

## MDCAT Chemistry

Past Paper MCQ's 2009 - 2022

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## Atomic Structure

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1. The maximum probability of finding an electron is at distance of:
- a) 0.53 mm      b) 0.53 nm      c) 0.153 nm      d) 1.53 mm

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2. All the three p – orbitals have same energy in the absence of magnetic field and are called ..... orbital's:

- a) Generated      b) Delocalized      c) Degenerated      d) Localized

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3. relative energies of 4s , 4p and 3d orbitals are in the order

- a)  $3d < 4p < 4s$       b)  $4p < 4s < 3d$   
c)  $4s < 3d < 4p$       d)  $4p < 3d < 4s$

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4. Which quantum number tells us about orientation of orbitals:

- a) Principal quantum number      b) spin quantum number  
c) Azimuthal quantum number      d) magnetic quantum number

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5. Correct order of energy in the given sub – shells is:

a)  $5s > 3d > 3p > 4s$

b)  $3p > 3d > 5s > 4s$

c)  $5s > 3d > 4s > 3p$

d)  $3p > 3d > 4s > 5s$

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6. Which increase in the value of principal quantum number 'n' the shape of the s orbitals remain same although their sizes

a) Decrease

b) remain the same

c) Increase

d) may or may not remain the same

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7. According to the number of protons, neutrons and electrons given in the table , which one of the following option is correct?

a)  $As^{+3}$  ,  $Ga^{+3}$  ,  $Ca$

b)  $As^{+3}$  ,  $Ga^{+3}$  ,  $Ca^{+2}$

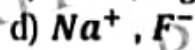
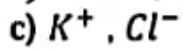
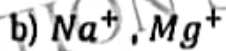
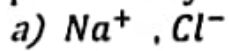
c)  $As^{+3}$  ,  $Ga^{+2}$  ,  $Ca$

d)  $As^{+3}$  ,  $Ga$  ,  $Ca^{+2}$

| Species | Proton | Neutron | Electron |
|---------|--------|---------|----------|
| As      | 33     | 42      | 30       |
| Ga      | 31     | 39      | 28       |
| Ca      | 20     | 20      | 20       |

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8. Which one of the following pairs has the same electronic configuration as possessed by neon (Ne - 10)

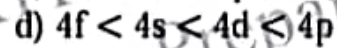
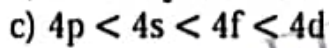
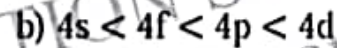
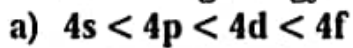


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9. There are four orbitals s, p, d and f. which order is correct with respect to the increasing energy of the orbitals

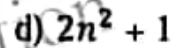
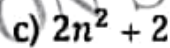
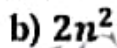
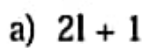


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10. The maximum number of electrons in electrons configuration can be calculated by using formula:



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11. Number of electrons in  ${}_{31}^{71}\text{Ga}^{3+}$  will be

- a) 28      b) 30      c) 29      d) 34

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12. Number of neutrons in  ${}_{30}^{66}\text{Zn}$  will be:

- a) 30      b) 38      c) 35      d) 36

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13. Among the following which contains same no. of electrons and protons but different no of neutron.

- a) Isobars      b) Isotones      c) Isotopes      d) None of these

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14. Isotopic symbol of ion Sulphur - 33 is  ${}_{16}^{33}\text{S}^{-2}$  how many number of protons and neutrons are present if number electrons are 18?

a)  $P = 18, n = 15$

b)  $p = 16, n = 18$

c)  $P = 16, n = 17$

d)  $p = 17, n = 16$

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15. Which is the correct electronic configuration of chromium ( $\text{Cr}_{24}$ )?

