INDIAN SCHOOL SOHAR
UNIT TEST - I 2018 – 2019
CHEMISTRY

Class	:	**XI**	**Max. Marks**	:	**50**
Date	:	**21.05.2018**	**Duration**	:	**2.00 Hrs**

General Instructions:
(i) All questions are compulsory.
(ii) Question numbers 1 and 2 very short answer questions carrying 1 mark each.
(iii) Question numbers 3 to 6 are short answer questions carrying 2 marks each.
(iv) Question numbers 7 to 16 are also short answer questions carrying 3 marks each.
(v) Question numbers 17 and 18 are long answer questions carrying 5 marks each.
(vi) Use log tables, if necessary, Use of calculator is not allowed.
(vii) Constants: Atomic Masses C = 12u; Cl = 35.5 u; Na = 23 u; O= 16 u; H = 1 u; K = 39 u; Mn = 55 u;
N_A = 6.02 x 10^{23}

1. Write the electronic configuration of Cu^{2+} (Z = 29), Cr^{3+} (Z = 24).

2. State modern periodic law.

3. (i) State Gay Lussac's law gaseous volumes.
   (ii) State the law of multiple proportions.

   OR

   (i) State Avogadro's law.
   (ii) State the law of definite proportions.

4. The density of 3 M solution of NaCl is 1.25gmL^{-1}. Calculate the molality of the solution.

5. The ionisation energy of H-atom (in the ground state) is x kJ. Find the energy required for an electron to jump from second to third energy level.

6. (i) Which important property did Mendeleev use to classify the elements in his periodic table?
   (ii) Write the IUPAC name and symbol of an element having atomic number 118.

7. Calculate the atomic mass (average) of chlorine using the following data:

Isotope	% of Natural Abundance	Molar Mass
^{35}Cl	75.77	34.9689
^{37}Cl	24.23	36.9659

   OR

   Write the definition of the following:
   (i) Avogadro constant (ii) Mole (iii) Formula Mass

8. 50.0 kg of $N_2(g)$ and 10.0 kg of $H_2(g)$ are mixed to produce $NH_3(g)$. Calculate the $NH_3(g)$ formed. Identify the limiting reagent in the production of NH_3 in this solution.

9. (i) How many grams of $KClO_3$ must be decomposed to prepare 3.36 L of oxygen at STP?
   (ii) How many moles of methane are required to produce 22 g of $CO_2(g)$ after combustion?

10. Define the following:
    (i) Molarity.
    (ii) Molality.
    (iii) Mole fraction

11. State the following:

(i)   Hund's Rule

(ii)   Heisenberg uncertainty principle

12.   A photon of wavelength 4×10^{-7} m strikes on metal surface, the work function of the metal being 2.13 eV. Calculate (i) the energy of the photon (eV), (ii) the kinetic energy of the emission, and (iii) the velocity of the photoelectron. (1eV = 1.602×10^{-19} J)

13.   (i)   Write the electronic configuration of the following ions:

        (a) H^- (b) Na^+ (c) O^{2-} (d) F^-

       (ii)   What are the atomic numbers of elements whose outermost electrons are represented by

        (a) $3s^1$ (b) $2p^3$ (c) $3p^5$

       (iii)   Which atoms are indicated by the following configurations?

        (a) $[He]\, 2s^1$ (b) $[Ne]\, 3s^2 3p^3$ (c) $[Ar]\, 4s^2\, 3d^1$

14.   Calculate the kinetic energy of a moving electron which has wavelength of 4.8 pm.

       (Mass of electron = 9.1×10^{-31} kg; h = 6.626×10^{-34} kgm^{2}s^{-1})

15.   (i)   State Pauli's Exclusion Principle.

       (ii)   Account for the following:

        (a) Chromium has configuration $3d^5 4s^1$ and not $3d^4 4s^2$.

        (b) Bohr's orbits are called stationary orbits or states.

16.   Write any three differences between the modern periodic table and Mendeleev's Periodic table.

17.   (a)   Write the four differences between mixture and compound.

       (b)   A welding gas contains carbon and hydrogen only. Burning a small sample of it in oxygen gives 3.38 g of carbon dioxide, 0.690 g of water and no other products. A volume of 10L (measured STP) of this welding gas is found to weigh 11.6g. Calculate empirical formula, molar mass of the gas and molecular formula.

OR

       (a)   Calcium carbonate reacts with aqueous HCl according to the reaction

        $CaCO_3(s)\ +\ 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$

        What mass of $CaCO_3$ is required to react completely with 25 mL of 0.75M HCl?

       (b)   Chlorine is prepared in the laboratory by treating manganese dioxide (MnO_2) with aqueous hydrochloric acid according to the reaction.

        $4HCl(aq) + MnO_2(s) \rightarrow 2H_2O(l) + MnCl_2(aq) + Cl_2(g)$

        How many grams of HCl react with 5.0 g of manganese dioxide?

18.   (a)   What is the relationship between wavelength and momentum?

       (b)   Explain the following:

       (i)   Photoelectric effect

       (ii)   Absoption spectrum

       (c)   The uncertainty in the position of moving bullet of mass 10g is 10^{-5}m. Calculate the uncertainty in its velocity.

OR

       (a)   The energy of an α-particle is 6.8×10^{-18}J. What will be the wavelength associated with it? (h = 6.626×10^{-34} Js; 1 amu = 1.67×10^{-27}kg)

       (b)   Describe the following:

            (i)   Principal quantum number   (ii)   azimuthal quantum number