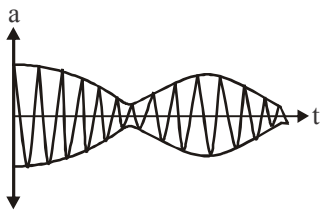
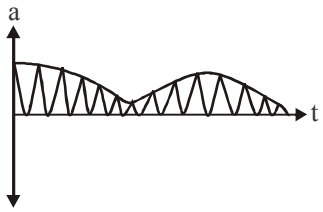
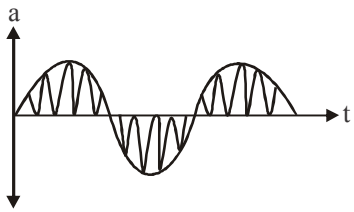
29 Communication Systems

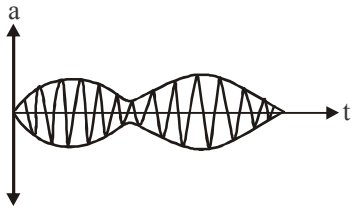
Diagram Based Questions :

1. Which one of the following represents rectified wave?

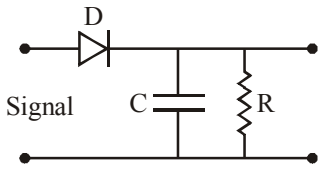
(a)


(b)


(c)


(d)


2. A diode detector is used to detect an amplitude modulated wave of 60% modulation by using a condenser of capacity 250 picofarad in parallel with a load resistance 100 kilo ohm. Find the maximum modulated frequency which could be detected by it.



(a) 10.62 MHz (b) 10.62 kHz
(c) 5.31 MHz (d) 5.31 kHz

Solution

1. **(b)**

2. **(b)** **Given :** Resistance R = 100 kilo ohm

$= 100 \times 10^3\ \Omega$

Capacitance C = 250 picofarad

$= 250 \times 10^{-12}$F

$\tau = RC = 100 \times 10^3 \times 250 \times 10^{-12}$ sec

$= 2.5 \times 10^7 \times 10^{-12}$ sec

$= 2.5 \times 10^{-5}$ sec

The higher frequency whcih can be detected with tolerable distortion is

$$f = \frac{1}{2\pi m_a RC} = \frac{1}{2\pi \times 0.6 \times 2.5 \times 10^{-5}} Hz$$

$$= \frac{100 \times 10^4}{25 \times 1.2\pi} Hz \quad = \frac{4}{1.2\pi} \times 10^4 Hz$$

= 10.61 KHz

This condition is obtained by applying the condition that rate of decay of capacitor voltage must be equal or less than the rate of decay modulated singnal voltage for proper detection of mdoulated signal.