a)  $1s^2, 2s^2, 2p^6, 3s^6, 4s^2, 3d^4$

b)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1, 3d^5$

c)  $1s^2, 2s^2, 2p^6, 3s^6, 3d^6$

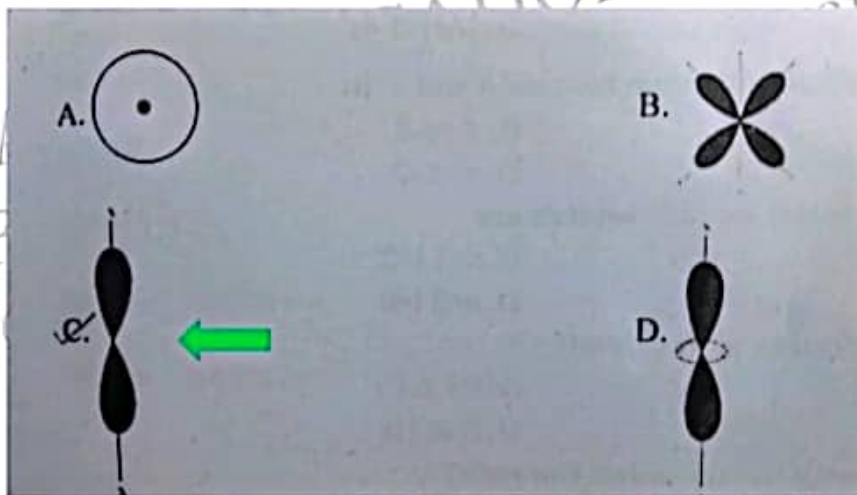
d)  $1s^2, 2s^2, 3s^2, 3p^6, 3p^6, 4s^2, 3d^6$

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16. Identify the correct option associated with the shape of p-orbital:



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17. The order of energy level in  $K^{19}$  is?

a) 4s , 4p

b) 4s , 3d

c) 3p , 4s

d) 3s , 3d

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18. Maximum numbers of electron in a sub – shell is given by

a)  $2(2l - 1)$

b)  $2(2l + 1)$

c)  $2(l+1)$

d)  $2l+1$

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19. Which of the following element in its atomic state has electrons fully occupying first two spherically symmetrical orbital?

a) Oxygen

b) Helium

c) Beryllium

d) carbon

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20. What are the values of principal quantum number and azimuthal quantum number for the last electron in chlorine atom?

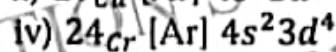
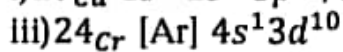
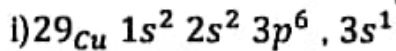
- a) 1, 6      b) 1, 3      c) 3, 1      d) 6, 1

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21. Which of the following electrons configuration is / are correct?



- a) i only      b) ii only      c) i and ii only      d) ii and iii only

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22. Quantum number which describes the orientation of orbitals in three dimensions space is

- a) Spin quantum number      b) azimuthal quantum number  
c) Magnetic quantum number      d) principal quantum number

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23. Which one has greater mass?

- a) Alpha      b) Beta      c) Gamma      d) Proton

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24. Which of the following is the electrons configuration of Cr?

- a)  $[\text{Ar}]3d^5 4s^2$       b)  $[\text{Ar}]3d^4 4s^2$   
c)  $[\text{Ar}]3d^6 4s^0$       d)  $[\text{Ar}]3d^5 4s^1$

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25. The relation between quantum number  $n$  and  $l$  is:

- a)  $n = l - 1$       b)  $l = n - 2$       c)  $l = n - 1$       d)  $n = l - 2$

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26. Quantum number values for '2p' orbitals are:

- a)  $n = 2 \quad l = 1$       b)  $n = 1 \quad l = 2$       c)  $n = 1 \quad l = 0$       d)  $n = 2 \quad l = 0$

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27. Which pair has 1 electron in its orbital?

- a) Li and Fe      b) Na and Cr      c) K and Mn      d) H and He

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28. Which of the following has lowest  $e/m$  ratio?

