

Structure of Atom

1. **Assertion (A):** 2p orbital do not have any spherical node.

Reason (R): The number of nodes in p-orbitals is given by $(n-2)$ where n is the principal quantum number.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

2. **Assertion (A):** The radii of corresponding orbitals in all H-like particles are equal.

Reason (R): All H-like particles contain more than one electron.

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3. **Assertion (A):** The number of radial nodes in 3s and 4p orbitals is are equal.

Reason (R): The number of radial nodes in any orbital depends upon the values of 'n' and 'l' which are different for 3s and 4p orbitals.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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4. **Assertion (A):** Electrons are ejected from a certain metal when either blue or violet light strikes the metal surface. However, only violet light causes ejection from second metal.

Reason (R): The electrons in the first metal require less energy for ejection.

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- (4) Both (A) and (R) are false

5. **Assertion (A):** Hydrogen has one electron in its orbit but it produces several spectral lines.

Reason (R): There are many excited energy levels available.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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6. **Assertion (A):** The energy of an electron is largely determined by its principal quantum number.

Reason (R): The principal quantum number (n) is a measure of the most probable distance of finding the electron around the nucleus.

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7. **Assertion (A):** The 19th electron in potassium atom enters into 4s-orbital and not the 3d-orbital.

Reason (R): $(n + 1)$ rule is followed for determining the orbital of the lowest energy state.

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8. **Assertion (A):** The free gaseous Cr atom has six unpaired electrons.

Reason (R): Half-filled s-orbital has greater stability.

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9. **Assertion (A):** The atoms of different elements having same mass number but different atomic number are known as isobars.

Reason (R): The sum of protons and neutrons in isobars is always different.

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10. **Assertion (A):** A beam of electrons deflects more than a beam of α - particles in an electric field.

Reason (R): Electrons possess negative charge while α - particles possess positive charge.

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11. **Assertion (A):** In Lyman of H-spectra, the maximum wavelength of lines is 121.65 nm.

Reason (R): Wavelength is maximum if there is transition from the very next level.

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Reason (R): There are many excited energy levels available.

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15. Assertion (A): The electronic configuration of Cr is $[\text{Ar}]3d^4 4s^2$

Reason (R): Cr is filled according to aufbau principle.

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16. Assertion (A): Fe^{3+} ion has more stable electronic configuration than Fe^{2+} ion in ground state.

Reason (R): Fe^{2+} ion has more no. of unpaired electrons than Fe^{3+}

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17. Assertion (A): Radial probability distribution graph of an electron in 4d subshell consist of one radial node.

Reason (R): d-subshell of any shell contains radial nodes.

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18. Assertion (A): $\frac{1}{\lambda} = R_H Z^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$ can be

used to determine the wavelength of an electron in an orbit.

Reason (R): Wavelength associated with a photon is given by $\lambda = \frac{h}{\sqrt{2mKE}}$

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ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Ans.	1	4	1	1	1	1	1	3	3	2	1	4	1	1	1	3	3	4