Saitechinfo NEET JEE Academy

43, Haridoss Main Rd, CH-99. Ph:9444929163

ATOMIC STRUCTURE

Class 11 - Chemistry

Time Allowed: 1 hour and 29 minutes **Maximum Marks: 45**

1. The electrical discharge through the gases could be observed only at **[1]**

   a) very low pressure and very low voltage
   b) very high pressure and very high voltage
   c) very low pressure and very high voltage
   d) very high pressure and very low voltage

2. Which of the following substances, shows the properties of phosphorescent? **[1]**

   a) Zinc sulphate
   b) Zinc chloride
   c) Zinc nitrate
   d) Zinc sulphide

3. _____ rays produce fluorescence when made to fall on zinc sulphide: **[1]**

   a) Canal rays
   b) gamma rays
   c) X-rays
   d) Cathode rays

4. What is the standard value of e/m ratio? **[1]**

   a) 1.759×10^8 C/g
   b) 6.022×10^{23}
   c) 6.67×10^{-11} N/kg^2/m^2
   d) 9.8 m/s^2

5. Total number of orbitals associated with third shell will be **[1]**

   a) 2
   b) 4
   c) 9
   d) 3

6. Name the scientists who proposed the concept of uncertainty principle: **[1]**

   a) Heisenberg
   b) Max Planck
   c) Rutherford
   d) de Broglie

7. Number of angular nodes for 4d orbital is **[1]**

   a) 4
   b) 1
   c) 3
   d) 2

8. Atomic absorption spectrum consists of: **[1]**

   a) UV lines
   b) light lines
   c) dark lines
   d) broad lines

9. Name the scientists who proposed the concept of wave nature of matter? **[1]**

   a) Max Planck
   b) de Broglie
   c) Heisenberg
   d) maxwell

saitechinfo

10. In a set of degenerate orbitals, the electrons distribute themselves to retain like spins as far as possible. This statement belongs to **[1]**

a) Hund's rule of maximum multiplicity
b) Aufbau principle
c) Slater's rule
d) Pauli's exclusion principle

11. An ion with mass number 56 contains 3 units of positive charge and 30.4% more neutrons than the electrons. Assign the symbol to this ion. **[3]**

12. How much energy is required to ionise a H-atom if the electron occupies n = 5 orbit? Compare your answer with the ionisation enthalpy of H-atom (energy required to remove the electron from n = 1 orbit). **[3]**

13. The quantum numbers of six electrons are given below. Arrange them in order of increasing energies. If any of these combination(s) has/have the same energy lists. **[3]**

i. n = 4, l = 2, m_l = -2, $m_s = -\frac{1}{2}$
ii. n = 3, l = 2, m_l = 1, $m_s = +\frac{1}{2}$
iii. n = 4, l = 1, m_l = 0, $m_s = +\frac{1}{2}$
iv. n = 3, l = 2, m_l = -2, $m_s = -\frac{1}{2}$
v. n = 3, l = 1, m_l = -1, $m_s = +\frac{1}{2}$
vi. n = 4, l = 1, m_l = 0, $m_s = +\frac{1}{2}$

14. Find out the number of wave made by a Bohr electron in one complete revolution in its 3rd orbit. **[3]**

15. State any three limitations of Bohr's model? **[3]**

16. What observations in scattering experiment led Rutherford to make the following conclusions? **[5]**

i. The most of the space in an atom is empty.
ii. The whole of the mass of the atom is present in the centre of the nucleus.
iii. Nucleus has positive charge.

On the basis of scattering of α-particles by a thin metal foil, describe the Rutherford model of an atom. What are the drawbacks of this model?

17. i. State any three postulates of Bohr's model of an atom. **[5]**
ii. What is Zeeman effect and Stark effect.

18. Find **[5]**

i. the total number of neutrons and
ii. the total mass of neutrons in 7 mg of 14 C

(Assume that the mass of the neutron = 1.675 $\times$ 10^{-27} kg)

19. i. A beam of helium atoms move with a velocity of $2.0 \times 10^3\ ms^{-1}$. Find the wavelength of the particle constituting the beam $\left(h = 6.626 \times 10^{-34} Js\right)$. **[5]**
ii. An electron is moving with a kinetic energy of $2.275 \times 10^{-25}\ J$. Calculate its de-Broglie wavelength. (Mass of electron $= 9.1 \times 10^{-31}\ kg, h = 6.6 \times 10^{-34} Js$)

saitechinfo