- a)  $Li^{2+}$       b)  $H^{+1}$       c)  $He^{+}$       d) **Be**

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29. According to Bohr, the orbits in which electrons revolve around the nucleus are:

- a) Oval      b) Elliptical      c) Cylindrical      **d) Circular**

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30. Atomic number of K:

- a) 19**      b) 21      c) 27      d) 11

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31. Number of protons, electrons and neutrons in  $Pb^{+2}$ :

- a) 82, 80, 125      b) 80, 82, 125      c) 125, 82, 80      **d) 125, 80, 82**

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32. Spin could be:

a)  $+\frac{1}{2}, -\frac{1}{2}$

b)  $\frac{1}{2}, +\frac{1}{2}$

c)  $\frac{1}{2}, 0$

d) None of these

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33. The e/m values of positive rays depend on ..... Enclosed in a discharge tube:

a) Nature of gas

b) Properties of gas

c) Composition of gas

d) All of these

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34. Cancer treatment which radiation use:

a) Alpha

b) Beta

c) Gamma

d) Cathode rays

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35. M – shell contain:

- a) s      b) s, p, d      c) s, p, d, f      d) s, p

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36. Who discover neutron:

- a) Chadwick      b) Goldstein      c) Painck      d) Thomson

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37. If electrons are passed in electric and magnetic field then correct equation is:

- a) Will go straight      b) will bend towards the positive plate  
c) Will bend towards negative plate  
d) Will be deflected perpendicular to the axis of magnetic field

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38. Total no. of electrons that can be accommodated in f-subshell;

- a) 6      b) 14      c) 10      d) 18

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39.  $n + l$  value for 5d is:

- a) 5      b) 6      c) 7      d) 8

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40. Maximum number of electrons in p – subshell are:

- a) 6      b) 10      c) 12      d) 14

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41. Number of electrons in 3p subshell of Ca?

- a) 4                      b) 5                      c) 6                      d) 2

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42. Number of electrons in the outermost shell of chloride ion ( $Cl^-$ ) is:

- a) 17                      b) 1                      c) 7                      d) 8

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43. Number of electrons in chloride ion:

- a) 8                      b) 7                      c) 9                      d) 18

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44. According to Planck's quantum theory:

- a) A body emits energy in quanta
- b) a body absorbs energy in quanta
- c) emits or absorb radiations discontinuously
- d) All of these

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45. Rydberg's constant is related to the atomic no. as:

- a)  $Z^2$
- b)  $\frac{1}{Z^2}$
- c)  $Z^3$
- d)  $Z$

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46. Positive rays are also known as:

- a) X-rays
- b) Gamma rays
- c) Canal rays
- d) Cathode rays

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47. Magnetic quantum number of s is:

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

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48. Planck's constant was named after scientist:

- a) Helsenberg                      b) Planck                      c) Henry                      d) Bohr

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49. During blood formation, d orbitals splits into ..... of orbitals:

- a) 3 sets                      b) 4 sets                      c) 5 sets                      d) 2 sets

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50. The probability of finding an electron between s-orbitals is zero. This place is called .....

- a) Nodal      b) Non – Nodal      c) Anti – nodal      d) Erect

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51. Each electron in an atom must have its own unique set of quantum number is a statement of .....

- a) Aufbau principle      b) Hund's ryule  
c) Pauli exclusion principle      d) None of these

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52. The lobes of d – orbitals lie between the axis:

- a) First two      b) In all axis      c) first three      d) None of these

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53. Different kind of atoms of same elements are called isotopes having different ..... But same ..... Property?

- a) Physical , atomic      b) Physical , chemical  
c) Chemical , physical    d) Chemical , atomic

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54. Potassium has electronic configuration (2, 8, 8, 1) and become ion by attaining configuration:

- a) 2, 8, 8, 2      b) 2, 8, 8      c) 2, 8, 1      d) 2, 8, 8, 8

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55. Spectrum is the visual display or ..... Of component of white light where it is passed through prism:

- a) Rarefaction      b) radiation      c) Collection      d) Dispersion

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56. Which has greater energy according to Auf – bau principle ( $n + l$ ):

- a) 5d      b) 4f      c) 7s      d) 6p

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