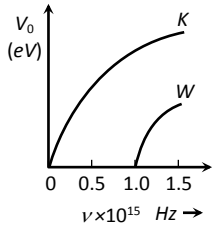
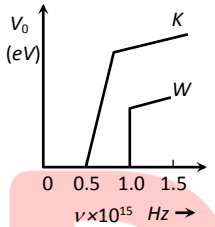
DPP
DAILY PRACTICE PROBLEMS

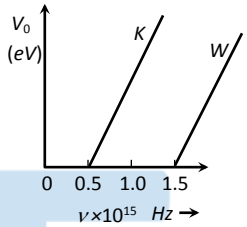
Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 4**

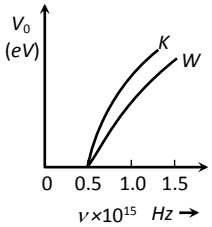
Topic :- Dual nature of radiation and matter

1. The figure showing the correct relationship between the stopping potential V_0 and the frequency v of light for potassium and tungsten is

a) 

b) 

c) 

d) 

2. The de-Broglie wavelength of a proton (charge $=1.6 \times 10^{-19}$ C, mass$=1.6 \times 10^{-27}$ kg) accelerated through a potential difference of 1kV is

a) 600 Å b) 0.9×10^{-12} m c) 7 Å d) o.9 nm

3. The potential difference applied to an X-ray tube is $5kV$ and the current through it is 3.2 mA. Then the number of electrons striking the target per second is

a) 2×10^{16} b) 5×10^{16} c) 1×10^{17} d) 4×10^{15}

4. Which is not true with respect to the cathode rays

a) A stream of electrons b) Charged particles
c) Move with speed same as that of light d) Can be deflected by magnetic fields

5. If in a photoelectric experiment, the wavelength of incident radiation is reduced from 6000 Å to 4000 Å then

a) Stopping potential will decrease b) Stopping potential will increase
c) Kinetic energy of emitted electrons will decrease d) The value of work function will decrease

6. Photon of frequency v has a momentum associated with it. If c is the velocity of light, the momentum is

a) v/c b) hvc c) hv/c^2 d) hv/c

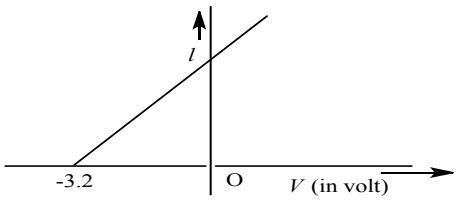
7. Air becomes conducting when the pressure ranges between

a) 76 cm and 10 cm b) 10 cm and 1 cm c) 1 cm and 10^{-3} cm d) 10^{-4}cm and 10^{-7}cm

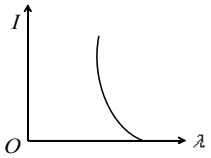
8. The specific charge of a proton is 9.6×10^7 Ckg^{-1}.The specific charge of an alpha particle will be

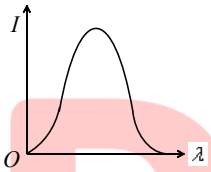
a) 9.6×10^7 Ckg^{-1} b) 19.2×10^7 Ckg^{-1} c) 4.8×10^7 Ckg^{-1} d) 2.4×10^7 Ckg^{-1}

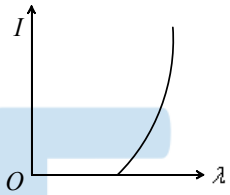
9. What should be the velocity of an electron so that its momentum becomes equal to that of a photon of wavelength 5200Å ?
   a) $10^3 ms^{-1}$ b) $1.2 \times 10^3 ms^{-1}$ c) $1.4 \times 10^3 ms^{-1}$ d) $2.8 \times 10^3 ms^{-1}$
10. In a photoelectric experiment the relation between applied potential difference between cathode and anode V and the photoelectric current I was found to be shown in graph below. If Planck's constant $h = 6.6 \times 10^{-34} Js$, the frequency of incident radiation would be nearly (in s^{-1})

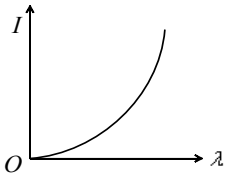


   a) 0.436×10^{18} b) 0.436×10^{17} c) 0.775×10^{15} d) 0.775×10^{16}
11. The anode voltage of a photocell is kept fixed. The wavelength λ of the light falling on the cathode is gradually changed. The plate current 1 of the photocell varies as follows

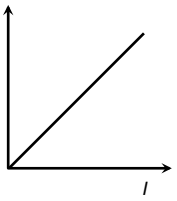
a) 

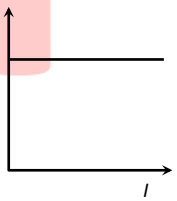
b) 

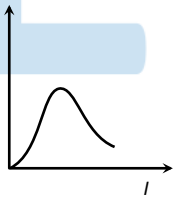
c) 

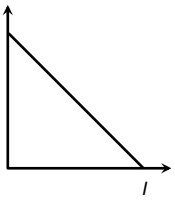
d) 

12. If an electron and proton are propagating in the form of waves having the same wavelength, it implies that they have the same
   a) Energy b) Momentum c) Velocity d) Angular momentum
13. The correct curve between the stopping potential (V) and intensity of incident light (I) is

a) 

b) 

c) 

d) 

14. While doing his experiment, Millikan one day observed the following charges on a single drop
   (i) $6.563 \times 10^{-19} C$ (ii) $8.204 \times 10^{-19} C$
   (iii) $11.50 \times 10^{-19} C$ (iv) $13.13 \times 10^{-19} C$
   (v) $16.48 \times 10^{-19} C$ (vi) $18.09 \times 10^{-19} C$

   From this data the value of the elementary charge (e) was found to be
   a) $1.641 \times 10^{-19} C$ b) $1.630 \times 10^{-19} C$ c) $1.648 \times 10^{-19} C$ d) $1.602 \times 10^{-19} C$
15. Which of the following shows particle nature of light
   a) Refraction b) Interference c) Polarization d) Photoelectric effect
16. When an inert gas is filled in place of vacuum in a photo cell, then
   a) Photo-electric current is decreased
   b) Photo-electric current is increased
   c) Photo-electric current remains the same
   d) Decrease or increase in photo-electric current does not depend upon the gas filled

17. Momentum of a photon of wavelength λ is
    a) h/λ b) $h\lambda/c^2$ c) $h\,\lambda/c$ d) Zero
18. Molybdenum is used as a target element for production of X-rays because it is
    a) A heavy element and can easily absorb high velocity electrons
    b) A heavy element with a high melting point
    c) An element having high thermal conductivity
    d) Heavy and can easily deflect electrons

19. In Millikan's oil drop experiment, an oil drop of mass 16×10^{-6} kg is balanced by an electric field of 10^6 Vm^{-1}. The charge in coulomb on the drop is
    (assuming $g = 10$ ms^{-2})
    a) 6.2×10^{-11} b) 16×10^{-9} c) 16×10^{-11} d) 16×10^{-13}

20. The X-ray beam coming from an X-ray tube will be
    a) Monochromatic
    b) Having all wavelengths smaller than a certain maximum wavelength
    c) Having all wavelengths larger than a certain minimum wavelength
    d) Having all wavelengths lying between a minimum and a maximum wavelength