atomic mass of the element?
  - b) What is the volume occupied by 16g of oxygen at STP?
5. Explain the spectrum of hydrogen.
  6. What volume of 0.5M HCl solution should be mixed with 0.1M HCl solution to get 2L of 0.2M HCl solution?
  7. An organic compound on analysis gave the following percentage composition:  
C= 32%, H=4% and the rest oxygen. If the molar mass of the compound is  $150 \text{ gmol}^{-1}$ , find the molecular formula of the compound. (Atomic mass of H=1, C=12, O=16  $\text{gmol}^{-1}$ )
  8. What information does Principal and spin quantum number give about an electron in an atom? What permitted values do they take?
  9. 50g of  $\text{CaCO}_3$  is treated with 500mL of 1M HCl solution. Find the volume of  $\text{CO}_2$  evolved at STP. Which is the limiting reagent? ( Atomic mass of Ca=40  $\text{gmol}^{-1}$  )
  10. State Heisenberg's uncertainty principle. Give its significance.
  11. a) Write the values of four quantum number for the 13<sup>th</sup> electron in aluminium. ( Z=13)  
b) How many electrons in sulphur (Z=16) can have  $n+l = 3$  ?  
c) What will happen to the wavelength of a moving particle if its velocity is doubled?

OR

- a) How many subshells are associated with  $n=4$ ?
- b) How many electrons will be present in the subshells having  $s = -1/2$  for  $n=4$ ?
- c) What are the possible values of magnetic quantum number for i)  $l=0$  ii)  $l=2$  ?
12. a) Define mole.
- b) Calculate the total number of moles present in a gaseous mixture containing  $3.011 \times 10^{23}$  molecules of oxygen and  $6.022 \times 10^{21}$  molecules of ozone.
13. a) Define i) quantum ii) black body
- b) On what does the energy of quantum depend ? What is this equation called?
14. Arrange the following in the increasing order of their mass:
- a) 5.6L of ozone at STP b)  $6.022 \times 10^{22}$  atoms of oxygen c)  $6.022 \times 10^{22}$  molecules of oxygen
15. Write the electronic configuration of  $Mn^{2+}$  ion ( $Z=25$ ) and predict the following:
- i) number of unpaired electrons ii) number of electrons with  $n=3$  and  $m=0$
- iii) number of electrons having Azimuthal quantum number ' $l$ '=1
16. If the energy of an electron in 3<sup>rd</sup> Bohr orbit is  $-E$ , what is the energy of the electron in
- a) 1<sup>st</sup> Bohr orbit b) 2<sup>nd</sup> Bohr orbit in terms of ' $E$ '?
17. Explain the rules followed in the filling up of different orbitals of an atom with electrons giving suitable examples.

OR

- a) How does Bohr's model of an atom explain a) stability of an atom b) origin of spectral lines in hydrogen spectrum.
- b) What are the limitations of Bohr's model?
- c) Explain the dual behaviour of electron.
18. a) State Photoelectric effect.
- b) What are the observations of photoelectric effect?
- c) The threshold frequency for a metal is  $7 \times 10^{14} s^{-1}$ . Calculate the kinetic energy of an electron emitted when radiation of frequency  $10^{15} s^{-1}$  hits the metal. ( $h=6.6 \times 10^{-34} JS$ )
- OR
- a) How does de Broglie and Heisenberg's uncertainty principle raise objection to Bohr's theory? Explain.
- b) The wavelength of the first spectral line of Balmer series is  $6500 \text{ \AA}$ . What is the wavelength of the second spectral line of Balmer series?

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