**CLASS – XI**          **CHEMISTRY**                                    **BASIC CONCEPTS**

Q1.     Classify the following into elements, compounds and mixtures.  Divide mixtures into homogeneous and heterogeneous (i) marble  (ii)  Honey  (ii) Toothpaste (i) Sugar  (v) gold  (vi) Niter (vii) Iodized Table salt  (viii) Iron (ix)  Steel  (x) Distilled water (xi)  slaked   lime   (xii) oxygen (xiii) Gasoline (xiv)  silk (xv)  Tap  water.

Q2.     Classify following into metals and non-metals;-  (i)  Helium   (ii)  Sodium (iii)  Mercury  (iv)  graphite (v)  Carbon (vi)  silicon (vii) Magnesium (viii)  Phosphorous (ix)  Arsenic  (x)  Antimony

Q3.     How will you separate the constituents present in the following mixtures: -        (i)  common  salt  and water

        (ii) Iodine and sand  (iii)  sugar and sulphur  (iv)  Kerosene and water (v)  salt + sand + sulphur + Iron

Q4.     With the help of example justify each statement for different laws of chemical combination.

Q5  (i)   How many gram molecules are present in 4.9g of $H_2SO_4$?

    (ii)  Calculate the mass of 0.72 molecules of $CO_2$.

Q6.     Calculate the number of atoms in: - (i) 0.25 mole atoms of C              (ii) 0.20 mole molecules of $O_2$.

Q7.     How many atoms of carbon and oxygen are present in 1.5 mole of $CO_2$?

Q8.     How many molecules and atoms of phosphorus are present in 0.1 moles of $P_4$ molecules?

Q9.     How many silver atoms are present in a piece of jewellery weighing 10.78 g?  Ag = 107.8 a.m.u.

Q10.    What weight of calcium contains the same number of atoms as per present in 3.2g of sulphur?

Q11.    Calculate the number of atoms present in: -  (i) 52 moles of He          (ii) 52 a.m.u. of He          (iii) 52g of He

Q12.    Calculate the total number of electrons present in 1.6g of methane.

Q13.    How many atoms of each type are present in 143g of washing soda ($NaCO_3$. 10 $H_2O$)?

Q14.    Calculate the no. of moles of phosphorus in 92.9 g of 'P' assuming that molecular formula of 'P' is $P_4$. Also calculate the no. of atoms and molecules of P in the sample.

Q15.    What is the mass of 0.04 mol of $Co_2$?

Q16.    Calculate the mass of water molecule?

Q17.    How many molecules of water are there in 1L of water? The density of water is 1.0 g / ml.

Q18.    How many moles of hydrogen are there in 0.925g of Ca $(OH)_2$ ? Ca = 40 a.m.u.

Q19.    Calculate the mass of 1 molecule of $CS_2$?

Q20.    1 million atoms of silver weigh 1.79 x $10^{-16}$g.  Calculate the atomic mass of silver.

Q21.    Calculate the weight of CO moving same no. of oxygen atoms as are present in 88g of carbon dioxide?

Q22.    Chlorophyll contains 2.68% of mg by weight.  Calculate no. of mg atoms in 2.00 g of chlorophyll.(at mass of Mg = 24)

Q23.    The cost of table salt and sugar are Rs. 2 per kg. and Rs. 6 per kg. respectively.  Calculate the cost per mole.

Q24.    Calculate the no. of gold atoms in 300 mg. Of a gold ring of 20 carat gold (at mass of gold = 197, pure gold is 24 carat).

Q25.    Find the mass of an atom of silver. The molar mass of Ag atom is 108 g mol$^-$.

**CLASS – XI            SUBJECT – CHEMISTRY                        ATOMIC STRUCTURE**

Q1. What experiment led to the discovery of electrons?  Draw a neat labeled diagram?

Q2. Write the difference b/w canal rays and cathode rays?

Q3. Explain with diagram Thomson's Plum pudding model of an atom?

Q4. Explain Rutherford experiment with neat labeled diagram.  Write its observations & conclusions.

Q5. Explain the draw backs of Rutherford's Experiment.

Q6. Write the main postulates of Bohr's model of an atom.

Q7. Explain the first model of an atom based on quantisation of energy.

Q8. Name two properties of light radiations which indicate its particles like nature.

Q9. Name two properties of electrons which indicate its wave nature.

Q10. Explain the following (i) Black – Body radiations (ii) Photo electric effect.

Q11. Why is photoelectric effect more common in alkali metals?

Q12. Draw graph between intensity & wavelength for black body radiation at 2 temperatures. $T_1$ & $T_2$ ($T_2 > T_1$).  Interpret graph.

Q13. What do you mean by 'Quantum'?

Q14. Define emission spectrum & Absorption spectrum?

Q15. What is the value of Rydberg's constant in Joules.

Q16. Write the expression for energy of $n^{th}$ orbit & radius of $n^{th}$ orbit for $He^+$.

Q17. Calculate the momentum of a particle which has Deboglie's wavelength of 1 mm.

Q18. Find $\lambda$ of a moving e- with KE = $3 \times 10^{-25}$ joules?

Q19. On the basis of uncertainty principle; show that an electron can't exist in the nucleus.

Q20. Define quantum mechanics / Name the scientists who developed Quantum mechanics.

Q21. Draw the plot of orbital wave function $\varpi$ (r) as a function of r for 1s & 2s orbital.

Q22. How is the probability density variation of 25 orbital different from that of 1s orbital?

Q23. Which of the following representations is incorrect for C atom & why?

(a) $\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\uparrow\uparrow$ .        (b)    $\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow$ $\uparrow$
      1s      2s      2p                          1s      2s      2p

(c)    $\wedge$V      $\wedge$V      $\uparrow\uparrow$        (d)    $\uparrow\downarrow$   $\uparrow\downarrow$   $\downarrow\downarrow\downarrow$

Q24. Explain the following:-        (a) Heisenberg's Uncertainty Principle        (b) Aufbau Principle
(c) Pauli Exclusion Principle (d) Hund's Rule of Maximum Multiplicity.

Q25. Explain with reason why 'half filled & completed filled orbital" are stable. Explain in terms of configuration of Cr (24) & Cu (29)

Q26. How many orbitals will be present in the subshell when (a) l = 0 (b) l = 1        (c) l = 3

Q27. How many photons of light having wavelength $7000A^0$ are necessary to provide 1.0J of energy?