QUESTION BANK

1. ***Assertion (A):*** Linear AM detector applied with two amplitude-modulated waves simul-taneously, one being very weak with respect to the other, detects only the strong signal.

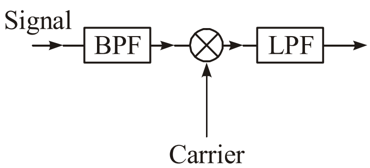
   Reason (R): Detector selectivity is increased in the presence of strong signal.

   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is not a correct explanation of A
   (c) A is true but R is false
   (d) A is false but R is true

2. In an AM signal when the modulation index is one, the maximum power P_t, (where P_c is the carrier power) is equal to

   (a) P_c (b) $1.5P_c$
   (c) $2P_C$ (d) $2.5\ P_c$

3. A DSB suppressed carrier reception is shown in the below figure. If (SNR)j is the S/N ratio for direct (incoherent) detection and $(SNR)_S$ is that for (coherent) synchronous detection, then



   (a) $(SNR)_s = 2(SNR)_i$
   (b) $(SNR)_s = (SNR)_i$
   (c) $(SNR)_s = 4(SNR)_i$
   (d) $(SNR)_s = 1/2(SNR)_i$

4. A 4 GHz carrier is DSB-SC modulated by a lowpass message signal with maximum frequency of 2 MHz. The resultant signal is to be ideally sampled. The minimum frequency of the sampling impulse train should be :

   (a) 4 MHz (b) 8 MHz
   (c) 8 GHz (d) 8.004 GHz

5. In commercial TV transmission in India, picture and speech signals are modulated respectively as

   (Picture) (Speech)
   (a) VSB & VSB
   (b) VSB & SSB
   (c) VSB & FM
   (d) FM & VSB

6. Which of the following demodulator(s) can be used for demodulating the signal $x(t) = 5(1 + 2\cos 200\pi t)\cos 20000\pi t$:

   (a) Envelope demodulator
   (b) Square-law demodulator
   (c) Synchronous demodulator
   (d) None of the above

7. $v(t) = 5[\cos(10^6\pi t) - \sin(10^3\pi t) \times \sin(10^6\pi t)]$ represents :

   (a) DSB suppressed carrier signal
   (b) AM signal
   (c) SSB upper sideband signal
   (d) Narrow band FM signal

8. A DSB-SC signal is generated using the carrier $\cos(\omega_c t + \theta)$ and modulating signal x(t). The envelop of the DSB-SC signal is :

   (a) x(t)
   (b) |x(t)|
   (c) Only positive portion of x(t)
   (d) $x(t)\cos\theta$

9. A modulated signal is given by, $s(t) = m_1(t)\cos(2\pi f_c t) + m_2(t)\sin(2\pi f_c t)$ where the baseband signal $m_1(t)$ and $m_2(t)$ have bandwidths of 10 kHz and 15 kHz, respectively. The bandwidth of the modulated signal, in kHz, is :

   (a) 10 (b) 15
   (c) 25 (d) 30

10. A modulated signal is given by $s(t) = e^{-at}\cos[(\omega_c + \Delta\omega)t]u(t)$, where a, ω_c and $\Delta\omega$ are positive constants, and $\omega_c >> \Delta\omega$. The complex envelope of s(t) is given by :

(a) $\exp(-at)\exp[j(\omega_c + D\omega)t]u(t)$

(b) $\exp(-at)\exp(j\Delta\omega t)u(t)$

(c) $\exp(j\Delta\omega t)\cdot u(t)$

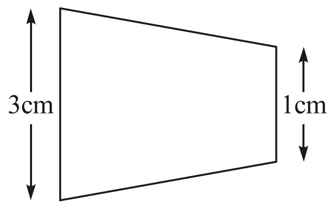
(d) $\exp[(j\omega_c+\Delta\omega)t]$

11. The Hilbert transform of $\cos\omega_1 t + \sin\omega_2 t$ is :

(a) $\sin\omega_1 t - \cos\omega_2 t$ (b) $\sin\omega_1 t + \cos\omega_2 t$

(c) $\cos\omega_1 t - \sin\omega_2 t$ (d) $\sin\omega_1 t + \sin\omega_2 t$

12. Consider the Trapezoidal pattern for AM wave shown below. Modulation index is given by



(a) 33% (b) 50%

(c) 75% (d) 100%

13. Consider vestigial signal sideband modulation system used to modulate a TV signal having bandwidth equal to 4 MHz. If roll-off factor is 1, then the bandwidth required to transmit the signal is given by

