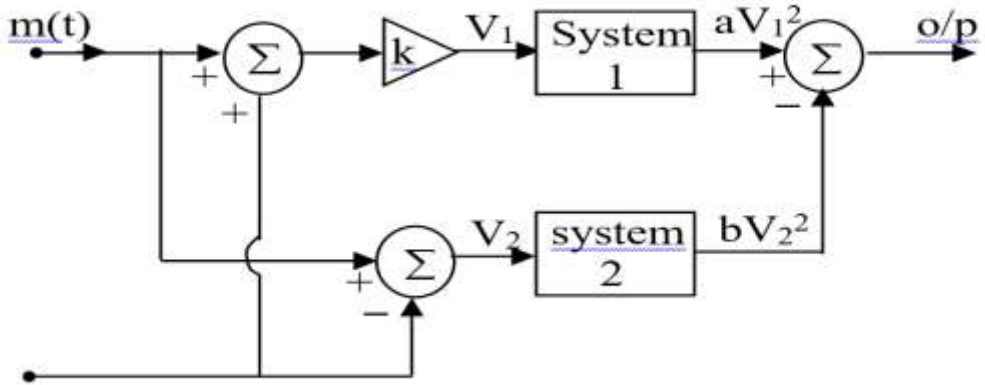
Practice Questions Analysis

Statement for linked answer questions 01 &02

Consider a system shown in the fig.



A cos ω_C t

01. The value of 'K' such that the output represents a DSB signal, is

(a) K = ab (b) K = a / b

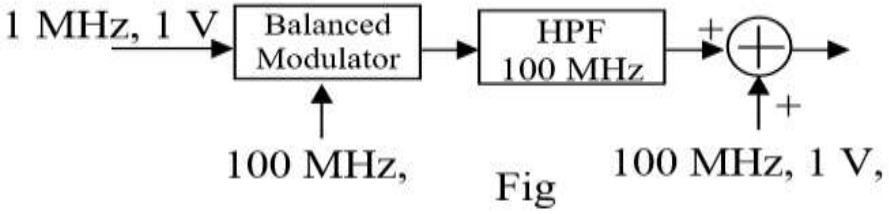
(c) $K = \sqrt{\frac{b}{a}}$ (d) $K^2 = (\sqrt{b}) / a$

02. When A = 10, m(t) = Cos 1000 π t, b = 1, the band width and power of the DSB signal are

(a) 1 KHz , 100 W (b) 1 KHz , 200 W

(c) 2 K Hz, 400 W (d) 1 KHz, 400 W

04. A 100MHz carrier of 1V amplitude and a 1 MHz modulating signal of 1V amplitude are fed to a balanced modulator. The output of the modulator is passed through an ideal high pass filter with cut-off frequency of 100MHz. The output of the filter is added with100MHz signal of 1V amplitude and 90^0 phase-shift as shown in fig.
The envelope of the resultant signal is



Fig

(a) constant

(b) $\sqrt{1+\sin(2\pi\times10^6 t)}$

(c) $\sqrt{5/4-\sin(2\pi\times10^6 t)}$

(d) $\sqrt{5/4+\cos(2\pi\times10^6 t)}$

04. Consider a system shown in fig. Let X(f) and Y(f) denote the Fourier transforms of x(t) and y(t) respectively. The ideal HPF has the cut-off frequency 10KHz.

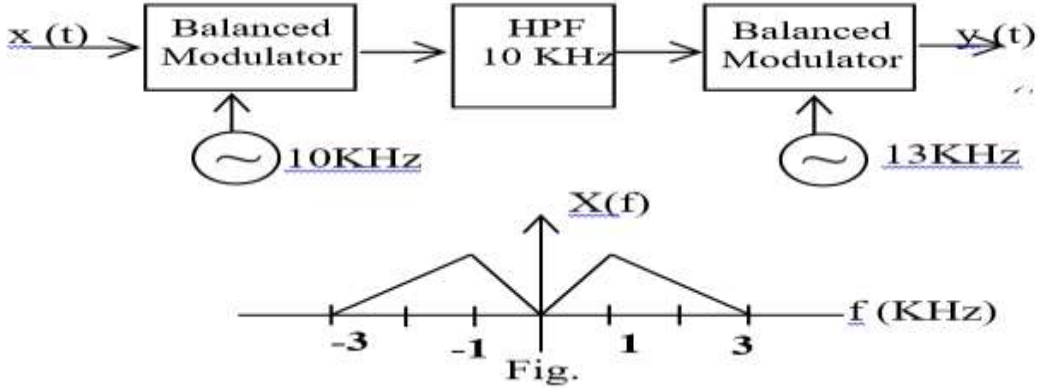


Fig.

The positive frequencies where Y(f) has spectral peaks are

(a) 1 KHz and 24 KHz

(b) 2 KHz and 24 KHz

(c) 1 KHz and 14 KHz

(d) 2 KHz and 14 KHz

05. Consider a base band signal m(t) containing frequency components at 100,200,and 400Hz. The signal is applied to an SSB modulator with a carrier at 100KHz.In the coherent detector used to recover m(t), the local oscillator frequency is 100.02KHz. When USB is transmitted, the frequency components at the synchronous detector output are

(a) 100Hz, 200Hz,& 400Hz (b) 200Hz, 300Hz,& 500Hz

(c) 80Hz, 180Hz,& 380Hz (d) 120Hz, 220Hz,& 420Hz

06. A message is occupying a band width from 300 Hz to 1000 Hz. If SSB AM is used and LSB is transmitted and synchronously detected with a local carrier frequency of 10 Hz more than that at the transmitter, the detected message occupies a band width

(a) from 280 Hz to 980 Hz
(b) from 310 Hz to 1010 Hz
(c) from 300 Hz to 1000 Hz
(d) from 290 Hz to 990 Hz

07. In telephone transmission 12 voice signals are multiolexed to form a basic group. The bandwidth allotted to each signal voice signal is 4KHz. Five basic groups are combined to form a super group. The bandwidth of a basic group and super group is

(a) 48KHz and 5KHz (b) 48KHz and 240KHz

(c) 24KHz and 48KHz (d) 240KHz and 48KHz

08. Eleven voice signals are SSB(upper side band) modulated and frequency division multiplied. Each voice signal is band limited to 3 KHz. The guard band is 1 KHz. The lowest carrier frequency is 300 KHz. The highest carrier frequency is

(a) 360 KHz
(b) 500 KHz
(c) 480 KHz
(d) 340 KHz

09. Five message signals having bandwidths 5 KHz, 10KHz, 10KHz, 2KHz and 5 KHz are applied to AM, DSB, SSB, SSB and AM modulators respectively and transmitted through the channel using FDM. The guard band is 1KHz. The bandwidth required to transmit the signals is
(a) 55KHz (b) 56KHz (c) 57KHz (d) 58KHz