Dual Nature of Radiation and Matter

📥 TRY YOURSELF

ANSWERS

1. The minimum amount of energy necessary to eject an electron out of a metal surface against the attractive forces of surrounding positive ions.

2. If E = energy of incident light (photons).

Then,

 $E < \phi$, no photoelectric effect will take place.

 $E = \phi$, photoelectric effect will just take place but K.E. of ejected photoelectrons is zero.

 $E > \phi$, photoelectric effect will take place along with possession of K.E. by ejected photoelectrons.

3. Work function of platinum is highest, $\phi_0 = 5.65$ eV. Work function of caesium is lowest, $\phi_0 = 2.14$ eV

4. Photoelectric effect shows the quantum nature of electromagnetic radiation.

- **5.** Work function $=h\upsilon = \frac{hc}{\lambda}$
- $\therefore \quad \text{The ratio, } \frac{\phi_A}{\phi_B} = \frac{hc}{\lambda_A} \times \frac{\lambda_B}{hc} = \frac{\lambda_B}{\lambda_A}$

6. Not all the electrons that absorb a photon come out as photoelectrons because most of electrons get scattered into the metal. Only those electrons come out as photoelectrons whose energy becomes greater than work function of metal.

7.
$$n = \frac{P}{h_1}$$

8. Einstein first explained the photoelectric effect.

9. As, $\phi = hv_0 \Rightarrow \phi = \frac{hc}{\lambda_0} \Rightarrow \lambda_0 = \frac{(6.63 \times 10^{-34})(3 \times 10^8)}{(3.3) \times (1.6 \times 10^{-19})}$ = 3770 Å

10.
$$E = \frac{hc}{\lambda} = \frac{6.6 \times 10^{-34} \times 3 \times 10^8}{1}$$
 J = $\frac{19.8 \times 10^{-26}}{1.6 \times 10^{-19}}$ eV
= 1.24 × 10^{-6} eV

11. In case of stable material, this is not possible because, to absorb a photon of larger wavelength and emit a photon of shorter wavelength, energy has to be supplied by the material.

$$p = \frac{E}{c} = \frac{hv}{c}$$

- **13.** Device which converts light energy into electrical energy.
- (i) Photo emissive cell.(ii) Photo voltaic cell(iii) Photo conductive cell

$$15. \quad \lambda = \frac{h}{p} = \frac{h}{mv}$$

16. The wave associated with moving particles is called matter wave.

17. Yes, de-Broglie equation is applicable to photons of radiation.

18. Electron microscope is the application of de-Broglie waves designed to study minute things.

19. It verifies the wave nature of electron.

BEST SELLING BOOKS FOR CLASS 12 MtG 🔍 🕲 🧶 📖 A @ A.Int 🖶 🔍 🔍 🔜 💼 100 PERCENT 00 100 PERCENT 12 NCERT. MATHEMATICS NCERT. NCERT. **F**•NGERTIPS **F**•NGERTIPS FUNGERTIPS And Address of the Ad - 🛯 🏹 Sectional Press CBSE CBSE CHEMISTRY PHYSICS MATHEMATICS A 🕲 🔕 🔍 🔿 🙆 🖃 🔍 🔍 🔕 🖳 Concerning of CONCERCE. NCERT NCERT NCERT. **F**+NGERTIPS **F**•NGERTIPS **F** NGERTIPS NCERT NCERT NCERT भौतिकी रसायन विज्ञान जीव विज्ञाल 2 **OUESTION BANK OUESTION BANK QUESTION BANK** 0 PHYSICS CHEMISTRY - 1 MATHEMATICS 0 -NTA HTA NTA Ξ 3 AIN **CHAMPION** CHAMP ON CHAMP ON PHYSICS CHEMISTRY MATHEMATICS CHAPTERWISE CHAPTERWISE TOPICWISE HAPTERWISE 2021-2012 2021-3013 76 MATHEMATICS CHEMISTRY PHYSICS MASED ON L ASED ON LAS LASED ON LATEST PALTERN (\mathbf{X}) X Y DAYS DAYS DAYS

MAIN

MATHEMATICS

MATHEMATICS

TSA

POWER GUIDE

B

000

MAIN

CHEMISTRY

-

ICED

CHEMISTRY

MATHEMATICS

MAIN

-

....

.....

ICED

21

PHYSICS

ADVANCED

EXPLORER

.....

Visit www.mtg.in for complete information

9

10

JEEMAIN

PHYSICS

JEE MAIN

CHAPTERWISE SOLUTIONS

44+20

PHYSICS

JEE MAIN EXPLORER **JEE**MAIN

CHEMISTRY

JEE MAIN

CHAPTERWISE SOLUTIONS

4+2

CHEMISTRY

NEW 2021 PATTERN

JEE MAIN

JEE MAIN

MATHEMATICS

JEEMAIN

CHAPTERWISE SOLUTIONS

/ 4/

MATHEMATICS

JEE MAIN 2022

5893

И