(a) 5 MHz (b) 4 MHz

(c) 6 MHz (d) 7 MHz

14. For a message signal m(t) = 10 cos 100t with 60% modulation, the maximum envelope time will be

(a) 10.3 ms (b) 13.3 ms

(c) 33.3 ms (d) 10 ms

15. One of the following methods cannot be used to remove the unwanted sideband in SSB, This is the

(a) filter system (b) phase-shift method

(c) third method (d) balanced modulator

16. In AM voltage signal S(t), with a carrier frequency of 1.15 GHz has a complex envelope $g(t) = A_c[1 + m(t)]$, $A_c = 500V$, and the Modulation is a 1 KHz sinusoidal test tone described by $m(t) = 0.8 \sin (2\pi \times 10^3 t)$, appears across a 50 W resistive load. What is the actual power dissipated in the load?

(a) 165 KW (b) 82.5 KW

(c) 3.3 KW (d) 6.6 KW

17. A given AM broadcast station transmits an average carrier power output of 40 KW and uses a modulation index of 0.707 for sine wave modulation. What is the maximum (peak) amplitude of output if the antenna is represented by 9.50 Ω resistive load?

(a) 50 KV (b) 50 V

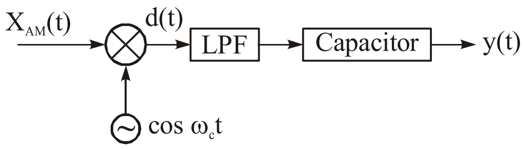
(c) 3.414 KV (d) 28.28KV

18. 15 signal each bandlimited to 15 KHz are to be transmitted over a single channel by frequency division multiplexing. If AM-SSB modulation guardband of 3 KHz is used, the bandwidth of the multiplexed signal will be

(a) 267 KHz (b) 270 KHz

(c) 534 KHz (d) 540 KHz

19. For given synchronous demodulator, modulated AM signal $X_{AM}(t) = [A + m(t)] \cos \omega_c t$. The value of y(t) is



(a) m(t) (b) $\frac{m(t)}{2}$

(c) $\frac{m(t)}{4}$ (d) zero

20. A non-linear device with a transfer characteristic given by $i = (10 + 2v_i + 0.2v_i^2)$ mA is supplied with a carrier of 1 V amplitude and a sinusoidal signal of 0.5 V amplitude in series. If at the output, the frequency component of AM signal is considered, the depth of modulation is

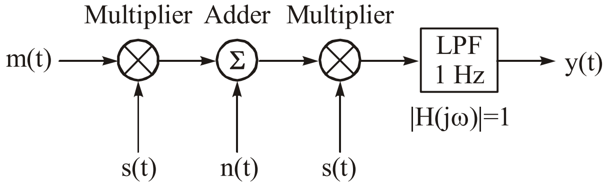
(a) 18% (b) 10%

(c) 20% (d) 33.33%

21. An AM modulator has output $x_c(t) = A \cos 400 \pi t + B \cos 380 \pi t + B \cos 420 \pi t$. The carrier power is 100 W and the efficiency is 40%. The value of A and B are

(a) 14.14, 8.16 (b) 50, 10
(c) 22.36, 13.46 (d) None of the above

22. In the given figure $m(t) = \frac{2 \sin 2\pi t}{t}$, s(t) = cos 200 πt and $n(t) = \frac{\sin 199\pi t}{t}$. The output y(t) is



