SHAILENDRA SHUKLA SIR

Objective Test
Atomic Structure

Time - $1\frac{1}{2}$ Hrs. **M.M.-150**

Q.1.Which of the following statements is incorrect-
(a) Cathode rays are the stream of electrons
(b) Cathode rays can produce X-rays
(c) e/m ratio of cathode rays is universal constant
(d) Anode rays are consisting of protons

Q.2.The correct sequence of e/m ratio is-
(a) e > p > n > α (b) n > p > e > α
(c) e > p > α > n (d) p > e > α > n

Q.3.Bohr's atomic model cannot explain the spectrum of following-
(a) H (b) He^+ (c) H^- (d) Li^{2+}

Q.4.Which of the following orbitals is non-directional in nature –
(a) s (b) p (c) d (d) f

Q.5.The maximum number of electrons residing in a p-orbital is –
(a) 2 (b) 6 (c) 10 (d) 14

Q.6.The orbital angular momentum of electrons residing in a p-orbital is –
(a) 0 (b) $\frac{h}{2\pi}\sqrt{2}$ (c) $\frac{h}{2\pi}\sqrt{6}$ (d) Unpredictable

Q.7.Which of the following rule governs the filling of electrons in degenerate orbitals-
(a) Pauli's exclusion principle (b) Hund's rule
(c) Aufbau's principle (d) (n+l) rule

Q.8.The degeneracy of d-orbitals in absence of magnetic field is-
(a) 0 (b) 1 (c) 3 (d) 5

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Q.9.The total number of nodes in 2s-orbital is-

(a) 0 (b) 1 (c) 2 (d) 3

Q.10.The number of spherical nodes in 3s-orbital is-

(a) 0 (b) 1 (c) 2 (d) 3

Q.11. The number of angular nodes in 3d-orbital is-

(a) 0 (b) 1 (c) 2 (d) 3

Q.12.Which of the following plane acts as nodal plane in $2p_x$-orbital-

(a) xy-plane (b) yz-plane

(c) xz-plane (d) None

Q.13.Which of the following plane acts as nodal plane in d_{xy} orbital is –

(a) xz plane (b) yz plane

(c) both the above (d) xy plane

Q.14.The de-Broglie wavelength of a tennis ball of mass 60 gm moving with a velocity of 10 m/sec is approximately-

(a) 10^{-33} m (b) 10^{-31} m (c) 10^{-25} m (d) 10^{-16} m

Q.15.The total number of orbitals present in a shell is –

(a) n^2 (b) (n+l)

(c) 2(n+l) (d) $2n^2$

Q.16.Which of the following electronic transitions gives rise the line of highest frequency-

(a) n = 2 to n = 1 (b) n = 3 to n = 2

(c) n = 4 to n = 3 (d) n = 3 to n = 1

Q.17. Which of the following series of Hydrogen spectra lies in visible region-

(a) Lymen series (b) Balmer series

(c) Paschen series (d) Brackett series

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Q.18.The wave number of second spectral line of Balmer series is –

(a) 3R/16 (b) 3R/4

(c) 5R/27 (d) 9R/16

Q.19.The total number of spectral lines formed in transition of an electron from an orbit of n = 3 to n = 1 is-

(a) 3 (b) 2 (c) 5 (d) None

Q.20. As per Bohr's atomic model, which of the following cannot be the angular momentum of an electron in an atom-

(a) $\frac{h}{2\pi}$ (b) $\frac{h}{\pi}$ (c) $\frac{3h}{2\pi}$ (d) $\frac{h}{4\pi}$

Q.21.The splitting of spectral lines into finer lines in magnetic field is called-

(a) Zeeman effect (b) Stark effect

(c) Raman effect (d) Crompton effect

Q.22. Considering same velocity, which of the following has highest wavelength-

(a) Electron (b) Proton

(c) Neutron (d) α – Particle

Q.23.Which of the following orbitals has highest energy –

(a) 3s (b) 3p (c) 4s (d) 3d

Q.24. For hydrogen atom which of the following orbitals has highest energy-

(a) 3s (b) 3p (c) 3d (d) All have same energy

Q.25.The correct set of quantum numbers for valence electron of sodium is-

(a) 3, 0, 0, +1/2 (b) 2, 0, 0, +1/2

(c) 3, 1, 0, +1/2 (d) 3, 0, +1, +1/2

Q.26.Which of the following set of quantum numbers is not possible-

(a) 3, 0, 0, +1/2 (b) 2, 0, 0, +1/2

(c) 3, 1, 0, +1/2 (d) 3, 0, +1, +1/2

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Q.27.Which of the following set of quantum numbers corresponds to the 5th d-electron of Zn atom-

