



CHEMISTRY

BOOKS - JEEVITH PUBLICATIONS CHEMISTRY (KANNADA ENGLISH)

STRUCTURE OF ATOM

One Mark Questions And Answers

1. Mention the constituents of atom.



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2. Who discovered electrons ?



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3. What is the mass of electron?



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4. Mention the value of charge on an electron.



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5. Mention the value of charge on a proton.



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6. What is the mass of proton?



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7. Who discovered proton?



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8. Who invented charge on electron?



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9. What is the limitation of Thomson's model of atom.



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10. Who discovered neutron?



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11. What is atomic number?



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12. What is mass number?



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13. Write the relationship between mass number and atomic number.



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14. How do you represent an atom symbolically with atomic number and mass number?



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15. What is the number of proton and neutron

in ${}_{92}\text{X}^{235}$?



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16. Give the number of Protons, Electrons and

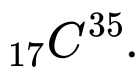
Neutrons present in the atom having atomic

number 27 and mass number 56.



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17. Mention the proton, neutron and electrons



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18. Name the species which has no electron.



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19. Name the atom which has no neutron.



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20. What is the ratio between mass of proton and electron?



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21. Name the particles which constitute cathode rays.



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22. Who demonstrated the particle property of an electron?



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23. Name the physicists who for the first time verified the wave nature of electrons.



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24. What is the charge on neutrons?



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25. Mention the mass of neutron.



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26. Define velocity of the wave [c].



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27. What is photon?



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28. How do measure wavelength of wave?



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29. How is velocity is related with wave number and frequency ?



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30. What is the value of 1 Å?



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31. Define the term 'radiation'.



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32. How are velocity, frequency and wavelength of light radiation related?



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33. State Pauli's exclusion principles.



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34. An atom having mass number 40 has 20 neutrons in its nucleus. What is the atomic number of the element?



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35. What is aufbau principle?



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36. What is emission spectrum?



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37. How is the magnetic moment of paramagnetic species is related to the number of unpaired electrons present in it?



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38. Differentiate between the terms 'ground state' and 'excited state'.



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39. What is the expression for the energy of a photon?



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40. Write the unit for frequency of radiation.



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41. Name the experiment which shows that light has particle property.



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42. Name the experiment which shows that light was wave property.





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43. How is wave number and wavelength of a wave related?



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44. What is the velocity of light?



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45. Define wavelength.



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46. Define Wave number.



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47. Define frequency of light.



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48. What type of waves does light constitute?



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49. What is orbital (atom orbital)?



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50. How many electrons can be accommodated in an orbital?



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51. Write the de Broglie's equation.



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52. Write Rydberg's formula.



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53. Write the Balmer equation.



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54. What are the four prominent lines in Balmer series of hydrogen spectrum?



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55. What is the value of Rydberg's constant?



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56. Give the range of wavelengths of visible light.



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57. Give the Rydberg equation where R is Rydberg constant?



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58. Name the element whose atom contains six protons in the nucleus.



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59. Name the series of hydrogen spectrum, which has the least wavelength.



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60. Name the spectral series of hydrogen atom, which be in infrared region.



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61. Match the following:

Column I	Column II
(a) Na^+ and Ne	(i) High ionization enthalpy
(b) Be and Mg	(ii) high electron affinity
(c) F and Cl	(iii) Isoelectronic species
(d) Ne and Ar	(iv) Diagonal relationship



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62. What is the value of 1 nm?



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63. What is the SI unit of wavelength (λ)?



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64. What is the SI unit of Wave number (n)?



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65. (a) Define velocity. What is the SI unit of velocity ?

(b) What is the difference between speed and velocity ?

(c) Convert a speed of 54 km/h into m/s.



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66. ELECTROMAGNETIC SPECTRUM



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67. What is the value of planck's constant?



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68. What is Line spectrum of hydrogen?



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69. Define SHELLS.



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70. Define Node (Or) nodal surfaces.



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71. Give the total number of nodes in any orbital.



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72. What is isotopes?



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73. What is Isobars?



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Two Marks Questions And Answers

1. Write the difference between isotope and isobars.



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2. Explain Planks quantum theory.



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3. Distinguish between emission spectra and absorption spectra.



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4. What do you mean by electromagnetic spectra?



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5. Write the electromagnetic spectra in the increasing order of wave length . (Decreasing order of frequency)



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6. Deduce the de-Broglics matter wave equation.



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7. Explain the wave nature of light.



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8. Distinguish between particle and wave.



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9. Explain Werner Heisenberg's uncertainty principle (qualitative).



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10. Mention the Merits of Bohr's theory.



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11. Write any two limitations of Bohr's theorem.



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12. Write the difference between orbit and orbital.



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13. Draw the structure of p-orbitals (Draw the shape of orbital whose Azimuthal quantum no is 1).



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14. Draw the structure of d-orbital (Orbital whose Azimuthal quantum no= 2).



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15. What do you mean by electronic configuration? With the sequence.



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16. Explain the electronic configuration of cation Fe^+ .



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17. Explain electronic configuration of anion using N.



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18. State Pauli's exclusion principles.



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19. State and explain Hund's Rule of maximum multiplicity.



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20. What are quantum numbers and name them?



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21. Write all quantum number values for 3s orbital electrons.



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22. An orbital can contain only two electrons.
Why?



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23. Write the atomic number at an element with outer configuration.



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24. Write the atomic number at an element with outer configuration.



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25. Write the electronic configuration of

Cl^- ion



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26. Write the electronic configuration of

Na^+ ion



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27. What are the limitations of Rutherford's model?



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28. Explain electromagnetic radiations.



