



Question 11. What is common between d_{xy} and $d_{x^2-y^2}$ orbitals?

Answer: Both have identical shape, consisting of four lobes.

Question 12. If n is equal to 3, what are the values of quantum numbers l and m ?

Answer:

$l = 0, 1, 2$

$m = -2, -1, 0, +1, +2$ and $S = +1/2$ and $-1/2$ for each value of m .

Question 13.

Calculate the number of protons, neutrons and electrons in $^{80}_{35}\text{Br}$?

Answer:

$Z = 35$

$A = 80$

Atomic no. = 35 No. of protons = 35

No. of protons No. of electrons No. of neutrons

= $80 - 35 = 45$

Question 14. An electron beam after hitting a neutral crystal produces a diffraction pattern? What do you conclude?

Answer: Electron has wave nature.

Question 15. An electron beam on hitting a ZnS screen produces a scintillation on it. What do you conclude?

Answer: Electron has particle nature.

Question 16. Discuss the similarities and differences between a 1s and a 2s orbital.

Answer: Similarities:

- Both have spherical shape.
- Both have same angular momentum.

Differences:

- 1s has no node while 2s has one node.
- Energy of 2s is greater than that of 1s.

Question 17. What will be the order of energy levels 3s, 3p and 3d in case of H-atom?

Answer: All have equal energy.

Question 18. How many unpaired electrons are present in Pd ($Z = 46$)?

Answer:

The electronic configuration of the element palladium ($Z = 46$)

is $[\text{Kr}]^{36} 4d^{10} 5s^0$.

This means that it has no unpaired electron.

Question 19. Distinguish between a photon and quantum.

Answer: A quantum is a bundle of energy of a definite magnitude ($E = h\nu$) and it may be from any source. However, a photon is quantum of energy associated with light only.

Question 20. What type of metals are used in photoelectric cells?

Give one example.

Answer: The metals with low ionisation enthalpies are used in

photoelectric cells. Caesium (Cs), an alkali metal belonging to group 1 is the most commonly used metal.

Question 21. When is the energy of electron regarded as zero?

Answer: The energy of the electron is regarded as zero when it is at infinite distance from the nucleus.

At that point force of attraction between the electron and the nucleus is almost nil. Therefore, its energy is regarded as zero.

Question 22. What is difference between the notations l and L?

Answer: 'l' signifies the secondary quantum number.

'L' signifies second energy level ($n = 2$).

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