WAVES AND PARTICLES

1. An electron and a proton are accelerated through the same potential difference. The ration of their De Broglie wave length will be --

   (a) $\sqrt{\frac{m_p}{m_e}}$ (b) $\frac{m_e}{m_p}$ (c) $\frac{m_p}{m_e}$ (d) 1

2. What potential must be applied on an electron microscope so that it may produce an electron of wavelength 1 $\dot{A}$?

   (a) 50 V (b) 100 V (c) 150 V (d) 200 V

3. The momentum of photon of wavelength 0.01 A^0 will be –

   (a) h (b) $10^{-2}\ h$ (c) $10^{12}\ h$ (d) $10^2\ h$

4. The kinetic energies of an electron and proton are same. The ratio of De Broglie wavelengths associated with them will be –

   (a) 1 : $(1836)^2$ (b) $\sqrt{1836}$: 1 (c) 1836 : 1 (d) $(1836)^2$: 1

5. A particle with rest mass m_0 is moving with speed C. The De Broglie wavelength associated with it will be –

   (a) Zero (b) ∞ (c) $\frac{hv}{m_o c}$ (d) $\frac{m_o c}{h}$

6. The effective mass of a photon of energy hv will be

   (a) Zero (b) ∞ (c) $\frac{hv}{c^2}$ (d) m_0

7. The momentum of photon of frequency 10^9 Hz will be ----

   (a) 31 kg-m/s (b) 7.3×10^{-29} kg-m/s
   (c) 2.2×10^{-33} kg-m/s (d) 6.6×10^{-26} kg-m/s

8. The De Broglie wavelength of an atom at absolute temperature T^0K will be –

   (a) $\frac{h}{mkT}$ (b) $\frac{h}{\sqrt{3mkT}}$ (c) $\frac{\sqrt{3mkT}}{h}$ (d) $\sqrt{3mkT}$

9. The wavelength of a photon of momentum 6.6×10^{-24} kg-m/s will be ---

   (a) 1 A^0 (b) 10 A^0 (c) 100 A^0 (d) 1000A^0

10. The wavelength of an electron of energy 100 eV will be ---

    (a) 1.2 A^0 (b) 10 A^0 (c) 100 A^0 (d) 1 A^0

11. The ratio of wavelengths of deuteron and photon accelerated through the same potential difference will be ---

    (a) $\frac{1}{\sqrt{2}}$ (b) $\sqrt{\frac{2}{1}}$ (c) $\frac{1}{2}$ (d) $\frac{2}{1}$

12. Through what potential difference should an electron be accelerated so that its De Broglie wavelength becomes 0.4 $\dot{A}$

(a) 9410 V (b) 94.10 V (c) 9.140 V (d) 941.0 V

13. The De Broglie wavelength of thermal neutrons at 27^0 C will be –

(a) $1.77\ A^0$ (b) 1.77 m (c) 1.77 cm (d) 1.77 mm

14. The De Broglie wave present in the fifth Bohr orbit is

(a)  (b) 

(b)  (d) 

15. The De Broglie wavelength associated with electron in nth Bohr orbit is --

(a) $\frac{2\pi r}{n} A^0$ (b) $2\,\pi n\, A^0$ (c) $\frac{1}{n}\ A^0$ (d) $n\ A^0$

16. The De Broglie wavelength associated with a material particle when it is accelerated through a potential difference of 150 volt is 1 $\dot{A}$. The De Broglie wavelength associated with the same particle when it is accelerated through a potential difference of 1350 V will be –

(a) $\frac{1}{4} A^0$ (b) $\frac{1}{3}\ A^0$ (c) $1\ A^0$ (d) 0

17. If E and P are the energy and the momentum of a photon respectively then on reducing the wavelength of photon---

(a) p and E both will decrease (b) p and E both will increase

(c) p will increase and E will decrease (d) p will decrease and E will increase

18. If $\propto$ - particle, proton, electron and neutron are moving with the same velocity then maximum De Broglie wavelength will be of

(a) $\propto$ particles (b) neutron (c) proton (d) electron

19. The De Broglie wavelength associated with electrons revolving round the nucleus in a hydrogen atom in ground state, will be –