(a) $\frac{\sin 2\pi t}{2t}$

(b) $\frac{\sin 2\pi t}{2t} + \frac{\sin \pi t}{t} \cos 3\pi t$

(c) $\frac{\sin 2\pi t}{2t} + \frac{\sin 0.5\pi t}{t} \cos 1.5\pi t$

(d) $\frac{\sin 2\pi t}{2t} + \frac{\sin \pi t}{t} \cos .75\pi t$

23. An arbitrary signal m(t) has zero average value and it is band-limited to 3.2 kHz. It is sampled at the rate of 8 k samples/s. The samples are passed through an ideal band-pass filter with centre frequency of 32 kHz and bandwidth of 6.4 kHz. The output of the band-pass filter is

(a) AM-DSB signal with suppressed carrier
(b) AM-DSB signal with carrier
(c) AM-SSB signal with carrier
(d) a sequence of exponentially decaying sine waves

24. A 4 GHz carrier is DSBSC modulated by a low pass message signal with maximum frequency of 2 MHz. The resultant signal to be ideally sampled. The minimum frequency of the sampling train should be

(a) 4 MHz (b) 8 MHz
(c) 8 GHz (d) 8.004 GHz

25. In an amplitude modulated system, if the total power is 600 W and the power in carrier is 400 W, then the modulation index is

(a) 0.5 (b) 0.75
(c) 0.9 (d) 1

26. The ramp signal m(t) = at is applied to a delta modulator with sampling period T_s and step size 5. Slope overload distortion would occur if

(a) $\delta < a$ (b) $\delta > a$
(c) $\delta < aT_s$ (d) $\delta > aT_s$

27. Which one of the following statements regarding the threshold effect in demodulators is correct?

(a) It is exhibited by all demodulators when the input signal to noise ratio is low
(b) It is the rapid fall in output signal to noise ratio when the input signal to noise ratio falls below a particular value
(c) It is the property exhibited by all AM suppressed carrier coherent demodulators
(d) It is the property exhibited by correlation receivers

28. For an AM wave, the maximum voltage was found to be 10 V and the minimum voltage was found to be 5 V. The modulation index of the wave would be

(a) 0.33 (b) 0.52
(c) 0.40 (d) 0.1

29. A carrier of frequency 1 MHz is amplitude modulated by a signal of frequency of 1 kHz to a depth of 60%. This is passed through a filter of characteristics shown in the given Figure-I and Figure-II. If the filter output is fed to an envelope detector, the detector output will be

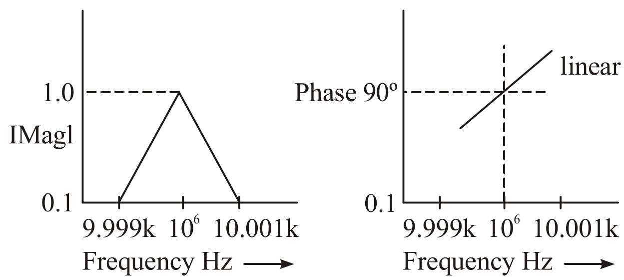


Figure I Figure II

(a) zero (b) DC
(c) DC + 1kHz signal (d) 1 kHz signal

30. If the radiated power of AM transmitter is 10 kW, the power in the carrier for modulation index of 0.6 is nearly

(a) 8.24 kW (b) 8.47 kW

(c) 9.26 kW (d) 9.6 kW

31. In a low-level AM system, the amplifier which follows the modulated stage must be the

(a) linear device (b) harmonic device

(c) class-C amplifier (d) non-linear device

32. In a single-tone amplitude modulated signal at a modulation depth of 100% transmit a total power of 15W, the power in the carrier component is

(a) 5W (b) 10W

(c) 12W (d) 15W

33. Which one of the following is used for the detection of AM-DSB-SC signal ?

(a) Ratio detector

(b) Foster-Seeley discriminator

(c) Product demodulator

(d) Balanced slope detector

34. Consider an amplitude modulated (AM) wave $c_m(t) = (A_c + A_m \cos\omega_m t)\cos\omega_c t$. If P_s denotes the power in any one of the side frequencies and P_T denotes the total powr of the AM signal, $A_c = 2A_m$ for which one of the following is TRUE ?

