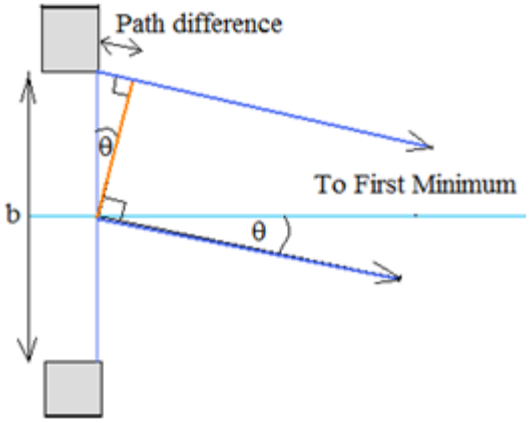
TEST UNITA' DUE (ANCHE SUGLI ARGOMENTI NON DIRETTAMENTE IN PROGRAMMA)

Two stars a distance of 2 light years apart are 10^6 light years from the earth what size telescope aperture is needed so that they are resolved?
(take the wavelength of light to be 500 nm)

A. 60 cm
B. 30 cm
C. 6 cm
D. 3 cm

The diagram below shows rays from two wavelets that will meet at the first minimum.



The path difference labelled is

A. ½λ
B. λ
C. bλ
D. b/λ

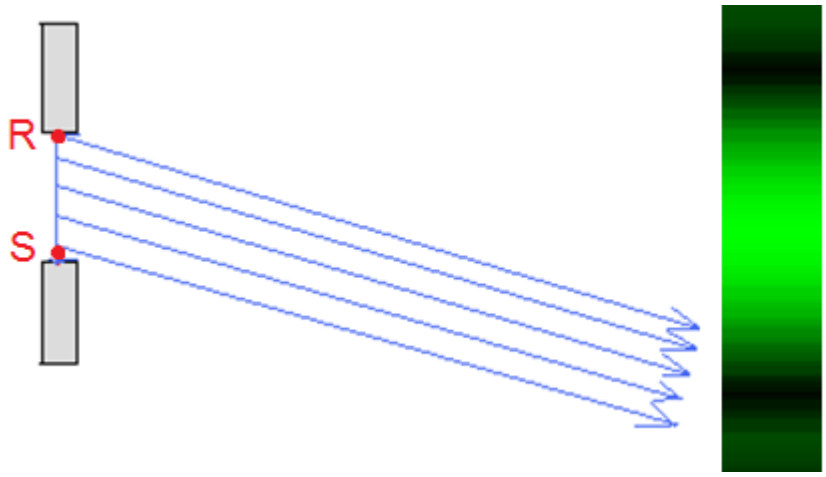
Which of the following would not be a good description of a photon:
(A) Light particles that cannot transport energy or momentum.
(B) The quanta of the electromagnetic field.
(C) Massless particles carrying the energy of radiation.
(D) Entities that always travel at c .

A photon has a chance of being absorbed by an atom, only if:
(A) It strikes it at exactly the right place.
(B) It has the same frequency as the natural frequency at which electrons in the atom like to vibrate.
(C) It has the exact energy corresponding to a quantum energy jump.
(D) Its wavelength is approximately equal to the width of the atom.

According to the classical physics, when a light illuminates a photosensitive surface, what should determine how long it takes before electrons are ejected from the surface?

(A) frequency (B) intensity (C) photon energy (D) wavelength

The diagram below represents the light from 5 wavelets that meet to form the 1st minimum in the diffraction pattern shown.
Note: The distance to the pattern is much further than the diagram so even though the rays look parallel they are not quite.



The phase difference between the wavelet from R and the wavelet from S is

A. 0
B. 2π
C. π
D. $\frac{1}{2}\pi$

Light of wavelength 600nm is incident on a slit of width 0.01mm. A diffraction pattern is formed on a wall 5m from the slit, the width of the central maxima is

A. 6 cm
B. 3 cm
C. 60 cm
D. 30 cm

If the ionisation potential of hydrogen atom is 13.6 volt, the energy required to remove an electron from the second orbit of hydrogen atom is

(A) 0.85 eV
(B) 1.51 eV
(C) 3.4 eV
(D) 13.6 eV

In a Young's Double Slit interference pattern, the fourth maximum has an irradiance that is roughly:

(A) As bright as the central maximum.
(B) Half as bright as the central maximum.
(C) 8% as bring as the central maximum.
(D) 0.08% as bright as the central maximum.