(a) 2, 1, 0, +1/2 (b) 3, 2, 0, -1/2

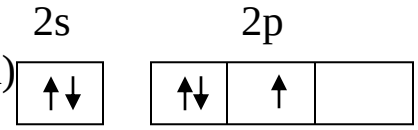
(c) 3, 2, +2, +1/2 (d) 3, 1, +1, +1/2

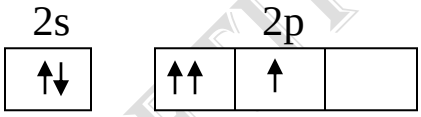
Q.28.The electron having which of the following set of quantum numbers, has highest energy-

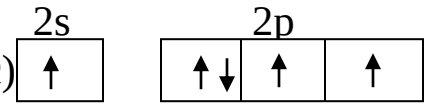
(a) 3, 2, 0, +1/2 (b) 2, 0, 0, +1/2

(c) 4, 1, 0, +1/2 (d) 3, 0, 0, -1/2

Q.29. In which of the following electronic configurations, only Hund's rule is violated-

(a) 

(b) 

(c) 

(d) All the above

Q.30.Which of the following is also called orientation quantum number-

(a) n (b) l (c) m (d) s

Q.31.The total number of orbitals in a shell is given by following expression-

(a) $\sum_{l=0}^{l=(n-1)}(2l+1)$ (b) $\sum_{l=0}^{l=(n-1)}2(2l+1)$

(c) $\sum_{l=0}^{l=n}(2l+1)$ (d) None

Q.32.Which of the following quantum numbers represents the size of an orbital-

(a) n (b) l (c) m (d) s

Q.33. If the radius of first Bohr's orbit of hydrogen atom is r_0, then the radius of its second Bohr's orbit will be-

(a) r_0 (b) $4r_0$ (c) $9r_0$ (d) None

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Q.34. If the radius of first Bohr's orbit of hydrogen atom is r_0, then the radius of second Bohr's orbit He^+ ion will be-

(a) r_0 (b) $4r_0$ (c) $9r_0$ (d) None

Q.35. The ratio of the energy of first Bohr's orbit of hydrogen atom and second Bohr's orbit of He^+ ion is-

(a) 1 (b) 4 (c) 1/4 (d) None

Q.36. If the energy of first Bohr's orbit of hydrogen atom is -13.6 eV, then the energy of second Bohr's orbit of He^+ ion will be-

(a) -13.6 eV (b) 4 × -13.6 eV
(c) 9×- 13.6 eV (d) Unpredictable

Q.37. The energy of first Bohr's orbit of hydrogen atom is -13.6eV. The ionization energy of hydrogen atom will be-

(a) -13.6 eV (b) +13.6 eV (c) -3.4 eV (d) None

Q.38. The energy of electron emitted in photo- electric effect depends upon which of the following parameter of incident light-

(a) intensity (b) frequency
(c) both (d) none

Q.39. The number of electrons emitted in photo- electric effect depends upon which of the following parameter of incident light-

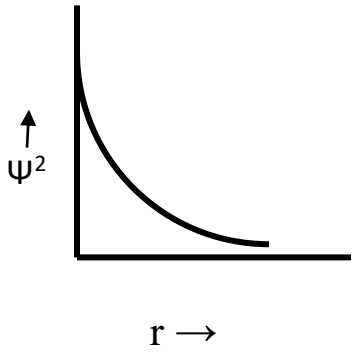
(a) intensity (b) frequency
(c) both (d) none

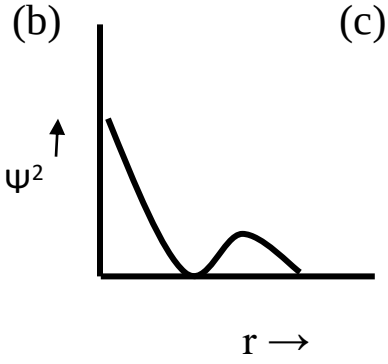
Q.40. The limiting value of product of uncertainty in position and momentum of an electron is-

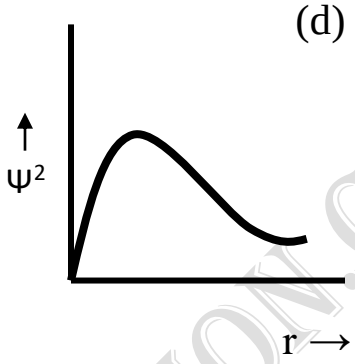
(a) $\frac{\boldsymbol{h}}{\boldsymbol{2\pi}}$ (b) $\frac{\boldsymbol{h}}{\boldsymbol{\pi}}$
(c) $\frac{\boldsymbol{3h}}{\boldsymbol{2\pi}}$ (d) $\frac{\boldsymbol{h}}{\boldsymbol{4\pi}}$