(a) $P_T = 3P_s$ (b) $P_T = 6P_s$

(c) $P_T = 9P_s$ (d) $P_T = 18P_s$

35. An amplitude modulated signal $s(t) = A_c[1 + km(t)]\cos 2\pi f_c t$ (message signal m(t) has powre P and constant k determines the modulation index) is sent through an AWGN channel and detected using an envelope detector. If the average carier power is large compared to the noise power and any DC component present at the envelope detector output is removed, the figure of the merit of the detector is

(a) $\frac{k^2P}{1+k^2P}$ (b) $\frac{P}{1+k^2P}$

(c) $\frac{2P}{A_c^2 + 2k^2P}$ (d) $\frac{P}{k^2+P}$

36. Match List I with List II and select the correct answer using the codes given below the lists:

List I

A. Collector modulation

B. Phase shift method

C. Balanced modulator

D. Amplitude limiter

List II

1. FM generation
2. DSB generation
3. AM generation
4. SSB generation

Codes:	A	B	C	D
(a)	3	4	1	2
(b)	4	3	1	2
(c)	3	4	2	1
(d)	4	3	2	1

37. Consider the following applications :

1. Singal adder
2. Signal multiplier
3. AM demodulator
4. Frequency multiplier
5. Pulse modulator

A balanced modulator is useful as

(a) 1, 2, 4 and 5 (b) 1, 3 and 5

(c) 2, 3, 4 and 5 (d) 2, 3 and 4

38. Consider the following statements about SSB (Single Side Band) transmission :

1. It requires less power.
2. Transmitter and receiver needed are simaple.
3. There is no interference.
4. Bandwidth required is less.

Of these statements :

(a) 1, 2 and 3 are correct

(b) 1, 2 and 4 are correct

(c) 1, 2 and 4 are correct

(d) 1 and 4 are correct

39. A 10 MHz carrier of peak value 10V is amplitude modulated by a 10 kHz signal of amplitude 6V. The amplitude of each side-band frequency is

(a) 3V (b) 4V

(c) 5V (d) 6V

40. Assertion (A) : For transmitting audio frequency signals, antennas of several hundred kilometers length would be required.

Reason (R) : For efficient radiation of electromagnetic energy to occur from an antenna, the wavelength of the radiated signal must be comparable with the physical dimensions of the antenna

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not a correct explanation of A

(c) A is true, but R is false

(d) A is false, but R is true

41. Consider an SSB signal where the modulating signal is a speech signal.

Assertion (A) : Its envelope detection will not recover the modulating signal.

Reason (R) : The envelope of an SSB is constant.

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not a correct explanation of A

(c) A is true, but R is false

(d) A is false, but R is true

42. ***Assertion (A) :*** Square law detectors, though simple, are not satisfactory for the detection of amplitude modulated signals.

Reason (R) : Square law detection leads to large second harmonic distortion, which is porportional to the modulation index of the sinusoidal signal.

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not a correct explanation of A

(c) A is true, but R is false

(d) A is false, but R is true

43. A DSB-SC signal is being detected synchronously. The phase error locally generated carrier will

(a) cause phase delay

(b) cause phase distortion only

(c) have the effect of reducing the output and causing phase distortion also

(d) reduce the detected output only

44. The output of a diode detector contains

(a) the modulating signal

(b) the DC voltage

(c) the RF ripple

(d) All of the above

45. An amplitude modulated analog waveform has a maximum amplitude A_{max} and a minimum amplitude A_{min} (a positive value), then the modulation index is given by

(a) $\frac{A_{min}}{A_{max}}$ (b) $\frac{2A_{min}}{A_{max}+A_{min}}$

(c) $\frac{A_{max}-A_{min}}{A_{max}+A_{min}}$ (d) $\frac{A_{max}-A_{min}}{2(A_{max}+A_{min})}$

