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BIT BANK (OBJECTIVE)

Subject with Code: Analog Communications(18EC0408)

Course & Branch: B. Tech – ECE

Year & Sem: II B. Tech & II Sem

Regulation: R18

UNIT – I

- 1 In commercial TV transmission in India, picture and speech signals are modulated respectively GATE -1990 []
(A) VSB & VSB (B) VSB & SSB (C). VSB & FM (D). FM & VSB
- 2 In a double side-band (DSB) full carrier AM transmission system, if the modulation index is doubled, then the ratio of total sideband power to the carrier power increases by a factor of ____ GATE-2014 []
(A). 1 (B). 2 (C). 4 (D). 8
- 3 The maximum power efficiency of an AM modulator is GATE -1992 []
(A). 25% (B). 33% (C). 50% (D).100%
- 4 Consider sinusoidal modulation in an AM systems. Assuming no over modulation , the maximum and minimum values of the envelope, respectively, are 3V and 1V calculate modulation index _____ GATE-2014 []
(A). 0.50 (B). 0.75 (C). 1.0 (D). 1.5
- 5 Which of the following Analog modulation scheme requires the minimum transmitted power and minimum channel band-width? GATE-2005 []
(A). AM (B). DSB-SC (C). SSB-SC (D). VSB
- 6 Suppose that the modulating signal is $x(t)=2\cos(2\pi f_m t)$ and the carrier signal is $x_c(t)=AC\cos(2\pi f_c t)$. Which one of the following is a conventional AM signal without over-modulation? GATE-2010 []
(A). $S(t)=ACm(t)\cos(2\pi f_c t)$ (B). $S(t)=AC[1+m(t)]\cos(2\pi f_c t)$ (C). $S(t)=AC\cos(2\pi f_c t)+AC4m(t)\cos(2\pi f_c t)$ (D). None
- 7 For a message signal $x(t)=\cos(2\pi f_m t)$ and carrier of frequency f_c . Which of the following represents a single side-band (SSB) signal? GATE-2009 []
(A). $\cos(2\pi f_m t)\cos(2\pi f_c t)$ (B). $\cos(2\pi f_c t)$ (C). $\cos[2\pi(f_c+f_m)t]$ (D). $[1+\cos(2\pi f_m t)].\cos(2\pi f_c t)$
- 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 GATE-2014 []

- (A). $x(t)$ (B). $|x(t)|$ (C). Only positive portion of $x(t)$ (D).None
9. A 1 MHz sinusoidal carrier is amplitude modulated by a symmetrical square wave of period 100 μ sec. Which of the following frequencies will not be present in the modulated signal? GATE-2002 []
- (A). 1000KHZ (B). 1020KHZ (C). 990KHZ (D).875KHZ
- 10 A 4 GHz carrier is DSB-SC modulated by a low-pass 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 GATE-1990 []
- (A). 5MHZ (B).8GHZ (C).8MHZ (D).8.006MHZ
- 11 Consider the amplitude modulated (AM) signal $AC\cos\omega ct+2\cos\omega mt\cos\omega ct$. For demodulating the signal using envelope detector, the minimum value of AC should be GATE-2008 []
- (A). 2 (B). 1 (C). 0.5 (D). 0
- 12 A super heterodyne radio receiver with an intermediate frequency of 455 KHz is tuned to a station operating at 1200 KHz. The associated image frequency is -----KHz GATE-1993 []
- (A). 1120HZ (B).2110HZ (C). 2200HZ (D). 2000HZ
- 13 The image channel selectivity of super heterodyne receiver depends upon GATE-1998 []
- (A). IF amplifiers only (B). RF and IF amplifiers only (C). Pre selector, RF and IF amplifiers (D). Pre selector and RF amplifiers
- 14 Which of the following demodulator (s) can be used for demodulating the signal GATE-1993 []
- $x(t)=5(1+2\cos200\pi t)\cos20000\pi t$
- (A)Envelope demodulator (B)Square-law demodulator (C) Synchronous demodulator (D).None
- 15 There analog signals, having bandwidth 1200 Hz, 600 Hz and 600 Hz, are sampled at their respective Nyquist rates, encoded with 12 bit words, and time division multiplexed. The bit rate for the multiplexed signal is []
- (A). 100kbps (B). 57.6kbps (C). 35.6kbps (D). 40kbps
- 16 Bandwidth of VSB is []
- (A) Same as SSB (B) Slightly higher than SSB (C) Same as AM (D) Same as DSB
- 17 In VSB []

