JEE MAIN : CHAPTER WISE TEST PAPER-2

SUBJECT :- CHEMISTRY **DATE.....**
CLASS :- 11th **NAME.....**
CHAPTER :- ATOMIC STRUCTURE **SECTION.....**

(SECTION-A)

1. Atomic radius is of the order of 10^{-8} cm and nuclear radius is of the order of 10^{-13} cm. Calculate what fraction of atom is occupied by nucleus ?
(A) 10^{-20} (B) 10^{-15} (C) 10^{-12} (D) None

2. Atomic weight of an element is not necessarily whole number because
(A) it contains electrons, protons and neutrons
(B) it contains allotropic forms
(C) atoms are no longer considered indivisible
(D) it contains isotopes

3. Which of the following are isoelectronic with one another ?
(A) Na^+ and Ne (B) K^+ and O
(C) Ne and O (D) Na^+ and K^+

4. The mass of an atom is constituted mainly by
(A) Neutron and neutrino
(B) Neutron and electron
(C) Neutron and proton
(D) Proton and electron

5. When atoms are bombarded with alpha particles, only a few in million suffer deflection, others pass out undeflected. This is because
(A) The force of repulsion on the moving alpha particle is small
(B) The force of attraction on the alpha particle to the oppositely charged electrons is very small
(C) There is only one nucleus and large number of electrons
(D) The nucleus occupies much smaller volume compared to the volume of the atom

6. Photoelectric effect is maximum in :
(A) Cs (B) Na (C) K (D) Li

7. Which of the following electron transition in a hydrogen atom will require the largest amount of energy ?
(A) From n = 1 to n = 2
(B) From n = 2 to n = 3
(C) From n = ∞ to n = 1
(D) From n = 3 to n = 5

8. Match the following
(A) Energy of ground state of He^+
(i) + 6.04 eV
(B) Potential energy of I orbit of H-atom
(ii) –27.2 eV
(C) Kinetic energy of II excited state of He^+
(iii) 54.4 V
(D) Ionisation potential of He^+
(iv) – 54.4 eV
(A) A – (i), B – (ii), C – (iii), D – (iv)
(B) A – (iv), B – (iii), C – (ii), D – (i)
(C) A – (iv), B – (ii), C – (i), D – (iii)
(D) A – (ii), B – (iii), C – (i), D – (iv)

9. Bohr's model can explain :
(A) The spectrum of hydrogen atom only
(B) The spectrum of atom or ion containing one electron only
(C) The spectrum of hydrogen molecule only
(D) The solar spectrum

10. If the series limit of wavelength of the Lyman series for the hydrogen atoms is 912Å, then the series limit of wavelength for the Balmer series of the hydrogen atom is :
(A) 912 Å (B) 912 × 2 Å
(C) 912 × 4 Å (D) 912/2 Å

11. The radius of hydrogen in ground state is 0.53 Å. In normal state the radius of Li^{2+} (atomic number = 3) in ground state will be :
(A) 1.06 Å (B) 0.265 Å
(C) 0.17 Å (D) 0.53 Å

12. The transition of the electron in hydrogen atom from the fourth to first energy shell emits a spectral line which falls in following series.
(A) Lyman (B) Balmer
(C) Pashen (D) Bracket

13. The speed of a proton is one hundredth of the speed of light in vacuum. What is its de-Broglie wavelength? Assume that one mole of protons has a mass equal to one gram [h = 6.626×10^{-27} erg sec] :
(A) 13.31×10^{-7} Å (B) 1.33×10^{-3} Å
(C) 13.13×10^{-5} Å (D) 1.31×10^{-2} Å

14. The uncertainity in position and velocity of a particle are 10^{-10} m and 5.27×10^{-24} ms^{-1} respectively. Calculate the mass of the particle ($h = 6.625 \times 10^{-34}$ Joule sec.)

(A) 0.099 Kg (B) 0.089 Kg

(C) 0.99 Kg (D) Can not predict

15. The wavelength of a charged particle _____the square root of the potential difference through which it is accelerated :

(A) is inversely proportional to

(B) is directly proportional to

(C) is independent of

(D) is unrelated with

16. Which of the following set of quantum numbers are permitted

(A) n = 3, l = 2, m = – 2, s = +1/2

(B) n = 3, l = 2, m = – 1, s = 0

(C) n = 2, l = 2, m = +1, s = – 1/2

(D) n = 2, l = 2, m = +1, s = – 1/2

17. Magnetic quantum number specifies -

(A) Size of orbitals

(B) Shape of orbitals

(C) Orientation of orbitals

(D) Nuclear stability

18. Magnetic moment of X^{n+} (Z = 26) is $\sqrt{24}$ B.M. Hence number of unpaired electrons and value of n respectively are :

(A) 4, 2 (B) 2, 4 (C) 3, 1 (D) 0, 2

19. Which of the following principles/rules limits the maximum number of electrons in an orbital to two

(A) Aufbau principle

(B) Pauli's exclusion principle

(C) Hund's rule of maximum multiplicity

(D) Heisenberg's uncertainty principle

20. The quantum numbers for the outermost electron of an element are given below as n = 2, l = 0, m = 0, s = $+\frac{1}{2}$. The atoms is :

(A) Lithium (B) Beryllium

(C) Hydrogen (D) Boron

(SECTION-B)

21. An element has the electronic configuration $1s^2, 2s^2 2p^6, 3s^2 3p^2$. Its valency electrons are :

22. If 10^{-17}J of light energy is needed by the interior of human eye to see an object. The number of photons of green light (λ = 550 nm) needed to see the object are :

23. In a sample of H-atom electrons make transition from 5^{th} excited state to ground state, producing all possible types of photons, then number of lines in infrared region are

24. What is likely to be orbit number for a circular orbit of diameter 20 nm of the hydrogen atom if we assume Bohr orbit to be the same as that represented by the principal quantum number?

25. Energy required to pull out an electron from 1^{st} orbit of hydrogen atom to infinity is 100 units. The amount of energy needed to pull out the electron from 2nd orbit to infinity is :

26. A photon of 300 nm is absorbed by a gas and then emits two photons. One photon has a wavelength 496 nm then the wavelength of second photon in nm :

27. For sodium atom the number of electrons with m = 0 will be :

28. The orbital angular momentum for an electron revolving in an orbit is given by $\sqrt{\ell(\ell+1)}\ \frac{h}{2\pi}$. This momentum for an s-electron will be given by

29. The wavelength of the radiation emitted, when in a hydrogen atom electron falls from infinity to stationary state 1, would be (Rydberg constant = 1.097×10^7 m^{-1})

30 The energy required to break one mole of Cl–Cl bonds in Cl_2 is 242 kJ mol^{-1}. The longest wavelength of light capable of breaking a single Cl–Cl bond is : ($c = 3 \times 10^8$ m s^{-1} and $N_A = 6.02 \times 10^{23}$ mol^{-1})