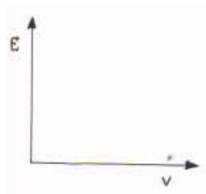
(a) 0.3 A^0 (b) 3.3 A^0 (c) 6.62 A^0 (d) 10 A^0

20. An electron is accelerated from rest, between two points at which the potentials are 20 V and 40 V respectively. The De Broglie wavelength associated with the electron will be –

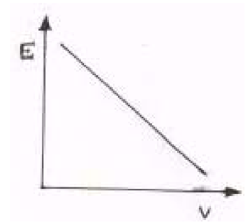
(a) 0.75 A^0 (b) 7.5 A^0 (c) 2.75 A^0 (d) 2.75 m

21. The curve between the energy and frequency of photon will be –

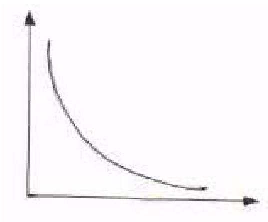
(a)



(b)



(c)



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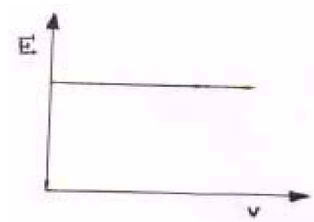


22. Relation between wavelength of electron and photon of same energy is -

(a) $\lambda_{ph} > \lambda_e$ (b) $\lambda_e > \lambda_{ph}$

(b) (c) $\lambda_{ph} = \lambda_e$ (d) none of these

23. De-Broglie wavelength (λ) depends upon mass 'm' and energy 'E' according to the relation represented as

(a) $mE^{1/2}$ (b) $m^{1/2}E$ (c) $m^{-1/2}\,E^{-1/2}$ (d) $m^{-1/2}\,E^{1/2}$

24. Particle nature and wave nature of electromagnetic waves and electrons can be shown by

(a) Electron has small mass, deflected by the metal sheet
(b) X-ray is diffracted, reflected by thick metal sheet
(c) Light is refracted and defracted
(d) Photoelectricity and electron microscopy

25. De Broglie wavelength of a body of mass m and kinetic energy E is given by :

(a) $\frac{h}{\sqrt{2mE}}$ (b) $\frac{h}{2mE}$ (c) $\frac{\sqrt{2mE}}{h}$ (d) $\lambda = \frac{h}{mE}$

26. An electron and a proton have the same de-broglie wavelength. Then the kinetic energy of the electron is

(a) Zero
(b) infinity
(c) equal to the kinetic energy of the proton
(d) greater then the kinetic energy of the proton

27. The energy that should be added to an electron to reduce its de Broglie wavelength from
10^{-10} m to 0.5 x 10^{-10} m will be
(a) Thrice the initial energy
(b) twice the initial energy
(c) equal to the initial energy
(d) four times the initial energy

28. The formula for the wavelength associated with a particle having momentum p is
(a) $\frac{p}{h}$
(b) *ph*
(c) (*p* + *h*)
(d) $\frac{h}{p}$

29. The kinetic energy of electron and proton is 10^{-32} J. Then relation between their De-Broglie wavelength is –
(a) $\lambda_p < \lambda_r$
(b) $\lambda_p = \lambda_e$
(c) $\lambda_p > \lambda_e$
(d) $\lambda_p = 2\lambda_e$

30. Photon and electron are given same energy (10^{-20} J). The wavelength associated with it are λ_{ph} and λ_{el} respectively. Then, which statement is true—
(a) $\lambda_{ph} > \lambda_{el}$
(b) $\lambda_{ph} < \lambda_{el}$
(c) $\lambda_{ph} = \lambda_{el}$
(d) $\frac{\lambda_{el}}{\lambda_{ph}} = c$

31. For a moving cricket ball, the correct de Broglie wavelength is –
(a) It is not applicable for such a big particle
(b) $\frac{h}{\sqrt{2mE}}$
(c) $E\sqrt{\frac{h}{2m}}$
(d) $\frac{h}{2mE}$

32. The de-Broglie wavelength of an electron having 80 eV of energy is nearly
(1eV = 1.6 x 10^{-19} J;
Mass of the electron = 9 x 10^{-31} kg;
Plank's constant = 6.6 x 10^{-34} Js)
(a) 140 A^0
(b) 0.14A^0
(c) 14 A^0
(d) 1.4 A^0

