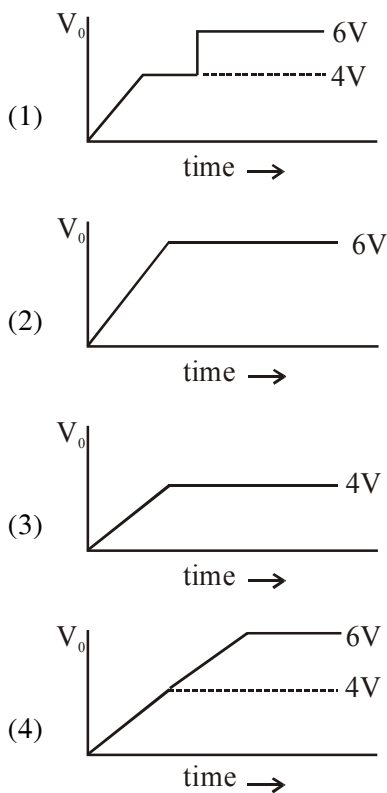
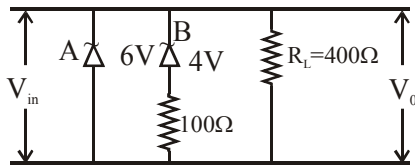


19. Two Zener diodes (A and B) having breakdown voltages of 6V and 4V respectively, are connected as shown in the circuit below. The output voltage V_0 variation with input voltage linearly increasing with time, is given by :
 ($V_{\text{input}} = 0\text{V}$ at $t = 0$) (figures are qualitative)



Official Ans. by NTA (4)

20. The correct match between the entries in column I and column II are :

I	II
Radiation	Wavelength
(a) Microwave	(i) 100m
(b) Gamma rays	(ii) 10^{-15} m
(c) A.M. radio waves	(iii) 10^{-10} m
(d) X-rays	(iv) 10^{-3} m

- (1) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
 (2) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)
 (3) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
 (4) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)

Official Ans. by NTA (4)

21. The surface of a metal is illuminated alternately with photons of energies $E_1 = 4\text{eV}$ and $E_2 = 2.5\text{eV}$ respectively. The ratio of maximum speeds of the photoelectrons emitted in the two cases is 2. The work function of the metal in (eV) is _____.

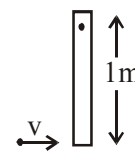
Official Ans. by NTA (2.00)

22. Nitrogen gas is at 300°C temperature. The temperature (in K) at which the rms speed of a H_2 molecule would be equal to the rms speed of a nitrogen molecule, is _____.

(Molar mass of N_2 gas 28 g)

Official Ans. by NTA (41.00)

23. A thin rod of mass 0.9 kg and length 1m is suspended, at rest, from one end so that it can freely oscillate in the vertical plane. A particle of mass 0.1 kg moving in a straight line with velocity 80 m/s hits the rod at its bottom most point and sticks to it (see figure). The angular speed (in rad/s) of the rod immediately after the collision will be _____.



Official Ans. by NTA (20.00)

24. A body of mass 2kg is driven by an engine delivering a constant power 1J/s. The body starts from rest and moves in a straight line. After 9 seconds, the body has moved a distance (in m) _____.

Official Ans. by NTA (18.00)

25. A prism of angle $A = 1^\circ$ has a refractive index $\mu = 1.5$. A good estimate for the minimum angle of deviation (in degrees) is close to $N/10$. Value of N is _____.

Official Ans. by NTA (5.00)