



ANANDALAYA  
SUMMATIVE ASSESSMENT – 1  
Class : XI

Subject: CHEMISTRY  
Date 21/09/ 2016

M.M: 70  
Time: 3 Hour

**General Instructions:**

1. All questions are compulsory.
  2. Marks for each question are indicated against it.
  3. Question numbers 1 to 5 are very short answer questions, carrying 1 mark each. Answer these in one word or about one sentence each.
  4. Question numbers 6 to 10 are short answer questions, carrying 2 marks each. Answer these in about 30 words each.
  5. Question numbers 11 to 22 are short answer questions carrying 3 marks each. Answer these in about 40 words each.
  6. Question number 23 is value based question and carries 4 marks.
  7. Question numbers 24 to 26 are long answer questions carrying 5 marks each. Answer these in about 70 words each.
  8. Use log tables, if necessary. Use of calculator is not permitted.
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- 1 Express the number 5.607892 to four significant figures. (1)
  - 2 Give general electronic configuration of d-block and f-block elements. (1)
  - 3 Arrange the following species in order of increasing ionic radii:  $N^{3-}$ ,  $O^{2-}$ ,  $F^-$ ,  $Na^+$ ,  $Mg^{2+}$ , and  $Al^{3+}$  (1)
  - 4 Oxygen has lower  $\Delta_f H$  than N and F. Why? (1)
  - 5 Electro-negativity goes on decreasing down the group. Give reason. (1)
  
  - 6 What are degenerate orbitals? Explain giving an example. (2)
  - 7 Out of proton and electron which one will have a higher velocity to produce matter waves of the same wavelength? Explain. (2)
  - 8 Although  $NH_3$  and  $H_2O$  molecules are distorted tetrahedral, bond angle in water is less than that in ammonia. (2)
- OR**
- At  $0^\circ C$ , the density of a gaseous oxide at 2 bar is the same as that of nitrogen at 5 bar. What is the molecular mass of the oxide?
- 9 A vessel of 120mL capacity contains a certain amount of gas at  $35^\circ C$  and 1.2 bar pressure. The gas is transferred to another vessel of volume 180mL at  $35^\circ C$ . What would be its pressure? (2)
  - 10 What type of interparticle forces are broken in each of the following processes? (2)
    - (i) Sublimation of iodine
    - (ii) Evaporation of water
    - (iii) Sublimation of dry ice
    - (iv)  $HCl(g) \rightarrow HCl(l)$
  
  - 11 State Dalton's law of partial pressures. Give its utility. (3)
  - 12 What do mean by gram atomic mass. One million silver atoms weigh  $1.79 \times 10^{16}$  g. Calculate the gram atomic mass of silver. (3)
  - 13 (i) The unpaired electron in Al and Si are present in the 3p orbital. Which electron will experience more effective charge from the nucleus? (3)
    - (ii) Indicate the number of unpaired electrons in (i) P (ii) Cr (iii) Fe (iv) Cu
  - 14 (i) Comment on the statement that "all elements having high ionization enthalpies also have high electron gain enthalpies." (3)
    - (ii) Out of oxygen and sulphur which has greater negative electron gain enthalpy and why?
  - 15 Compare the relative stability of the following species and indicate their magnetic properties:  $O_2^+$ ,  $O_2^-$ ,  $O_2^{2-}$  (3)

**OR**

Draw diagrams showing the formation of a double and triple bond between the carbon atoms in the  $C_2H_4$  and  $C_2H_2$  molecules

- 16 1.375 g of cupric oxide was reduced by heating in a current of hydrogen and the mass of copper that remained was 1.098 g. In another experiment, 1.179 g of copper was dissolved in the nitric acid and the resulting copper nitrate converted into cupric oxide by ignition. The mass of cupric oxide formed was 1.476 g. Show that these results illustrate the law of constant proportion. (3)
- 17 Calculate the wavelength and energy of radiation emitted for the electronic transition from infinity to the first orbit of the hydrogen atom. (3)
- 18 Predict the hybrid state of central atom in the following compounds:  $\text{CO}_3^{2-}$ ,  $\text{NH}_3$ ,  $\text{SF}_4$ ,  $\text{ClF}_3$ ,  $\text{BrF}_5$ ,  $\text{XeF}_4$ . (3)
- 19 State Boyle's law and Charles's law. Use these laws to derive the relationship  $P_1V_1/T_1 = P_2V_2/T_2$  (3)
- 20 Explain why the bond order of  $\text{N}_2$  is greater than  $\text{N}_2^+$  but the bond order of  $\text{O}_2$  is less than that of  $\text{O}_2^+$ ? (3)
- 21 Two flasks of equal capacity contain  $\text{NH}_3$  and  $\text{SO}_2$  gas respectively under similar conditions. Which flask contains (i) more number of moles (ii) more mass of gas (iii) more number of atoms. (3)
- 22 The increasing order of reactivity among group 1 elements is  $\text{Li} < \text{Na} < \text{K} < \text{Rb} < \text{Cs}$  whereas that among group 17 elements is  $\text{F} > \text{Cl} > \text{Br} > \text{I}$ . Explain. (3)
- 23 Water is a universal solvent. But alcohol also dissolves most of the substances soluble in water. And also many more. Boiling point of water is  $100^\circ\text{C}$  and that of alcohol is  $80^\circ\text{C}$ . The specific heat of water is much higher than the specific heat of alcohol. (4)
- (a) List out three possible differences if instead of water as the liquid in our body we had alcohol.  
(b) What value can you derive from this special property of water and its innumerable uses in sustaining life on earth?
- 24 a) What is the difference between 160 cm and 160.0 cm . (5)  
b) In the combustion of methane, what is the limiting reactant and why?  
c) A compound made up of two elements A and B has A = 70 %, B = 30 %. Their relative number of moles in the compound is 1.25 and 1.88. Calculate (a). Atomic masses of the elements A and B (b) Molecular formula of the compound , if its molecular mass is found to be 160

**OR**

A welding fuel gas contains carbon and hydrogen only. Burning a small sample of it in oxygen gives 3.38 g carbon dioxide, 0.690 g of water and no other products. A volume of 10.0 L (measured at STP) of this welding gas is found to weigh 11.6 g. Calculate (i) empirical formula, (ii) molar mass of the gas, and (iii) molecular formula..

- 25 a) Calculate wave number of yellow radiations having wavelength of  $5800 \text{ \AA}$  . (5)  
b) What are the values of n and l for 2p orbital?  
c) Which of the following orbitals are not possible? 1p, 2s, 3f and 4d  
d) Write the electronic configuration of the element having atomic number 24.

**OR**

What are the draw backs of Bohr's atomic model? Show that the circumference of the Bohr orbit for the hydrogen atom is an integral multiple of the de Broglie wavelength associated with the electron revolving around the orbit.

- 26 a) Which hybrid orbitals are used by carbon atoms in the following molecules? (5)  
(a)  $\text{CH}_3\text{-CH}_3$ ; (b)  $\text{CH}_3\text{-CH=CH}_2$ ; (c)  $\text{CH}_3\text{-CH}_2\text{-OH}$ ; (d)  $\text{CH}_3\text{-CHO}$  (e)  $\text{CH}_3\text{COOH}$   
b) Which out of  $\text{NH}_3$  and  $\text{NF}_3$  has higher dipole moment and why?

**OR**

Discuss the shape of the following molecules using the VSEPR model:  $\text{BeCl}_2$ ,  $\text{BCl}_3$ ,  $\text{AsF}_5$ ,  $\text{H}_2\text{S}$ ,  $\text{PH}_3$