doubtnut
India's Number 1 Education App

PHYSICS

BOOKS - MBD -HARYANA BOARD

DUAL NATURE OF MATTER AND RADIATIONS

Very Short Answer Type Questions

1. The rest mass of the photon is

Watch Video Solution

2. The photoelectric work function

Watch Video Solution

3. The work function of a metal

Watch Video Solution

4. Explain threshold wavelength.

Watch Video Solution

5. What are photoelectrons ?

Watch Video Solution

6. If the frequency of incident radiation on a photocell is doubled for the same intensity, then what change will you observe in photoelectric current ?

Watch Video Solution

7. The stopping potential for acertain photosensitive metal is Vq when the frequency of incident radiation is V_0 When the frequency of the incident radiations is doubled, what will be the stopping potential ?

Watch Video Solution

8. If the intensity of the incident radiation in a photocell is increased, how does the stopping potential vary?

Watch Video Solution

9. If the intensity of the incident radiation in a photocell is increased, how does the stopping potential vary?

Watch Video Solution

10. What is the effect on the velocity of the emitted photoelectrons if the wavelength of the incident light is decreased ?

Watch Video Solution

11. What is the de-Broglie wavelength associated with an electron accelerated through a potential of 100V ?

Watch Video Solution

12. What is the de-Broglie wavelength of a bullet of mass 0.040 kg travelling at a speed of 1.0 km/sec ?

Watch Video Solution

13. Which photon is more energetic: A red one or a violet one?

Watch Video Solution

14. Work functions for metals A and B are 2 eV and 4 eV respectively. Which metal has a lower threshold wavelength and why ?

Watch Video Solution

15. The maximum kinetic energy of electrons emitted by a photocell is 2-8 V. What is the stopping potential ?

Watch Video Solution

16. Einsteins photoelectric equation is

Watch Video Solution

17. The phenomenon which proves the particle nature of electromagnetic wave is

Watch Video Solution

18. How many electron- volt make one joule?

Watch Video Solution

19. What is threshold frequency in photoelectric emission?

Watch Video Solution

20. What is the de-Broglie wavelength associated with an electron moving with a speed of $5.4 \times 10^{6} ms^{-1}$?

Watch Video Solution

21. What is the effect on the velocity of emitted photoelectrons if the wavelength of the incident light is increased ?

Watch Video Solution

22. The maximum kinetic energy of a photoelectron is 3 eV. What is its stopping potential ?

Watch Video Solution

23. What is de-Broglie wavelength of a 0.2 kg ball moving with speed of 30 ms^{-1} ?

Watch Video Solution

24. The de Broglie wavelength associated with a ball of mass 150 g travelling at 30 m s^{-1} is

Watch Video Solution

25. Calculate the de-Broglie wavelength of electrons accelerated through a potential difference of 64 volts

Watch Video Solution

26. An increase in the frequency of the incident light increase the velocity with which photoelectron is ejected. Explain how?

Watch Video Solution

27. Name different processes involved in electron emission.

View Text Solution

28. What is photon ? Write formula for its energy.

Watch Video Solution

29. The strength of the photoelectric current depends upon

Watch Video Solution

30. Write the three characteristic features in photoelectric effect which cannot be explained on the basis of wave theory of light, but can be explained by using Einstein's equation.

Watch Video Solution

31. Give principle of a photocell.

Watch Video Solution

32. What is the momentum of a photon of frequency v ?

Watch Video Solution

33. What is an electron volt (eV) ?

Watch Video Solution

Short Answer Type Questions

1. If the frequency of incident radiation on a photocell is doubled for the same intensity, what change will you observe in the kinetic energy of emitted photoelectrons ?

Watch Video Solution

2. Describe photoelectric effect and state the laws of photoelectric emission.

Watch Video Solution

3. Explain photoelectric effect Explain the effect of increase of intensity of incident radiations on photoelectrons emitted by a photo-tube.

Watch Video Solution

4. Define photoelectric work function. How is it related to thresold frequency?

Watch Video Solution

5. Define photoelectric effect. Draw a graph to show the variation of stopping potential with frequency of incident radiation on a metal plate.

Watch Video Solution

6. Explain effect of potential on photoelectric current.

View Text Solution

7. Draw a graph, showing the effect of potential on photoelectric current. Hence define stopping potential.

View Text Solution

8. Discuss the variation of photocurrent with collector plate potential for different intensity of radiations.

View Text Solution

9. What is photoelectric effect ? Explain effect of intensity on photoelectric current.

Watch Video Solution

10. State Einstein's photoelectric equation and explain the terms involved.

Watch Video Solution

11. Explain Einstein's equation for photoelectric emission.

Watch Video Solution

12. Write Einstein's photoelectric equation. Define the threshold frequency v_0 and stopping potential V_0.

Watch Video Solution

13. Describe photoelectric effect and state the laws of photoelectric emission.

Watch Video Solution

14. Define photoelectric effect and state the laws of photoelectric emission.

View Text Solution

15. State two laws of photoelectric emission. Are cathode rays waves or particle?

Watch Video Solution

16. Explain the laws of photoelectric effect from the Einstein photoelectric equation.

View Text Solution

17. State Einstein's photoelectric equation. Explain any two characteristics of photoelectric effect on the basis of this equation.