33. A positron and a proton are accelerated by the same accelerating potential. Then the ratio of the associated wavelengths of positron and proton will be :
(M = Mass of proton, m – mass of positron)
(a) $\frac{M}{m}$
(b) $\sqrt{M/m}$
(c) $\frac{m}{M}$
(d) $\sqrt{m/M}$

34. Which of the following has maximum wavelength of matter waves. (Velocity is the same) –
(a) Proton
(b) Neutron
(c) α – particle
(d) α –particle

35. The wave nature of electron is verified by—
(a) Thomson's experiment
(b) Davisson and Germer experiment
(c) de Broglie law
(d) Planck's law

36. The de Broglie λ associated with proton changes by 0.25% if its momentum is changes by p_o. The initial momentum was

(a) 100 p_o (b) p_o / 400 (c) 401 p_o (d) p_o / 100

37. Wavelength of neutron at 27^0 C is λ . The wavelength of neutron at 92.7^0 C is

(a) $\lambda/3$ (b) $\lambda/2$ (c) $\lambda/4$ (d) $\lambda/\sqrt{3}$

38. The de-Broglie wavelength of a particle moving with a velocity 2.25 x 10^8 m/s is equal to the wavelength of photon. The ratio of kinetic energy of the particle to the energy of the photon is

(velocity of light is 3 x 10^8 m/s)

(a) 1/8 (b) 3/8 (c) 5/8 (d) 7/8

39. According to be Broglie, the de Broglie wavelength for electron in an orbit of hydrogen atom is 10^{-9}m. The principal quantum number for this electron is

(a) 1 (b) 2 (c) 3 (d) 4

ELECTRONS AND PHOTONS

40. Sodium and copper have work functions 2.3 eV and 4.5 eV respectively. Then the ratio of the wavelengths is nearest to
(1) 1 : 2 (2) 4 : 1 (3) 2 : 1 (4) 1 : 4

41. Two identical photocathodes receive light of frequencies f_1 and f_2. If the velocities of the photoelectrons (of mass m) coming out are respectively v_1 and v_2, then
(1) $v_1^2 - v_2^2 = \frac{2h}{m}(f_1 - f_2)$

(2) $v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2)\right]^{1/2}$

(2) $v_1^2 + v_2^2 = \frac{2h}{m}(f_1 + f_2)$

(4) $v_1 - v_2 = \left[\frac{2h}{m}(f_1 - f_2)\right]^{1/2}$

42. According to Einstein's photoelectric equation, the plot of the kinetic energy of the emitted photo electrons from a metal vs the frequency, of the incident radiation gives a straight line whose slope
(1) Depends on the nature of the metal used
(2) Depends on the intensity of the radiation
(3) Depends both on the intensity of the radiation and the metal used
(4) Is the same for all metals and independent of the intensity of the radiation.

43. The work function of a substance is 4.0 eV. The longest wavelength of light that can cause photoelectron emission from this substance is approximately
(1) 540 mm (2) 400 nm (3) 310 nm (4) 220 nm

44. A photocell is illuminated by a small bright source placed 1 m away. When the same source of light is placed (1/2) m away, the number of electrons emitted by photocathode
would
(1) Decrease by a factor of 2 (2) increase by a factor of 2
(3) decrease by a factor of 4 (4) increase by a factor of 4

45. If the kinetic energy of a free electron doubles, its de Broglie wavelength changes by the Factor
(1) $1\sqrt{2}$ (2) $\sqrt{2}$ (3) $1/2$ (4) 2

46. Photon of frequency *v* has a momentum associated with it. If c is the velocity of light, the momentum is
(1) hv/c (2) v/c (3) *hvc* (4) hv/c^2

47. Flash spectrum confirms a/an

(1) Total solar eclipse (2) lunar eclipse

(3) earthquake (4) magnetic storm

48. The photoelectric threshold wavelength for silver is λ_0 . The energy of the electron ejected from the surface of silver by an incident wavelength $\lambda(\lambda < \lambda_0)$ will be

