



PHYSICS

BOOKS - PUNJAB BOARD PREVIOUS YEAR PAPERS

Wave Nature of Matter



1. Find de-Brogile wavelength of wave

associated with a particle of rest mass

 $9 imes 10^{-31}$ kg and moving with a speed $1.5 imes 10^8 m s^{-1}~(h=6.6 imes 10^{-34}$ Js).

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2. Find de-Brogile wave length of wave associated with a particle of rest mass 5×10^{-30} kg and moving with a speed $1.8 \times 10^8 m s^{-1}$ ($h = 6.6 \times 10^{-34}$ JS).

3. Calculate the momentum of electrons if their wavelength is $2\overset{\circ}{A}$. Given that Plank.s constant, h = $6.629 \times 10^9 - 34$) Js, mass of electrons, $m = 9.1 \times 10^{31}$ kg.

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4. Calculate the de-Brogile wavelength for

electron moving with speed of $6 imes 10^5 m s^{-1}$?

5. What voltage must be applied to an electron microscope to produce electrons of wavelength $0.4 \mathring{A}$?

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6. A photon and an electron have got same De Brogile wavelength $pprox 10^{-10}m$). Which has greater knietic energy? Explain.

7. What is the momentum and De Broglie wavelength of an electron with kinetic energy of 120 eV.

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8. Calculate the momentum and De Brogile wavelength of the electrons accelerated through a potential difference of 56V. Mass of electron is 9.1×10^{-31} kg.

9. Calculate the momentum of electrons , if their wavelength is $1 \overset{\circ}{A}$. Given that Plank.s constant , h= $6.626 imes 10^{-34}$ Js,mass of electron, $m=9.1 imes 10^{-31}$ kg.

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10. Calculate the momentum of electrons, if their wavlength is $3\overset{\circ}{A}$. Given that Plank.s constant , $h=6.626 imes10^{-34}$ Js, mass of electron, $m=9.1 imes10^{-31}$ kg.



11. Calculate the De-Brogile wavelength of an electron and proton if their $10^5 m/s$ given mass of electron is 9.1×10^{-31} kg (kilogram). Mass of proton $1.67 \times 10^{-27} kg$.

Plank.s constant

 $h = 6.625 imes 10^{-34}$ JS (Joule Second).



12. Calculate the de-Brogile wavelength for electron moving with speed of $6 \times 10^5 m s^{-1}$?

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13. Calculate the de Brogile wavelength for electron moving with a speed of $9 \times 10^5 m s^{-1}$ Given $h = 6.6 \times 10^{-34} J s$ and mass of electron $= 9.1 \times 10^{-31}$ kg.

14. Calculate the momentum of electrons if their wavelength is $2\overset{\circ}{A}$. Given that Plank.s constant, h = $6.629 \times 10^9 - 34$) Js, mass of electrons, $m = 9.1 \times 10^{31}$ kg.

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15. What is the de-Broglie wavelength of an

electron beam accelerated through a potential

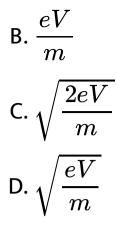
difference of 25 V?

16. What is de -Brogile wavelength of an eectron beam accelerated through a potential difference of 36 V?



17. An electron of mass .m. and charge .e. is accelerated from rest through a potential difference .V. in vaccum . Its final velocity will be

A.
$$\frac{eV}{2m}$$



Answer:



18. The minimum wavelength of the X-rays produced by electrons accelerated through a potential of .V. (in volt) is directly proportional

A. $\sqrt{1}$

 $\mathsf{B}.\,V^2$

C.
$$\frac{1}{\sqrt{V}}$$

D. $\frac{1}{V}$

Answer:



19. The de Brogile wave corresponding to a particle of mass .m. and velocity .v. has a wavelength associated with it.



B. hmv

C.
$$\frac{mh}{v}$$

D. $\frac{h}{\sqrt{m}v}$

Answer:

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20. Select the correct option:

If an electron and a photon have smae de Brogile wavelength, then they will habe same: A. Energy

B. velocity

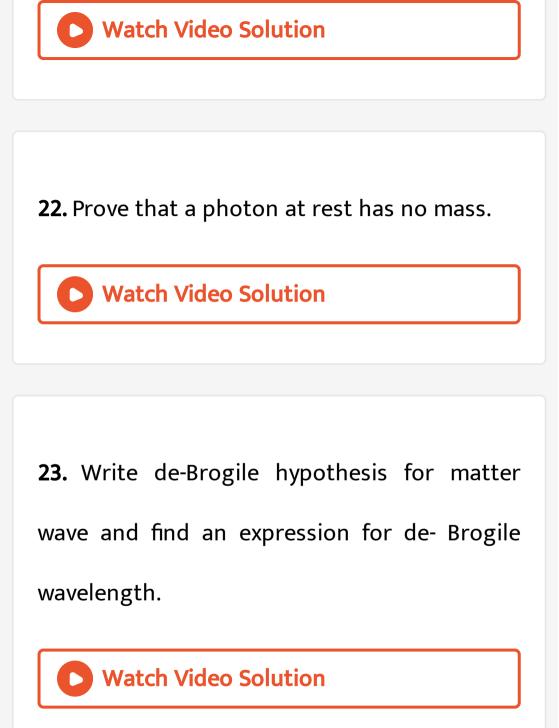
C. Linear momentum

D. Angular momentum

Answer:

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21. Wavelength of electromagnetic radiation is doubled, what will happen to energy of photon?



24. An electron and a proton are possessing same amount, of kinetic energy. WHich of two has a greater De Brogile wavelength? Justify your answer.

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25. Electron and proton are moving with the

same speed, which will have more wvalength?

26. An electron and α particle have same debrogile wavelength associated with them. How are their kinetic energy related to each other?



27. Write de-Brogile hypothesis for matter wave and find an expression for de- Brogile wavelength.



28. Calculate the de_Brogile.s wavelngth of an

electron of energy 400 eV.

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29. Write de-Brogile hypothesis for matter wave and find an expression for de- Brogile wavelength.

30. Why are de-Brogile waves with a moving

football not visible?

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31. Explain why wave nature of matter is not

apparent in our daily observations.

32. Derive an expression for de-Brogile.s wavelength associstaed with an accelerated electron.