Watch Video Solution

18. State laws of photoelectric emission.

Watch Video Solution

19. Show that the de-Broglie wavelength A of an electron of energy E is given by the relation :

$$\lambda = \frac{h}{\sqrt{2mE}}.$$

View Text Solution

20. Derive expression for the de-Broglie wavelength of an electron moving under a potential difference of V volt. Name an

experiment which verified the wave nature of electrons.

Watch Video Solution

21. Why are de-Broglie waves with a moving foot ball not visible?

Watch Video Solution

22. Why are de Broglie waves associated with a moving football is not apparent to us?

Watch Video Solution

23. Blue light can eject electrons from a photosensitive surface while orange light can not. Will violet and red light eject electrons from the same surface?

Watch Video Solution

24. State de-Broglie relation for wavelength of matter waves. Show that the de-Broglie

wavelength of electrons accelerated through a potential of V volt can be expressed as :

$$\lambda = \frac{h}{\sqrt{2meV}}$$

Watch Video Solution

25. How does Davisson and Germer's experiment verify the wave nature of electrons ?

Watch Video Solution

26. Kinetic energy remaining the same, which of the two have greater de-Broglie wavelength proton or electron ? Explain.

Watch Video Solution

27. An electron and proton are moving in the same direction and possess same K.E. Find the ratio of de-Broglie wavelength associated with these particles.

View Text Solution

28. The wavelength λ of a photon and the de-Broglie wavelength of an electron have the same value. Show that the energy of the photon is $\frac{2\lambda mc}{h}$ times the kinetic energy of the electron, Where m,c and h have their usual meanings.

Watch Video Solution

29. A photon and an elecron have the same de Broglie wavelength. Which has greater total

energy? Explain

Watch Video Solution

Long Answer Type Question

1. What are photons ? State their properties.

Watch Video Solution

Objective Type Questions

1. The wavelength of a wave with frequency 10^{14} Hz will be :

A. 3×10^{-6} m

B. 3×10^{6} m

C. 10^{6}m

D. None

Answer: A

Watch Video Solution

2. If threshold wavelength for sodium is 6800Å then the work function will be

A. 1.82 eV

B. 3.64 eV

C. 0.91 eV

D. 2.73 eV

Answer: A

Watch Video Solution

3. For which of the following stopping potential required is maximum ?

A. Blue

B. Green

C. Red

D. Yellow

Answer: D

View Text Solution

4. The de-Broglie waves associated with an electron accelerated through a potential difference of 121V is :

A. 1.227 nm

B. 12.270 nm

C. 0.112 nm

D. 11.200 nm

Answer: C

Watch Video Solution

5. The wavelength of an electron of energy 10 keV will be :

A. 0.12Å

B. 1.2Å

C. 12Å

D. 120Å

Answer: A

 Watch Video Solution

6. If a proton and electron have the same de Broglie wavelength, then

A. both have the same kinetic energy

B. proton has more K.E. than electron

C. electron has more K.E. than proton

D. Both have the same velocity.

Answer: C

 Watch Video Solution

7. The de-Broglie waves associated with an electron moving under a potential difference of 100 V will have wavelength :

A. 12.27×10^{-11}

B. 12.27×10^{-10}m

C. 12.27×10^{-9} m

D. 1 m

Answer: A

Watch Video Solution

8. The rest mass of the photon is

A. zero

B. hv

C. $\frac{hc}{\lambda}$

D. $\frac{hv}{c}$

Answer: A

Watch Video Solution

9. When a proton is accelerated with 1 volt potential difference, then its kinetic energy is

A. $\frac{1}{1840}$ eV

B. 1840 eV

C. 1 eV

D. 1840 c^2 eV.

Answer: C

Watch Video Solution

10. Which of the following has the largest de Broglie wavelength (all have eual velocity)?

A. Proton

B. α-particle

C. Neutron

D. Electron

Answer: D

Watch Video Solution

11. Plancks' constant has the dimensions of

A. Linear momentum

B. Angular momentum

C. Energy

D. Power

Answer: B

 Watch Video Solution

12. Light of wavelength 4000 Å falls on a photosensitive plate with photoelectric work function 1.96 eV. The K.E. of photoelectrons emitted will be :

A. 1.148 eV

B. 1.152 eV

C. 1.156 eV

D. 1.158 eV

Answer: A

Watch Video Solution

Watch Video Solution

13. The energy of a photon of wavelength λ is given by

A. $hc\lambda$

B. $\frac{hc}{\lambda}$

C. $\frac{\lambda}{hc}$

D. $\frac{h\lambda}{c}$

Answer: B

Watch Video Solution

14. Stopping potential for which will be minimum ?

A. Yellow

B. X-lays

C. Red

D. Blue

Answer: C

View Text Solution

15. de-Broglie wavelength associated with an electron at V potential difference is :

A. $\frac{12.27}{\sqrt{V}}\text{Å}$

B. $\sqrt{\frac{12.27}{V}}\text{Å}$

C. $\frac{1.277}{\sqrt{V}}\text{Å}$

D. $\sqrt{\frac{1.227}{V}}\text{Å}$

Answer: A

Watch Video Solution

16. Which of the following has minimum stopping potential?

A. Blue

B. Yellow

C. Violet

D. Red

Answer: D

Watch Video Solution

17. The de-Broglie wavelength associated with a particle of momentum p is given as :

A. p/h

B. h/p

C. hp

D. None of these

Answer: B

Watch Video Solution