What color of light is emitted when an electron moves from the third energy level to the second energy level?

(A) red (B) yellow (C) blue-green (D) violet

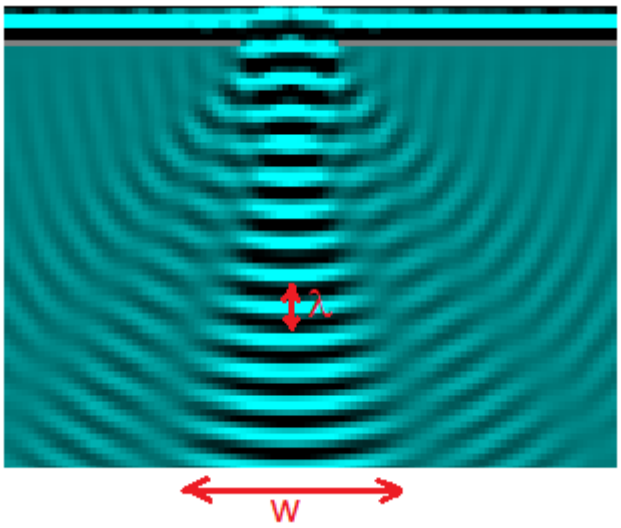
If the finite width of the slits was taken into account, one would expect the fourth maximum of the double slit interference pattern to be:

(A) Brighter than when the slits are assumed to be infinitesimally thin.
(B) Less bright than when the slits are assumed to be infinitesimally thin.
(C) About the same brightness as when the slits are assumed to be infinitesimally thin.
(D) More or less bright, depending on the width of the slits and the wavelength of the light

In the hydrogen spectrum the frequency of a line resulting from the transition of the electron from the orbit of quantum number n_x to quantum number n_1 is *f*. In a hydrogen-like atom the *same transition* gives rise to a spectral line of frequency 9*f*. The hydrogen-like atom has atomic number

(A) 1
(B) 2
(C) 3
(D) 6

The picture below is from a simulation of single slit diffraction showing the wavelength λ and the width of the principal maximum w. If the slit is made narrower:



A. w will decrease and λ will increase.
B. w will increase and λ will stay the same
C. w will stay the same but λ will increase.
D. w will stay the same but λ will decrease.

The wavelength of a photon with an energy of 3.6 eV is:
(A) 869 nanomters.
(B) 345 nanometers
(C) 543 nanometers
(D) 552 nanometers.

The spectrum observed when white light is shone through a prism is best explained by:

(A) Diffraction
(B) Dichroism
(C) Distortion
(D) Dispersion

Which of the following suggested that Thompson's model of the atom was not quite correct?

(A) atomic absorption spectra; (B) decay of radioactive atoms; (C) the deflection of cathode rays in an electric field; (D) the scattering of alpha particles.

In Young's Double Slit Experiment, increasing the wavelength of light will serve to:

(A) Increase the separation between the fringes and increase their width.
(B) Increase the separation between the fringes, but decrease their width.
(C) Decrease the separation between the fringes and decrease their width.
(D) Decrease the separation between the fringes, but increase their width.

Which electron configuration represents an atom in the excited state?

(A) $1s^2,2s^2,2p^6,3p^1$; (B) $1s^2,2s^2,2p^6,3s^2,3p^1$; (C) $1s^2,2s^2,2p^6,3s^2,3p^2$; (D) $1s^2,2s^2,2p^6,3s^2$.

The total number of d orbitals in the third principal energy level is

(A) 1; (B) 5; (C) 3; (D) 7.

According to Einstein's photon theory of light, what does the intensity of light shining on a metal determine?

(A) the number of photons hitting the metal in a given time interval (B) the energy of photons hitting the metal (C) whether or not photoelectrons will be emitted (D) KE_{Max} of emitted photoelectrons

Light of wavelength 3.0×10^{-7} m shines on the metals lithium, iron and mercury which have work function of 2.3 eV, 3.9 eV and 4.5 eV respectively. Will exhibit the photoelectric effect:

(A) lithium, iron and mercury (B) iron and mercury (C) lithium and iron (D) iron

Light of wavelength 3.0×10^{-7} m shines on the metals lithium, iron and mercury which have work function of 2.3 eV, 3.9 eV and 4.5 eV respectively. The maximum kinetic energy for the photoelectrons is:

(A) 0,2 eV (B) 2.0×10^{-19} J (C) 1.8 eV (D) 4.0×10^{-13} erg