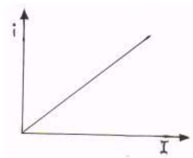
(1) $hc(\lambda_0 - \lambda)$ (2) $\frac{hc}{\lambda_0 - \lambda}$ (3) $\frac{h}{c}\left(\frac{\lambda_0 - \lambda}{\lambda\lambda_0}\right)$ (4) $hc\left(\frac{\lambda_0 - \lambda}{\lambda\lambda_0}\right)$

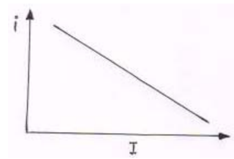
49. An electron of mass m_e and a proton of mass m_p are moving with the same speed. The ratio of their de-Broglie's wavelengths $\frac{\lambda_e}{\lambda_p}$ is

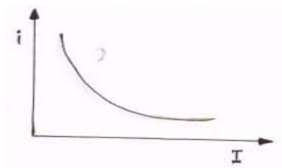
(1) 1 (2) 1836 (3) $\frac{1}{1836}$ (4) 918

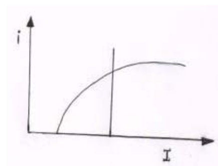
PHOTO ELECTRIC EFFECT

50. The correct curve between the intensity of incident photons and the photoelectric current is

(1) 

(2) 

(3) 

(4) 

51. When a piece of metal is illuminated by monochromatic light of wavelength λ then the stopping potential for photoelectric current is $3V_0$. When the same surface is illuminated by light of wavelength 2λ, then the stopping potential becomes V_0. The value of threshold wavelength for photoelectric emission will be –

(1) 4λ (2) 8λ (3) $\frac{4}{3}\lambda$ (4) 6λ

52. When blue light is made incident on a metallic surface, then electrons are emitted by it. But electrons are not emitted by green light. By which of the following radiations the photo-electric emission will be possible?

(1) Red (2) Infrared (3) Violet (4) Yellow

53. When the source of light is kept at a distance of 1m from photoelectric cell then the value of stopping potential is 4 volt. If it is kept at a distance of 4m then stopping potential will be –

(1) 2 Volt (2) 1 Volt (3) 4 Volt (4) 16 Volt

54. On making ultraviolet light of energy 6.2 eV incident on aluminum surface, faster photoelectrons are emitted. If the work function of aluminum surface is 4.2 eV, then the kinetic energy of these fastest electrons will be—

(1) 3.2×10^{-19} Joule (2) 3.2×10^{-17} Joule

(3) 3.2×10^{-16} Joule (4) 3.2×10^{-11} Joule

55. The maximum kinetic energy of electrons emitted by a metallic plate of work function 2eV, when light of wavelength 4000 $\dot{A}$ is made incident on it, will be—

(1) 2 eV (2) 1.1 eV (3) 0.5 eV (4) 1.5 eV

56. The light photons of energy 1eV and 2.5 eV respectively are made incident on a metallic plate of work function 0.5 eV one after the other. The ratio of maximum kinetic energies of photoelectrons emitted by them will be –

(1) 4 : 1 (2) 1 : 4 (3) 1 : 5 (4) 1 : 2

57. The slope of $V_0 - v$ curve is equal to –

(1) e (2) ϕ_0 (3) $\frac{h}{e}$ (4) h

58. The energy of incident photons corresponding to maximum wavelength of visible light will be–

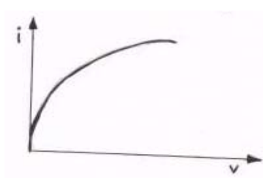
(1) 3.2 eV (2) 7 eV (3) 1.55 eV (4) 1 eV

59. The following figure shows $V_0 - v$ curve for two different metallic surfaces P and Q. The work function of P, as compared to that of Q, is –

(1) less (2) more (3) equal (4) nothing can be said

60. The curve between current (i) and potential difference (V) for a photo cell will be –

(1)



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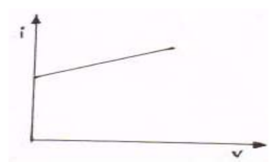

