

# Semiconductor Electronics : Materials, Devices and Simple Circuits

## CHAPTER 14



### ANSWERS

#### Topic 1

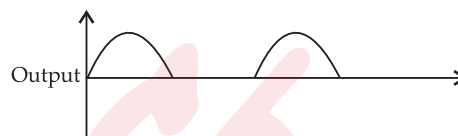
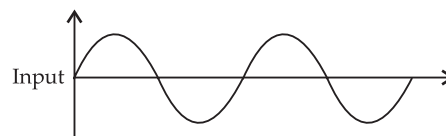
1. (c) : For  $n$ -type silicon statement (c) is true.
2. (d) : For  $p$ -type semiconductors statement (d) is true.
3. (c) : The energy band gap is largest for carbon, less for silicon and least for germanium.

So, the correct statement is (c).

$$(E_g)_C > (E_g)_{Si} > (E_g)_{Ge}$$

#### Topic 2

1. (c) : Under forward biasing the movement of majority charge carriers across the junction reduces the width of depletion layer or lowers the potential barrier.
2. (c) : In the unbiased  $p$ - $n$  junction, holes diffuse from the  $p$ -region to  $n$ -region because holes concentration in the  $P$ -region is high as compared to  $n$ -region.
1. In half wave rectification, only one ripple is obtained per cycle in the output.



Output frequency of a half wave rectifier  
= input frequency = 50 Hz

In full wave rectification, two ripples are obtained per cycle in the output.

Output frequency =  $2 \times$  input frequency  
=  $2 \times 50 = 100$  Hz