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29. What is the formula to calculate $\bar{\nu}$ (wave number) of spectral lines in hydrogen?



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30. What are Subshells?



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31. What is an orbital ?



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32. State $(n + 1)$ rule.



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33. Write the electronic configuration of oxygen



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34. Write the electronic configuration of silicon



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35. Write the electronic configuration of Zinc.



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36. Explain symmetrical distribution of electrons.



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37. Explain exchange energy.





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Three Marks Questions And Answers

1. Summarize the Bohr's Model of an atom.



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2. Explain the experimental set up and different series of emission spectrum of hydrogen.



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3. What is Wave number, Frequency and Amplitude? Give its SI Units.



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4. Discuss the observations of α - ray scattering experiment.



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5. What is the conclusion of α -ray scattering experiment?



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6. What are the properties of electromagnetic radiations?



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7. Discuss the characteristics of cathode rays.



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8. Explain the characteristics of canal rays



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9. Explain the characteristics of anode rays



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10. Explain Thomson's atom model/plum pudding model.



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11. Rutherford's atomic model accounts for :



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12. Explain the particle nature of EMR
(Electromagnetic Radiation]



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13. Discuss dual nature of light.



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14. Explain the significance of Ψ and Ψ^2 ?



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15. Illustrate rules for filling electrons in $(n + l)$ orbital using an example.



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16. Illustrate the stability of half filled and completely filled orbitals with a suitable example.



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1. Calculate the wave number, wavelength and frequency first line of hydrogen spectrum or Calculate the maximum wave length of a line in the Lyman series.



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2. Calculate the number of neutrons present in ${}_{92}\text{U}^{235}$ isotope.



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3. Calculate the wavelength and wave numbers of the first and second lines in the Balmer series of hydrogen spectrum. Given

$$R = 1.096 \times 10^7 m^{-1}$$



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4. Chlorine ($Z = 17$) has two isotopes with mass numbers 35 and 37, relative abundance being 3 : 1. Calculate the average atomic mass of chlorine.





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5. Calculate the wave number and wavelength of the first spectral line of Lyman series of hydrogen spectrum. Rydberg constant $R' = 10.97 \times 10^6 m^{-1}$.



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6. Calculate the wave number of the spectral line when electron jumps from the second Bohr orbit to the ground state. $R = 1.097 \times 10^7 m^{-1}$



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7. In a hydrogen atom, an electron jumps from third orbit to the first orbit. Find out the frequency and wavelength of the spectral line.

Given $R = 1.097 \times 10^7 \text{ m}^{-1}$



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8. An atom of an element has 29 electrons. The nucleus of the atom contains 35 neutrons.

Find the number of protons in the nucleus and the mass number.



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9. Calculate the wavelength of a wave of frequency 10^{12} Hz, travelling with the speed of light $3 \times 10^8 \text{ ms}^{-1}$.



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10. Calculate the frequency of electromagnetic radiation having the wavelength 3μ . Calculate the wave number corresponding to it. ($1\mu = 10^{-6} \text{ m}$)



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11. Calculate the frequency and energy per quantum of a radiation with a wavelength of 200 nm . ($c = 3 \times 10^8 \text{ ms}^{-1}$ and $h = 6.625 \times 10^{-34} \text{ Js}$)





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12. Calculate the number of photon of light with a wavelength of 6000 \AA that provide 1 joule of energy.



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13. A major line in an atomic emission spectrum occurs at 450 nm . Find the energy decrease, as this photon is emitted.



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14. Calculate the wave number, wavelength and frequency of the first line in the Balmer series.



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15. The red light of neon signs has a wavelength of 693 nm. Find the energy difference (per mole of atoms) between the two energy levels involved.



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16. Calculate the wavelength of an electron moving with a velocity of $2.5 \times 10^{-7} \text{ m s}^{-1}$ $h = 6.626 \times 10^{-34} \text{ J s}$: mass of an electron = $9.11 \times 10^{-31} \text{ kg}$.



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17. Find the mass of an electrically charged particle moving with a velocity of

$3 \times 10^6 \text{ m s}^{-1}$ and having a de Brogue wavelength of 2\AA .



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18. Calculate the energy of a photon whose wavelength is $3.864 \times 10^{-7} \text{ m}$.



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19. Calculate the de Broglie wavelength of an electron of mass $9.11 \times 10^{-31} \text{ kg}$ and

moving with a velocity of $1.0 \times 10^6 \text{ms}^{-1}$



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20. Calculate the de Broglie wavelength of a bullet of mass 25g moving with a velocity of 100ms^{-1} .



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21. Write the complete symbol for the atom with the given atomic number (Z) and atomic

mass (A)

$Z = 17, A = 35$



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22. Write the complete symbol for the atom with the given atomic number (Z) and atomic mass (A)

$Z = 92, A = 233$



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23. Write the complete symbol for the atom with the given atomic number (Z) and atomic mass (A)

$$Z = 4, A = 9$$



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24. The atomic number of an element is 5 and mass number is 11. Find the number of electrons, protons and neutrons present in an

atom of it. How can this element be represented.



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25. Write the complete symbol for the nucleus with atomic number 56 and mass number 138



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26. Write the complete symbol for the nucleus with atomic number 26 and mass number 55.



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27. Calculate the wavelength of a body of mass 1 mg moving with a velocity of 10 m sec^{-1} .



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28. Calculate the momentum of a moving particle which has a de- broglie wavelength of 200 pm.



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29. If the velocity of the electron in Bohr's first orbit is $2.19 \times 10^6 \text{ms}^{-1}$, calculate the de- Broglie wavelength associated with it.



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