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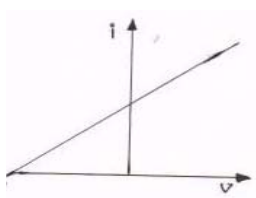
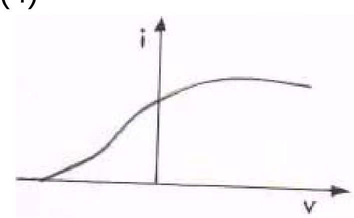


(4)



61. The work function of a metal is 2.5 eV. When photon of some proper energy is made incident on it, then an electron of 1.5 eV is emitted. The energy of photon will be –

(1) 4 eV (2) 1 eV (3) 1.5 eV (4) 2.5 eV

62. The threshold wavelength of lithium is 8000 $\dot{A}$. When light of wavelength 9000 $\dot{A}$ is made incident on it, then the photoelectrons—

(1) Will not be emitted (2) will be emitted

(3) more electrons will be emitted (4) nothing can be said

63. The threshold frequency for a metal is 10^{15} Hz. When light of wavelength 4000 $\dot{A}$ is made incident on it, then—

(1) Photoelectrons will be emitted from it with zero speed.

(2) Photoelectric emission will not be started by it.

(3) Photoelectrons will be emitted with speed 10^5 m/s.

(4) Photoelectrons will be emitted with speed 10^3 m/s.

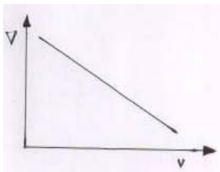
64. The photoelectric currents at distances r_1 and r_2 of light source from photoelectric cell are I_1 and I_2 respectively.

The value of $\frac{I_1}{I_2}$ will be –

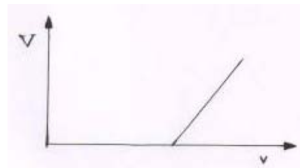
(1) $\frac{r_1}{r_2}$ (2) $\frac{r_2}{r_1}$ (3) $\left(\frac{r_1}{r_2}\right)^2$ (4) $\left(\frac{r_2}{r_1}\right)^2$

65. The curve between the frequency (v) and stopping potential (V) in a photoelectric cell will be—

(1)



(2)



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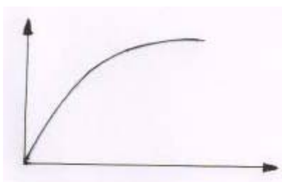

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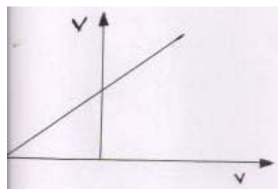
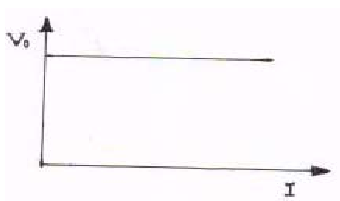


66. The correct curve between the stopping potential (V) and intensity of incident light (I) is –

(1)



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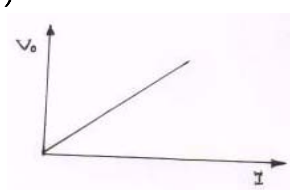

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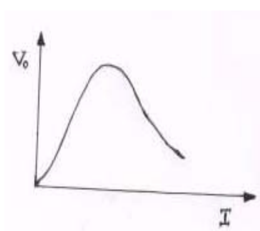
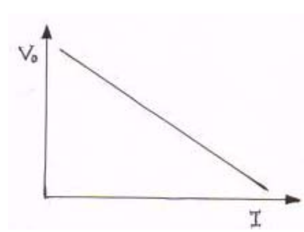


(4)



67. The photoelectric effect was experimentally studied by—

(1) Einstein (2) Lennard (3) Hertz (4) Rutherford

68. Stopping potential depends on—

(1) Frequency of incident light (2) intensity of incident light

(3) number of emitted electrons (4) number of incident photons

69. Ultraviolet radiations of wavelength 250 nm and intensity 5.0 W/m^2 are made incident on the surface of a metal (work-function = 3.2 eV). The maximum energy of emitted photoelectrons will be—

(1) 3.2 eV (2) 5.0 eV (3) 1.8 eV (4) 2.5 Ev

70. In the above problem, if only 1% of the incident photons emit photoelectrons, then the number of photoelectrons emitted per second per unit area will be –

