Full-1 (NEET)

Atomic Structure-18

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Q1. **Which set of quantum numbers is not allowed?**

(A) $n = 2,\ \ell = 1,\ m = 0,\ s = +\frac{1}{2}$

(B) $n = 3,\ \ell = 3,\ m = 0,\ s = -\frac{1}{2}$

(C) $n = 4,\ \ell = 0,\ m = 0,\ s = +\frac{1}{2}$

(D) $n = 5,\ \ell = 2,\ m = -1,\ s = -\frac{1}{2}$

Q2. **For $n = 4$, how many orbitals are possible in total?**

(A) 8

(B) 16

(C) 32

(D) 64

Q3. **Which quantum number determines the shape of the orbital?**

(A) Principal (n)

(B) Azimuthal (ℓ)

(C) Magnetic (m)

(D) Spin (s)

Q4. **According to Heisenberg uncertainty principle, the product of uncertainty in position and momentum is of the order of:**

(A) h

(B) $h/2$

(C) $h/4\pi$

(D) $h/2\pi$

Q5. **The de Broglie wavelength of an electron (mass m, velocity v) is:**

(A) h/mv

(B) mv/h

(C) hv/m

(D) mh/v

Q6. **Bohr radius of hydrogen atom is proportional to:**

(A) n

(B) n^2

(C) $1/n$

(D) Z/n^2

Q7. **The velocity of electron in the nth Bohr orbit of hydrogen atom is proportional to:**

(A) n

(B) $1/n$

(C) Z/n

(D) Z^2/n^2

Q8. **The energy of an electron in hydrogen atom (nth orbit) is given by:**

(A) $-13.6\,\dfrac{Z^2}{n^2}$ eV

(B) 13.6 eV

(C) $-13.6\,\dfrac{n^2}{Z^2}$ eV

(D) $13.6\,\dfrac{n^2}{Z}$ eV

Q9. In Bohr's model, the ratio of kinetic energy to total energy of electron is:

(A) 1

(B) 2

(C) 1/2

(D) -1

Q10. For hydrogen-like species, ionisation energy is proportional to:

(A) Z

(B) Z^2

(C) $1/Z$

(D) $1/Z^2$

Q11. Which spectral line is obtained when electron jumps from $n = 3$ to $n = 2$ in hydrogen atom?

(A) Lyman-α

(B) Balmer-α

(C) Paschen-α

(D) Brackett-α

Q12. Rydberg constant is expressed as:

(A) 109677 cm^{-1}

(B) 13.6 eV

(C) 6.63×10^{-34} J $\cdot$ s

(D) 9.1×10^{-31} kg

Q13. The line corresponding to transition $n = 4$ to $n = 2$ belongs to:

(A) Lyman series

(B) Balmer series

(C) Paschen series

(D) Brackett series

Q14. Which of the following correctly represents the relation between P.E, K.E and T.E of electron in Bohr's orbit?

(A) T.E = K.E + P.E

(B) P.E = $-2\times$ K.E

(C) K.E = $-$T.E

(D) All of these

Q15. If the wavelength of incident light is less than threshold wavelength, photoelectric effect:

(A) Occurs

(B) Does not occur

(C) Is independent of frequency

(D) None of these

Q16. In photoelectric effect, stopping potential depends upon:

(A) Intensity of light

(B) Frequency of light

(C) Work function only

(D) Both intensity and frequency

Q17. According to Planck's quantum theory, energy is emitted or absorbed in:

(A) Continuous manner
(B) Discrete packets
(C) Random manner
(D) None of these

Q18. The energy of a photon of wavelength λ is:

(A) hc/λ
(B) λ/hc
(C) $h\lambda/c$
(D) $c\lambda/h$

Q19. Electromagnetic waves consist of:

(A) Oscillating electric field only
(B) Oscillating magnetic field only
(C) Oscillating electric and magnetic fields
(D) Particles moving randomly

Q20. Which of the following has maximum frequency?

(A) Radio waves
(B) Infrared rays
(C) X-rays
(D) Microwaves

Answer Key:

Q1: B
Q2: B
Q3: B
Q4: C
Q5: A
Q6: B
Q7: C
Q8: A
Q9: D
Q10: B
Q11: B
Q12: A
Q13: B
Q14: D
Q15: A
Q16: B
Q17: B
Q18: A
Q19: C
Q20: C