46. The frequency spectrum of an amplitude modulated signal contains

(a) carrier frequency only

(b) sideband frequencies only

(c) modulated frequencies only

(d) carrier and sideband frequencies

47. A sine wave carrier $v_c = V_c \sin \omega_c t$ is amplitude-modulated by the signal $v_m = V_m \sin \omega_m t$ so that the modulation index is unity : then the normalized total power is carrier and side frequencies is given by

(a) $\frac{3}{4}V_c^2$ (b) V_c^2

(c) $\frac{3}{2}V_c^2$ (d) $3V_c^2$

48. A carrier voltage is simultaneously amplitude modulated by two sine waves causing modulation indices of 0.1 and 0.3. The overall rms value of modulation index is

(a) 0.10 (b) 0.35

(c) 0.50 (d) 0.70

49. An AM transmitter radiates 1 kW with an un-modulated carrier wave and 5 kW when it is amplitude modulated if the same carrier were frequency modulated, then the radiated power will be

(a) 4 kW (b) 5 kW

(c) 4.5 kW (d) 8 kW

50. The maximum transmission power efficiency of DSB-C amplitude modulation is

(a) 25% (b) 33.33%

(c) 50% (d) 100%

❑❑❑

ANSWERS AND EXPLANATIONS

1. *Ans. (d)*

Assertion and reason both are true for angle-modulation.

2. *Ans. (b)*

$$p_t = p_c\left(1+\frac{m_a^2}{2}\right)$$

$$m_a = 1$$

$$p_t = p_c\left(1+\frac{1}{2}\right) = 1.5p_c$$

3. *Ans. (b)*

In case of direct (incoherent) and coherent detection SNR remains same but in case of Non coherent detection SNR decreases compare to incoherent and coherent.

4. *Ans.(b)*

$$f_c = 4\text{ GHz} = 4000\text{ MHz}$$

$$f_m = 2\text{ MHz}$$

$$f_H = f_c + f_m = 4000 + 2$$

$$= 4002\text{ MHz}$$

$$f_L = f_c - f_m = 4000 - 2$$

$$= 3998\text{ MHz}$$

$$\text{B.W.} = f_H - f_L$$

$$= 4002 - 3998 = 4\text{ MHz}$$

$$\frac{f_H}{\text{B.W.}} = \frac{4002}{4}$$

So, $f_H >> \text{B.W.}$

$$f_{s(\min)} \cong 2\text{B.W.}$$

$$f_{s(\min)} = 2 \times 4 = 8\text{ MHz}$$

5. *Ans. (c)*

In commercial TV transmission in India, picture signal is modulated using VSB modulation and speech or audio signal is modulated using FM modulation.

6. *Ans. (c)*

Given that

$$x(t) = 5(1 + 2\cos 200\pi t)\cos 20000\pi t \quad \ldots(i)$$

The standard equation for AM signal is

$$\boxed{X_{AM}(t) = A_c(1 + m\cos\omega_m t)\cos\omega_c t}$$

By comparing the equation (i) and equation (ii), we have m = 2

Since the modulation index is more than 1 here, so it is the case of over modulation. When the modulation index of AM wave is more than 1 (over modulation) then the detection is possible only with synchronous modulator only. Such signals can not be detected with envelope detector.

7. *Ans. (d)*

$$v(t) = 5\cos(10^6\pi t) - \frac{5}{2}\cos(10^6 - 10^3)\pi t$$

$$+\frac{5}{2}(10^6 + 10^3)\pi t$$

So, carrier and upper side-band are in phase and lower side band is out of phase with carrier and upper side-band.

So, the given signal is narrow band FM signal.