(1) 6.25×10^{18} (2) 6.25×10^{16} (3) 6.25×10^{14} (4) 6.25×10^{12}

71. The radiations of two photons, whose energies are two times and five times the work function of a metal, are made incident on the metal surface in succession. The ratio of the velocities of emitted photo-electrons in two cases will be—

(1) 2 : 5 (2) 1 : 4 (3) 1 : 3 (4) 1 : 2

72. Increase in intensity of incident radiations increases

(1) the number of photoelectrons emitted
(2) the energy of photoelectrons emitted
(3) the threshold frequency
(4) the threshold wavelength

73. The incorrect statement about a photon is

(1) its rest mass is zero
(2) its energy is *hv*
(3) its threshold frequency
(4) its exerts no pressure

74. The graph shows V v/s v plots for two photoelectric surfaces A and B. The work function of A is—

(1) greater than that of B (2) less than that of B
(3) same as that of B (4) none of these

75. Radiations of frequency v are incident on a photosensitive material. The maximum kinetic energy of emitted photons is E. When the frequency of radiations is doubled, the maximum kinetic energy of photoelectrons will be –

(1) 2E (2) $\frac{E}{2}$ (3) E – *hv* (4) E + *hv*

76. In a photo electric phenomenon, the number of photoelectrons emitted depends on

(1) the intensity of incident radiation
(2) the frequency of incident radiation
(3) the velocity of incident radiation
(4) the work function of the photo cathode

77. The photoelectric work function for a metal surface is 4.125 eV. The cut-off wavelength for this surface is—

(1) 4125 $\dot{A}$ (2) 2065.5$\dot{A}$ (3) 3000 $\dot{A}$ (4) 6000 $\dot{A}$

78. The photoelectric work function of a metal surface is 2eV. When light of frequency 1.5×10^{15} Hz is incident on it, the maximum kinetic energy of the photoelectrons, is nearly

(1) 8 eV (2) 6 eV (3) 2 eV (4) 4 eV

79. In a photoelectric experiment, the maximum velocity of photoelectrons emitted
(1) depends on intensity of incident radiation
(2) does not depend on the cathode material
(3) depends on frequency of incident radiation
(4) does not depend on wavelength of the incident radiation

80. If in a photoelectric experiment the wavelength of incident radiation is reduced from 6000 $\dot{A}$ to 4000 $\dot{A}$, then
(1) stopping potential will decrease
(2) stopping potential will increase
(3) kinetic energy of emitted electrons will decrease
(4) the value of work function will decrease

81. When a point source of monochromatic light is at a distance of 0.2 m from a photoelectric cell, the cut-off voltage and the saturation current are 0.6 volt and 18 mA respectively. If the same source is placed 0.6 m away from the photoelectric cell, then
(1) The stopping potential will be 0.2 V
(2) the stopping potential will be 0.6 V
(3) the saturation current will be 6 mA
(4) the saturation current will be 18mA

82. In a photoelectric experiment, the stopping potential V_s is plotted against the frequency v of incident light. The resulting curve is a straight line which makes an angle θ with the v-axis. Then tan θ will be equal to
$(\phi = work\ \ function\, of\ surface)$.
(1) $\frac{h}{e}$ (2) $\frac{e}{h}$ (3) $\frac{-\phi}{e}$ (4) $\frac{eh}{\phi}$

83. If the intensity and frequency of incident light is doubled then:
(1) photo electric current will become 4 times
(2) kinetic energy of the emitted electron will be increased and current will be 2 times
(3) kinetic energy of electrons will be 4 times
(4) the kinetic energy of electrons will be 2 times

84. Quantum nature of lights explained by which of the following phenomena
(1) Huygen’s wave theory
(2) Photo electric effect
(3) Maxwell electromagnetic theory
(4) de-Broglie theory

85. As the intensity of incident light increases
(1) Photoelectric current increases
(2) Photoelectric current decreases
(3) Kinetic energy of emitted photoelectrons increases
(4) Kinetic energy of emitted photoelectrons decreases

86. If the threshold wavelength for a certain metal is 2000 $\dot{A}$, then the work-function of the metal is

(1) 6.2 J (2) 6.2 eV (3) 6.2 MeV (4) 6.2 KeV

87. The work function of aluminium is 4.2 eV. If two photons, each of energy 3.5 eV strike an electron of aluminium, then emission of electrons will be

(1) Possible (2) not possible
(3) data is incomplete (4) zero

88. Light of certain wavelength and intensity ejects photoelectrons from a metal plate. Then this beam is replaced by another beam of smaller wavelength and smaller intensity. As a result:

(1) No change occurs (2) Emission of photoelectric stops
(3) K.E of the photoelectric decreases but the strength of the photoelectric current increases.
(4) K.E of the photoelectrons increases but the strength of the photoelectric current decreases.

