Single Correct Answer Type:

1. The increasing order for the values of specific charge of e, p, n and α is

(A) e,p,n,α (B) n,p,e,α (C) n,p,α,e (D) n,α,p,e

2. The mass to charge ratio of cation is 1.5×10^{-8} kg/c . What is the mass of this cation?

(A) 2.4×10^{-24} g (B) 2.4×10^{-27} g (C) 2.4×10^{-24} kg (D) 2.4×10^{-27} mg

3. Which of the following are isodiaphers?

(A) $^{12}_{6}C$ and $^{14}_{6}C$ (B) $^{24}_{12}Mg$ and $^{23}_{11}Na$ (C) $^{14}_{6}C$ and $^{23}_{11}Na$ (D) $^{4}_{2}He$ and $^{16}_{8}O$

4. Calculate the energy of 0.5 mole photons of Electro Magnetic Radiations of wavelength $2000\,A^0$

(A) 1.495×10^{5} Joules (B) 2.99×10^{12} Joules (C) 2.99×10^{5} Joules (D) 1.495×10^{12} Joules

5. Calculate the wavelength, wave number and frequency of photon having 5 ev energy

(A) 247.5 nm, 40400 cm^{-1}, 1.212×10^{15} Hz (B) 2.475 nm, 404 cm^{-1}, 1.212×10^{13} Hz

(C) 2.475×10^{-7}, 4.04×10^{3} cm^{-1}, 12.12×10^{15} Hz (D) 24.75×10^{-7}, 4.04×10^{6} cm^{-1}, 1.212×10^{13} Hz

6. The number of waves produced by an electron in one complete revolution in valence shell of potassium

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

7. What will be the ionisation energy of Li^{+2} ion, if ionisation energy of Be^{+3} ion is 217.6 eV

(A) 54.4 eV (B) 217.6 eV (C) 122.4 eV (D) 13.6 eV

8. Which of the following relations is incorrect according to Bohr's theory?

(A) Velocity of $e^{-}\alpha\frac{1}{n}$ (B) Radius of orbit $\alpha\frac{n^2}{z}$

(C) Energy of $e^{-}\alpha\frac{n^2}{z^2}$ (D) Time for Revolution $\alpha\frac{n^3}{z^2}$

9. Calculate the difference between potential energies of first two orbits of Li^{+2} ion.

(Note: radius = $0.177\,A^0$, $K=9\times10^{9}$ $J.m/c^2$)

(A) 2.92×10^{-17} Joules (B) 3.9×10^{-17} Joules (C) 9.75×10^{-18} Joules (D) 4.5×10^{-18} Joules

10. The first ionisation energy of H is 21.79×10^{-19} Joules. Calculate the 2nd Ionisation energy of He^{+} ion

(A) 21.79×10^{-19} Joules (B) 43.58×10^{-19} Joules

(C) 87.16×10^{-19} Joules (D) 14.52×10^{-19} Joules

11. The radius of 4th orbit of H atom is 0.85 nm. Calculate the velocity of $\bar{e}$ in this orbit.

(A) 5.44×10^{5} m.sec^{-1} (B) 2.72×10^{6} m.sec^{-1} (C) 1.36×10^{6} m.sec^{-1} (D) 2.72×10^{5} m.sec^{-1}

12. According to Bohr's theory the angular momentum for an electron of 6th orbit is

(A) $\frac{6h}{\pi}$ (B) $\frac{3h}{2\pi}$ (C) $\frac{3\pi}{h}$ (D) $\frac{3h}{\pi}$

13. The energy of an electron in Bohr's 1st orbit of H-atom is – 13.6 eV. The possible energy value of excited state for electron in Bohr's orbits of H-atom is (in eV)

(A) – 13.6 (B) – 8 .4 (C) – 0.85 (D) – 10.2

14. The value of charge of oil droplets experimentally observed were -1.6×10^{-19}, -4×10^{-20} coulombs. The possible value of electronic charge (in coulombs), indicated by these results is

(A) -4×10^{-19} (B) -2×10^{-20} (C) -1.6×10^{-19} (D) -2×10^{-19}

15. If the speed of the electron in the Bohr's 1st orbit of H-atom is 'V'. The speed of the electron in Bohr's 2nd orbit of He^{+} ion

(A) V (B) V/2 (C) 2V (D) V/4

16. Which transition of Li^{+2} is associated with same energy change as n = 6 to n = 4 transition in He^{+}?

(A) n = 3 to n = 1 (B) n = 8 to n = 6 (C) n = 9 to n = 6 (D) n = 2 to n = 1

17. In a H-atom. If the energy of electron in the ground state is – x eV, then that in the 2nd excited state of He^{+} is

(A) $-x$ eV (B) $-\frac{4}{9}$ eV (C) $+2x$ eV (D) $-\frac{9}{4}$ eV

18. What is the ratio of energies of two Radiations of wavelengths $\lambda_1 = 200$ nm & $\lambda_2 = 4000$ A^0?

(A) 1 : 1 (B) 1 : 2 (C) 2 : 1 (D) 1: $\sqrt{2}$

19. An α-particle having kinetic energy 5 MeV falls on a Cu-Foil. The shortest distance from the nucleus of Cu to which α-particle reaches is

(A) 1.67×10^{-14} m (B) 2.35×10^{-13} m (C) 5.98×10^{-15} m (D) 3.56×10^{-14} m

20. Moseley equation is represented as $\sqrt{\nu} = a(z-b)$ where 'a' and 'b' are constants if a = b = 1, then atomic number of the element showing frequency of 400 Hz is

(A) 20 (B) 21 (C) 22 (D) 23

Numerical Based:

21. What is the ratio between series limit wavelengths of lyman & Balmer series of H-atom _____

22. If 10^{-10} ergs of light energy is needed by the interior of human eye to see an object and the number of photons (of $\lambda = 556$ nm) needed to see the object is 4x, then what is 'x' _____

23. In a collection of H-atoms, all the electrons jump from n = 5 to ground level finally (directly or indirectly) without emitting any line in Balmer series. The number of possible different radiations is _____

24. Electro magnetic radiation with least wave number results when an electron in H-atom falls from n = 6 to n = _____

25. The ratio of specific charges of alpha particle and proton is given by 2^{-x}, what is the value of 'x' _____

KEY

1.	D	2.	A	3.	D	4.	C	5.	A
6.	D	7.	C	8.	C	9.	A	10.	C
11.	A	12.	D	13.	C	14.	B	15.	A
16.	C	17.	B	18.	C	19.	A	20.	B
21.	4	22.	7	23.	6	24.	5	25.	1