8. *Ans. (b)*

9. *Ans. (d)*

$$\text{B.W.} = 2f_m$$

$$= 2 \times 15\text{ kHz}$$

$$= 30\text{ kHz}$$

10. *Ans.(b)*

Complex envelope

$$\tilde{g}(t) = g+(t)e^{-j\omega_c t}$$

Where $g_+(t)$ is preenvelope given as

$$g_+(t) = g(t) + j\hat{g}(t)$$

and $\hat{g}(t) = e^{-at}\sin[(\omega_c + \Delta\omega)t]$

$\therefore$ $g_+(t) = e^{-at}e^{+j(\omega_c+\Delta\omega)t}$

Hence $\hat{g}(t) = e^{-at}e^{-j\omega_c t}u(t)$

$$= e^{-at}e^{+j(\omega_c+\Delta\omega)t}e^{-j\omega_c t}$$

$$\tilde{g}(t) = e^{-at}e^{j\Delta\omega t}u(t)$$

11. ***Ans.(a)***

$$\cos\omega_1 t \xleftrightarrow{\text{H.T.}} \sin\omega_1 t$$

$$\sin\omega_2 t \xleftrightarrow{\text{H.T.}} -\cos\omega_2 t$$

12. ***Ans. (b)***

13. ***Ans. (c)***

$(B.W.)_{VSSB} = \left(1 + \frac{r}{2}\right) \cdot f_m$ and r = 1 (given)

$$B.W. = \left(1 + \frac{1}{2}\right) \cdot 4 = 6\,\text{MHz}$$

14. ***Ans. (b)***

$$RC \le \frac{1}{\omega_m}\frac{\sqrt{1-\mu^2}}{\mu}$$

Max envelope time ;

$$t_{env} = RC = \frac{1}{\omega_m}\frac{\sqrt{1-\mu^2}}{\mu}$$

$$= \frac{1}{100}\frac{\sqrt{1-(0.6)^2}}{0.6} = 13.3\,\text{ms}$$

15. ***Ans. (d)***

16. ***Ans. (c)***

Average power dissipated inthe load (50Ω)

$$= \frac{V^2}{R} = \frac{(500)^2}{2\times 50} + \frac{(400)^2}{4\times 500} = 3.3\,\text{KW}$$

17. ***Ans. (c)***

$$P_C = \frac{A_C^2}{2\times 50} = 40\times 1000 \Rightarrow A_C^2 = 2KV$$

$$A_m = \mu A_C = (0.707)\times 2 = 1.414\,KV$$

$\therefore$ peak amplitude of the output

$= A_C + A_m = 3.414$ KV

18. ***Ans. (a)***

15 × 15 KHz = 225 KHz

For Guard Band (15 – 1) 3 KHz = 42 KHz

Total Bandwidth = 267 KHz

19. ***Ans. (b)***

$$X_{AM}(t)\cos\omega_c t = [A + m(t)]\cos^2\omega_c t$$

$$= \frac{1}{2}[A + m(t)] + \frac{1}{2}[A + m(t)]\cos^2\omega_c t$$

After, LPF signal is $\frac{1}{2}m(t) + \frac{1}{2}A$

By passing through blocking capacitor

Then, $y(t) = \frac{m(t)}{2}$

20. ***Ans. (b)***

$$v_i(t) = \cos\omega_c t + 0.5\cos\omega_m t$$

$$i = 10 + 2(\cos\omega_c t + 0.5\cos\omega_{mt})$$

$$+0.2(\cos\omega_c t + 0.5\cos\omega_m t)^2$$

The AM signal

$$= 2\cos\omega_c t + 0.2\cos\omega_c t\cos\omega_m t$$

$$= (2 + 0.2\cos\omega_m t)\cos\omega_c t$$

$$b = \frac{0.2}{2} = \frac{1}{10} = 10\%$$

21. ***Ans. (a)***

Carrier power $P_c = \frac{A^2}{2} = 100W,\ A = 14.14$

$$E_{eff} = \frac{P_{sb}}{P_c + P_{sb}} = \frac{40}{100} \Rightarrow \frac{P_{sb}}{100 + P_{sb}} = 0.4$$