89. A photon of energy 8 eV is incident on a metal surface of threshold frequency 1.6 x 10^{15} Hz. The K.E of the photoelectrons emitted (in eV). (Take h = 6 x 10^{-34} J-S).

(1) 6 (2) 1.6 (3) 1.2 (4) 2

90. Graph of maximum kinetic energy of the photo-electrons against v, the frequency of the radiation incident of the metal, is a straight line of slope equal to:

(1) Work function (2) stopping potential
(3) $\frac{h}{e}$ (4) h

91. Relation between the stopping potential V_0 of a metal and the maximum velocity v of the photoelectrons is

(1) $V_0 \propto \frac{1}{v^2}$ (2) $V_0 \propto v^2$ (3) $V_0 \propto v$ (4) $V_0 \propto \frac{1}{v}$

92. Two radiations containing photon of energy twice and five times the work function of a metal are incident successively on the metal surface. The ratio of the maximum velocities of the emitted electrons in the two cases will be

(1) 1 : 1 (2) 1 : 2 (3) 1 : 4 (4) 1 : 3

93. A photoelectric cell is illuminated by a point source of light 1m, away. When the source is shifted to 2m, then:

(1) each emitted electron carries one quarter of the initial energy.
(2) number of electrons emitted is one half initial
(3) number of electrons emitted is one quarter of the initial number.
(4) each emitted electron carries one half the initial energy.

94. When the intensity of incident light is doubled then the maximum kinetic energy of electrons will become

(1) double (2) half (3) four times (4) uncharged

95. A light of wavelength λ and amplitude A is incident on metallic surface of threshold wavelength λ_0 in a photocell.

The saturation current in photocell is proportional to

(1) $A^2 \ \ if \ \ \lambda > \lambda_0$ (2) $A^2 \ \ if \ \ \lambda < \lambda_0$

(3) $A \ if \ \ \lambda < \lambda_0$ (4) $A \ if \ \ \lambda > \lambda_0$

96. When green light is incident on a certain metal surface electrons are emitted but no electrons are emitted by yellow light. If res light is incident on the same metal surface then :

(1) more energetic electrons will be emitted

(2) less energetic electrons will be emitted

(3) emission of electrons will depend on the intensity of light

(4) no electrons will be emitted

97. Light of frequency v is incident on a substance of threshold frequency $v_0(v_0 < v)$. The energy of the emitted photo-electric will be :

(1) $h(v - \ v_0)$ (2) $\frac{h}{v}$ (3) $he(v - \ v_0)$ (4) $\frac{h}{v_0}$

98. The curve drawn between velocity and frequency of photon in vacuum will be a :

(1) straight line parallel to frequency axis

(2) straight line parallel to velocity axis

(3) straight line passing through origin and making an angle of 45^0 with frequency axis

(4) Hyperbola

99. Threshold wavelength for a metal is 5200 $\dot{A}$ Photoelectrons will be ejected if it is irradiated by a light from:

(1) 50 watt infrared lamp (2) 1 watt infrared lamp

(3) 50 watt ultraviolet lamp (4) 0.5 watt infrared lamp

100. The slope of frequency of incident light and stopping potential for a given surface will be :

(1) h (2) $\frac{h}{e}$ (3) eh (4) e

101. A photo-cell is illuminated by a source of light, which is placed at a distance d from the cell, if the distance becomes $\frac{d}{2}$ then the number of electrons emitted per second will be

(1) Remain same (2) four times (3) two times (4) one-fourth

102. The work function of aluminium is 4.125 eV. The cut off wavelength for photoelectric effect for aluminium is-

(1) 150 nm (2) 420 nm (3) 200 nm (4) 300 nm