



# CHEMISTRY

## NCERT - NCERT CHEMISTRY(TELUGU)

### ATOMIC STRUCTURE-I

#### Example

1. What is the total number of orbitals present in the shell with the principal quantum number,  $n = 3$



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2. Using s, p, d, f notations, describe the orbital with the following quantum numbers (a)  $n=2, l=1$  (b)  $n=4, l=0$  (c)  $n=5, l=3$  (d)  $n=3, l=2$ .



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**Questions A Choose The Best Answer**

1. Atomic mass of an element is not necessarily a whole number because :

A. It contains electrons, protons and neutrons

B. It contains allotropic forms

C. It contains isotopes

D. Atoms are no longer considered indivisible

**Answer:**





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2. "No two electrons of the same atom can have all four quantum numbers the same".

Name the above principle.

- A. Exclusion principle
- B. Uncertainty principle
- C. Hund's rule
- D. Aufbau principle

**Answer:**



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3. When the 3d orbital is complete, the new electron will enter the

A. 4p orbital

B. 4f orbital

C. 4s orbital

D. 4d orbital

**Answer:**



4. The presence of 3 unpaired electrons in N atom can be explained by \_\_\_\_\_ ?

A. Pauling's exclusion principle

B. Aufbau principle

C. Uncertainty principle

D. Hund's rule

**Answer:**



5. The number of orbitals in a p-sub-shell is

A. 1

B. 2

C. 3

D. 6

**Answer:**



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6. The nucleus of an atom contains

- A. Electrons and protons
- B. Neutrons and protons
- C. Electrons, protons and neutrons
- D. Neutrons and electrons

**Answer:**



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7. Which is the lightest among the following?



A. An atom of hydrogen

B. An electron

C. A neutron

D. A proton

**Answer:**



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**8.** Which of the following has no neutrons in the nucleus?

A. Deuterium

B. Helium

C. Hydrogen

D. Tritium

**Answer:**



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9. When the value of the azimuthal quantum number is 3, the magnetic quantum number can have values :

A. +1, -1

B. +1, 0, 1

C. +2, +1, 0, -1, -2

D. +3, +2, +1, 0, -1, -2, -3

**Answer:**



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**10. 2p orbitals have :**

A.  $n = 1, l = 2$

B.  $n=1, l = 0$

C.  $n = 2, l = 0$

D.  $n = 2, l = 1$

**Answer:**



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**11.** The atomic number of an element is 17 and its mass number is 37. The number of protons, electrons and neutrons present in the neutral atom are :

A. 17, 37,20

B. 20,17,37

C. 17, 17, 20

D. 17, 20,17

**Answer:**



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**12.** Maximum number of electrons that can be accommodated in N shell is

A.  $n^2$

B.  $n + 1$

C.  $n - 1$

D.  $2n^2$

**Answer:**



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**13.** Which of the following is indicated by the magnetic quantum number ?

- A. The distance of the orbital from the nucleus
- B. The shape of the orbital
- C. The orientation of the orbital in space
- D. The spin of the electron

**Answer:**



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**Questions B Fill Up The Blanks**

1. The decomposition of an electrolyte by passage of electricity is known as .....



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2. When cathode rays are focused on thin metal foil, it gets heated up to .....



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3. Cathode rays produce .....on the walls of the discharge tube.





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4. The radiations which were not influenced by a magnet were called.....



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5. Neutron was discovered by



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## Questions C Write In One Or Two Sentence

1. What is the charge of an electron, proton and a neutron ?



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2. What is atomic number ?



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**3.** The maximum number of electrons that an orbital can hold is



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**4.** How many orbitals are there in the second orbit? How are they designated?



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5. Sketch the shape of s and p-orbital indicating the angular distribution of electrons



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6. What are the charge and mass of an electron?



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7. What is an orbital ?



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8. Give the order of filling of electrons in the following orbitals 3p, 3d, 4p, 3d and 6s.



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9. What is meant by principal quantum number?



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10. How many protons and neutrons are present in  ${}^1_8\text{O}$ ?



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11. What are the particles generally present in the nuclei of atoms?



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**12.** The atomic mass of an element is 24 and its atomic number is 12. Show how the atom of the element is constituted?



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**13.** How will you experimentally distinguish between a ray of neutron and ray of proton?



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**14.** What is the principal defect of Bohr's atomic model?



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**15.** Write the complete symbol for : (a) The nucleus with atomic number 56 and mass number 138 , (b) The nucleus with atomic number 26 and mass number 55 , (c) The nucleus with atomic number 4 and mass number 9.







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**16.** An atomic orbital has  $n = 3$ . What are the possible values of  $l$  ?



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**17.** An atomic orbital has  $l = 3$ . What are the possible values of  $m$ ?



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**18.** The electronic configuration of chromium ( $Z=24$ ) is



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**19.** Which energy level does not have p-orbital?



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**20.** An atom of an element has 19 electrons. What is the total number of p-orbital?



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21. How many electrons can have  $s + \frac{1}{2}$  in a d-sub-shell?



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22. Write the values of  $l$  and  $m$  for p-orbitals



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**23.** Which quantum accounts for the orientation of the electron orbital?



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**24.** What is shape of the orbital with (i)  $n = 2$  and  $l = 0$ , (ii)  $n = 2$  and  $l = 1$ ?



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**25.** Give the values for all quantum numbers for 2p electrons in nitrogen ( $Z = 7$ ).



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**26.** Give the electronic configuration of  $Mn^{2+}$  and Cu. Atomic number of Cu = 29 and Mn = 25.



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27. Explain why the valence electronic configuration of Cr and Cu are written as  $3d^5 4s^1$  and  $3d^{10} 4s^1$  instead of  $3d^4 4s^2$  and  $3d^9 4s^2$ ?



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## Questions D Explain Briefly On The Following

1. Describe Aufbau principle. Explain its significance in the electronic build up of

atoms.



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2. Using the s, p, d, notation, describe the orbital with the following quantum numbers?

(a)  $n = 1, l = 0$ , (b)  $n = 2, l = 0$ , (c)  $n = 3, l = 1$ , (d)  $n = 4, l = 3$ .



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3. Using the Aufbau principle, write the electronic configuration in the ground state of the following atoms : Boron ( $Z = 5$ ) Neon ( $Z = 10$ ) and Aluminium ( $Z = 13$ ).



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4. Describe the Rutherford's alpha particle scattering experiment. What are the conclusions of this experiment.



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5. What are the postulates of Bohr's model of hydrogen atom?



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6. Explain the various quantum numbers which completely specify the electron of an atom



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