$P_{ab} = 66.67W$

$$P_{sb} = \frac{1}{2}B^2 + \frac{1}{2}B^2 = 66.67 \Rightarrow B = 8.161$$

22. ***Ans. (c)***

$$m(t)s(t) = y_1(t) = \frac{2\sin(2\pi t)\cos(200\pi t)}{t}$$

$$= \frac{2\sin(202\pi t) - \sin(198\pi t)}{t}$$

$$y_1(t) + n(t) = y_2(t)$$

$$= \frac{\sin 202\pi t - \sin 198\pi t}{t} + \frac{\sin 198\pi t}{t}$$

$$y_2(t)s(t) = y(t)$$

$$= \frac{[\sin 202\pi t - \sin 198\pi t + \sin 199\pi t]\cos 200\pi t}{t}$$

$$= \frac{1}{2t}[\sin(402\pi t) + \sin(2\pi t)$$

$$-\{\sin(398\pi t) - \sin(2\pi t)\} + \sin(399\pi t) - \sin(\pi t)]$$

After filtering

$$y(t) = \frac{\sin(2\pi t) + 2\sin(2\pi t) - \sin(\pi t)}{2t}$$

$$= \frac{\sin(2\pi t) + 2\sin(0.5t)\cos(1.5\pi t)}{2t}$$

$$= \frac{\sin 2\pi t}{2t} + \frac{\sin 0.5\pi t}{t}\cos 1.5\pi t$$

23. ***Ans.(a)***

Signal has zero average value

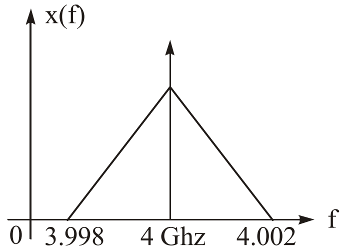
$\Rightarrow$ carrier is supressed

24. ***Ans. (d)***

4 GHz carrier DSB-SC modulated by a message signal 2 MHz.

Total bandwidth = 4.002 GHz

Nyquist rate = $2f_{max}$ = 8.004 GHz



25. ***Ans.(d)***

$$P_T = P_C\left(1 + \frac{m^2}{2}\right)$$

$$600 = 400\left(1 + \frac{m^2}{2}\right)$$

$$\Rightarrow \quad \frac{m^2}{2} = \frac{6}{4} - 1 = \frac{1}{2}$$

$$\Rightarrow \quad m = 1$$

26. ***Ans.(c)***

Slope overload distortion would occur is

$$a > \frac{\delta}{T_s} \Rightarrow \delta < aT_s$$

27. ***Ans.(b)***

The loss of a message in an envelope detector that operates at a low carrier-to-noise ratio is referred to as the threshold effect. By threshold we mean a value of carrier-to-noise ratio below which the noise performance of a detector deteriorates much more rapidly than proportionately to the CNR.

28. ***Ans.(a)***

Modulation index,

$$m = \frac{V_{max} - V_{min}}{V_{max} + V_{min}}$$

$$= \frac{10 - 5}{10 + 5}$$

$$= \frac{5}{15} = 0.33$$

29. ***Ans.(a)***

Fig. 1 and Fig. 2 is corrected as :

30. ***Ans.(b)***

$$P_T = P_C\left(1+\frac{m^2}{2}\right)$$

$$10 = P_C\left(1+\frac{0.6^2}{2}\right)$$

$$\Rightarrow \qquad P_C = 8.47 \text{ kW}$$

31. ***Ans.(a)***

In a low-level AM system, the amplifier must be linear device.

32. ***Ans. (b)***

33. ***Ans. (c)***

34. ***Ans. (d)***

35. ***Ans. (a)***

36. ***Ans. (c)***

37. ***Ans. (a)***

38. ***Ans. (c)***

39. ***Ans. (a)***

40. ***Ans. (a)***

41. ***Ans. (b)***

42. ***Ans. (a)***

43. ***Ans. (a)***

44. ***Ans. (d)***

45. ***Ans. (c)***

46. ***Ans. (d)***

47. ***Ans. (a)***

48. ***Ans. (b)***

49. ***Ans. (a)***

50. ***Ans. (b)***

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