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Q.41. The curve obtained on plotting probability density (Ψ^2) against the distance from the nucleus for 2p orbital is –

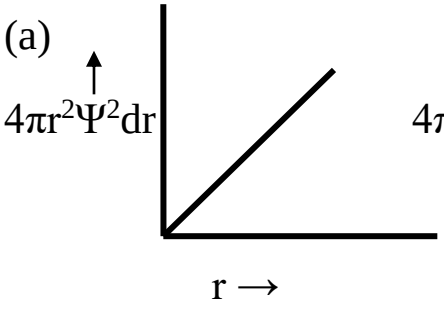
(a) 

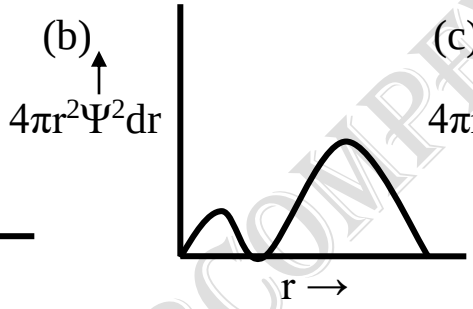
(b) 

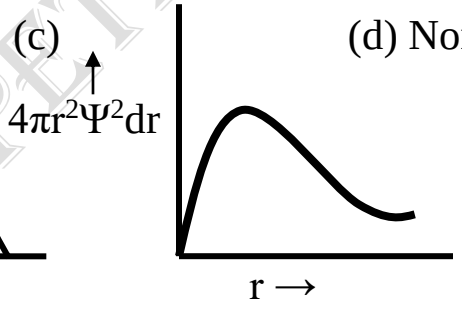
(c) 

(d) None

Q.42. If radial probability ($4\pi r^2\Psi^2 dr$) for 2s orbital is plotted against the distance from the nucleus, the curve obtained will be –

(a) 

(b) 

(c) 

(d) None

Q.43. Which of the following quantum numbers has been introduced to explain Zeeman effect-

(a) n (c) l (c) m (d) s

Q.44. Which of the following is incorrect-

(a) $p = \frac{h}{mv}$ (c) $p = \sqrt{2mE_K}$

(c) $p = \sqrt{2qmV}$ (d) None

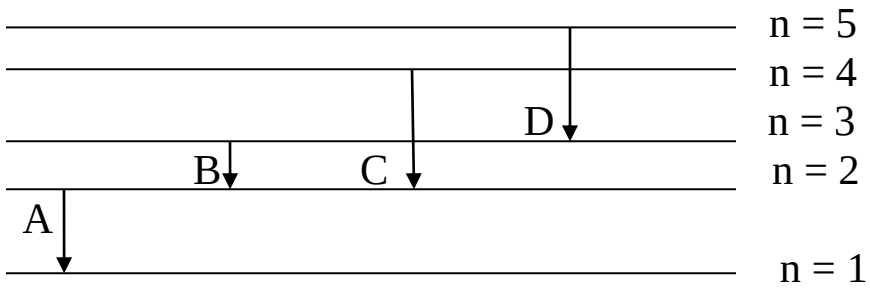
Q.45. If a particle having a charge q is accelerated with a potential difference of V then wavelength associated with particle wave will be-

(a) $\frac{q}{mv}$ (c) $\sqrt{2mE_K}$

(c) $h/\sqrt{2qmV}$ (d) None

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Q.46. Consider following electronic transitions-



The electronic transition corresponding to highest energy will be-

(a) A (b) B (c) C (d) D

Q.47. The number of electrons having (n+l) equal to 3 in Chlorine atom is-

(a) 2 (b) 4 (c) 6 (d) 8

Q.48.Which of the following is least stable-

(a) Li^- (b) Be^- (c) B^- (d) C^-

Q.49. A gas absorbs a photon of 355 nm and emits two wavelengths. If one of the emission is at 680 nm, the other will be at-

(a) 743 nm (b) 518 nm (c) 325 nm (d) 1025 nm

Q.50. A proton is about 1840 times heavier than electron. If it is accelerated by a potential difference of 1kV, its kinetic energy will be-

(a) 1 keV (b) 920 keV (c) 1/1840 keV (d) 1840 keV

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