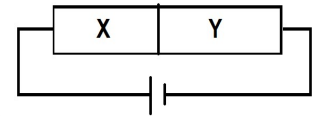


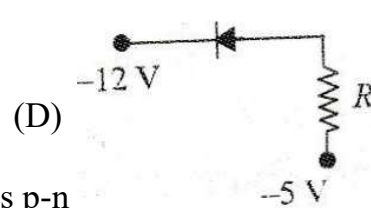
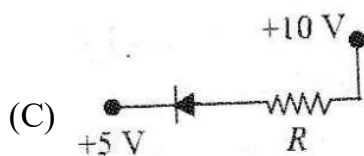
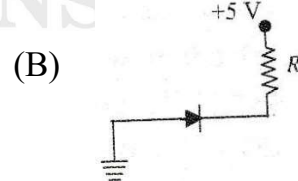
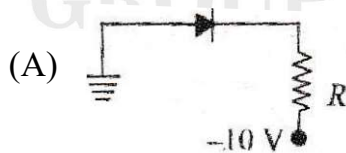
Physics Worksheet-I : Semiconductor-I

- In an unbiased p-n junction, holes diffuse from the p-region to n-region because
 - free electrons in the n region attract them.
 - they move across the junction by the potential difference.
 - hole concentration in p-region is more compared to n-region.
 - all the above
- When a forward bias is applied to a p-n- junction, it
 - raises the potential barrier
 - reduces the majority carrier current to zero
 - lowers the potential barrier
 - none of these
- What are the output frequencies of a half-wave and full-wave rectifier if input frequency is 50 Hz?
 - 50 Hz and 50 Hz
 - 50 Hz and 100 Hz
 - 100 Hz and 50 Hz
 - None of these
- A semiconductor X is made by doping a germanium crystal with arsenic ($Z=33$). A second semiconductor Y is made by doping germanium with indium ($Z=49$). The two are joined end to end and connected to a battery as shown, which of the following statements is correct.

- X is p-type, Y-is n-type and the junction is forward biased.
- X is n-type, Y-is p-type and the junction is forward biased.
- X is p-type, Y-is n-type and the junction is reverse biased.
- X is n-type, Y-is p-type and the junction is reverse biased.



- When an impurity is doped into an intrinsic semiconductor, the conductivity of the semiconductor
 - increases
 - decreases
 - remains the same
 - becomes zero
- A pure semiconductor has equal electron and hole concentration of 10^{16} m^{-3} . Doping by indium increases n_h to $4.5 \times 10^{22} \text{ m}^{-3}$.
 - 106 m^{-3}
 - 10^{22} m^{-3}
 - $\frac{10}{4.5 \times 10^{22}} \text{ m}^{-3}$
 - $4.5 \times 10^{22} \text{ m}^{-3}$
- If $V_B = 5\text{V}$, What should be the maximum value of R so that the voltage is above the knee point?
 - $4.3 \times 10^3 \Omega$
 - $8 \times 10^2 \Omega$
 - $3 \times 10^3 \Omega$
 - $2.5 \times 10^3 \Omega$
- Of the diodes shown in figure which one is reverse biased?

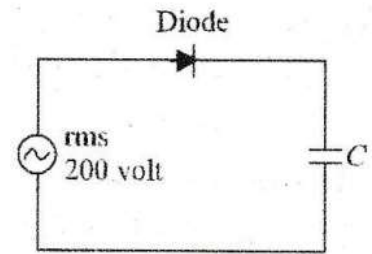


- If no external voltage is applied across p-n
 - no electric field across the junction.
 - an electric field pointing from n-type to p-type side across the junction.
 - an electric field pointing from p-type to n-type side across the junction.

(D) a temporary electric field during formation of p-n junction that would subsequently disappear.

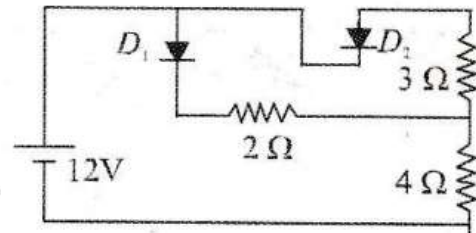
10. A sinusoidal voltage of rms value 200 volt is connected to the diode and capacitor C in the circuit shown to that half wave rectification occurs. The final potential difference in volt across C is

- (A) 500
(B) 200
(C) 283
(D) 141



11. In the circuit of figure treat the diodes as ideal. Current in the 4 ohm resistor is

- (A) 2 A
(B) 3 A
(C) 12/7 A
(D) 30/13 A



12. The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the

- (A) crystal structure. (B) variation of the number of charge carriers with temperature.
(C) type of bonding. (D) variation of scattering mechanism with temperature.

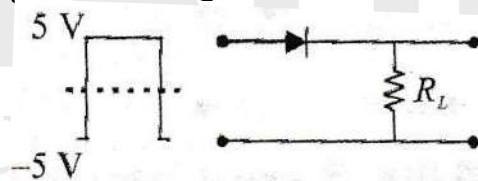
13. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 2480 nm is incident on it. The band gap in (eV) for the semiconductor is

- (A) 0.5 eV (B) 0.7 eV (C) 1.1 eV (D) 2.5 eV

14. In the ratio of the concentration of electrons that of holes in a semiconductor is 7/5 and the ratio of currents is 7/4 then what is the ratio of their drift velocities?

- (A) 4/7 (B) 5/8 (C) 4/5 (D) 5/4

15. If in p-n junction diode, a square input signal of 10V is applied as shown Then the output signal across R_L will be



- (A) (B) (C) (D)



Physics Worksheet-1 : Semiconductor-1

1-C	2-C	3-B	4-D	5-A	6-C	7-A	8-B	9-B	10-C	11-A	12-B	13-A	14-D	15-A
-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------