



Full-2 [JEE]
Atomic Structure -19

Total Questions: 20

- Q1. Two orbitals have the following quantum numbers: Orbital A: $n = 3, \ell = 2, m = 0$; Orbital B: $n = 3, \ell = 1, m = +1$. Which statement is correct?**
- (A) Both orbitals have same energy in hydrogen atom
 - (B) Orbital A has lower energy in multi-electron atom
 - (C) Orbital B has higher energy in hydrogen atom
 - (D) Both are identical orbitals
- Q2. How many orbitals are possible for $n = 5, \ell = 3$?**
- (A) 5
 - (B) 7
 - (C) 9
 - (D) 11
- Q3. If $n = 4$, what is the maximum number of electrons possible in all orbitals with $m = 0$?**
- (A) 2
 - (B) 4
 - (C) 6
 - (D) 8
- Q4. An electron is confined in a nucleus of radius 10^{-15} m. The minimum uncertainty in its momentum will be of the order:**
- (A) 10^{-19} kg·m/s
 - (B) 10^{-24} kg·m/s
 - (C) 10^{-19} J·s
 - (D) 10^{-34} kg·m/s
- Q5. If the uncertainty in position of a particle is halved, then uncertainty in momentum becomes:**
- (A) Doubled
 - (B) Halved
 - (C) Unchanged
 - (D) One-fourth
- Q6. Which particle will have maximum de Broglie wavelength if they all have same kinetic energy?**
- (A) Proton
 - (B) Neutron
 - (C) Electron
 - (D) Alpha particle
- Q7. An electron moving with velocity v has de Broglie wavelength λ . If velocity is made 4 times, its wavelength becomes:**
- (A) 4λ
 - (B) 2λ
 - (C) $\lambda/2$
 - (D) $\lambda/4$

- Q8. Bohr radius of hydrogen atom is a_0 . Radius of third orbit of Li^{2+} will be:**
- (A) $9a_0$
 (B) $3a_0/3$
 (C) a_0
 (D) $9a_0/3$
- Q9. The velocity of electron in first Bohr orbit of hydrogen is v . Velocity in second orbit of He^+ will be:**
- (A) $v/2$
 (B) v
 (C) $2v$
 (D) $v/4$
- Q10. For hydrogen atom, ratio of potential energy (PE): kinetic energy (KE): total energy (TE) is:**
- (A) $-2 : 1 : -1$
 (B) $2 : -1 : 1$
 (C) $-1 : 1 : 0$
 (D) $1 : -2 : 1$
- Q11. The ionisation energy of Li^{2+} is approximately:**
- (A) 13.6 eV
 (B) 27.2 eV
 (C) 40.8 eV
 (D) 122.4 eV
- Q12. The wavelength of light emitted when electron falls from $n = 3$ to $n = 1$ is related to Rydberg constant R as:**
- (A) $1/\lambda = R(1 - 1/3^2)$
 (B) $1/\lambda = R(1/1^2 - 1/3^2)$
 (C) $1/\lambda = R(1/3^2 - 1/1^2)$
 (D) $\lambda = R(1/9 - 1)$
- Q13. Which series of hydrogen spectrum lies in UV region?**
- (A) Lyman
 (B) Balmer
 (C) Paschen
 (D) Brackett
- Q14. In hydrogen atom, the ratio of wavelengths of first lines of Balmer to Lyman series is:**
- (A) $27/32$
 (B) $5/27$
 (C) $32/27$
 (D) $27/5$
- Q15. A metal has work function 2.5 eV. Threshold wavelength is:**
- (A) 496 nm
 (B) 620 nm
 (C) 248 nm
 (D) 1240 nm
- Q16. In photoelectric effect, increasing intensity of incident light (frequency $>$ threshold) increases:**
- (A) Stopping potential
 (B) Maximum kinetic energy of electrons
 (C) Number of photoelectrons emitted
 (D) Work function of metal
- Q17. If frequency of incident photon is doubled (above threshold), maximum KE of emitted elec-**

trons:

- (A) Doubles
- (B) Becomes half
- (C) Remains unchanged
- (D) Increases but not doubles

Q18. Which of the following electromagnetic waves has shortest wavelength?

- (A) UV rays
- (B) X-rays
- (C) Gamma rays
- (D) Microwaves

Q19. Which is true about electromagnetic waves?

- (A) E and B are parallel to each other
- (B) E and B are perpendicular to each other and to direction of propagation
- (C) E and B are opposite in phase
- (D) They require medium to propagate

Q20. A photon and an electron have same de Broglie wavelength. Which has greater momentum?

- (A) Photon
- (B) Electron
- (C) Both same
- (D) Depends on velocity

Answer Key:

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