- (A) A gradual cut-off of one side band is allowed (B) Rejecting one side band completely (C) Rejecting both side bands completely (D) None
- 18 If $\mu=1$, $P_c=$ _____ []
- (A) 33.33% of P_t (B) 80% of P_t (C) 0% of P_t (D) 66.66% of P_t
- 19 The process of retrieval of information is called []
- (A). Modulation (B). De-modulation (C). Receiver (D)none
- 20 The higher modulating frequency used in AM broadcasting system is []
- (A) 10KHz (B).5KHZ (C) 15KHz (D).2MHZ
- 21 Most common used information source in broadcasting []
- (A)Voice (B) Audio (C) Video (D) Both A & B
- 22 Which is caused by imperfect response of the system []
- (A)Interference (B) Distortion (C) Noise (D) All
- 23 Which is contamination by extraneous signals []
- (A)Interference (B) Distortion (C) Noise (D) All
- 24 The process of retrieval of information is called []
- (A)Modulation (B) Transducer (C) Receiver (D) Detection
- 25 Interference most often occurs in []
- (A)T.V (B) Voice (C)Broadcasting (D)None
- 26 What is/are the primary resource in communication system []
- (A)Transmitted power (B) Channel bandwidth (C) Both (D) None
- 27 In ever communication system most appear noise is []
- (A)Gaussian noise (B) White noise (C) Pink noise (D) Thermal noise
- 28 Modulation is the process of []

- (A) High Frequency to low band Frequency (B) Wide band to Narrow band Frequency (C) Pass band to band pass (D) None
- 29 Coding is a []
- (A) Signal processing (B) Symbol processing (C) both (D) None
- 30 Two key barriers to human communication are []
- (A) Distance (B) Cost (C) Ignorance (D) Language
- 31 Communication medium causes the signal to be []
- (A) Amplified (B) Modulation (C) Attenuated (D) Interfered with
- 32 The high frequency range extends from []
- (A) 300-3000 KHz (B) 3-30 KHz (C) 30-300 MHz (D) 300-3000 MHz
- 33 The Fourier transform of a voltage signal $x(t)$ is $X(f)$. The unit of $|X(f)|$ is []
- (A) Volts (B) Volts-sec (C) Volt/Sec (D) Volts²
- 34 If a signal $f(t)$ has energy E , the energy of the signal $f(2t)$ is equal to []
- (A) E (B) $E/2$ (C) $2E$ (D) $4E$
- 35 Transform a digital message into a new sequence of symbols []
- (A) Decoding (B) Sampling (C) Quantizer (D) Encoder
- 36 Which technique is used to improve the performance reliability in noisy channel []
- (A) Channel coding (B) Error Control coding (C) Source coding (D) Hamming coding
- 37 Which technique is used to improve the wide band noise reduction []
- (A) Channel coding (B) Error Control coding (C) Source coding (D) Hamming coding
- 38 What is/are the fundamental limitation of information transmission by electrical means []
- (A) Noise (B) Bandwidth (C) Both (D) None
- 39 Which is/are continuous wave modulation? []

(A) AM (B) FM (C) PM (D) All

40. The message signal contains three frequencies 5 kHz, 10 kHz, 20 kHz respectively. The BW of the AM signal is []
 (A) 40 kHz (B) 10 kHz (C) 20 kHz (D) 30 kHz

UNIT – II

1. Consider an angle modulation signal $s(t) = 6\cos[2\pi \times 10^3 + 2\sin(8000\pi t) + 4\cos(8000\pi t)]V$. The average power of $s(t)$ is GATE-2014 []
 (A) 10W (B) 18W (C) 20W (D) 28W
2. A modulation signal is $s(t) = m(t)\cos(40000\pi t)$, where the baseband signal $m(t)$ has frequency components less than 5 kHz only. The minimum required rate (in kHz) at which $y(t)$ should be sampled to recover $m(t)$ is GATE-2014 []
 (A) 15 K (B) 20 K samples/sec (C) 10K samples/sec (D) 8 samples/sec
3. A modulation signal is given by $s(t) = e^{-at}\cos[(\omega_c + \Delta\omega)t]u(t)$, where ω_c and $\Delta\omega$ are positive constants, and $\omega_c \gg \Delta\omega$. The complex envelope of $s(t)$ is given by GATE-1999 []
 (A) $\exp(-at)\exp[j(\omega_c + \Delta\omega)t]u(t)$ (B) $\exp(-at)\exp[j\Delta\omega t]u(t)$ (C) $\exp(-at)\exp[j\omega_c t]u(t)$ (D) none
4. A 10 MHz carrier is frequency modulated by a sinusoidal signal of 500 Hz, the maximum frequency deviation being 50 KHz. The bandwidth required, as given by the Carson's rule is GATE-1994 []
 (A) 101kHz (B) 125kHz (C) 102kHz (D) 150kHz
5. Consider the frequency modulated signal $10[\cos 2\pi \times 10^5 t + 5\sin(2\pi \times 1500 t) + 7.5\sin(2\pi \times 1000 t)]$ with carrier frequency of 10^5 Hz. The modulation index is GATE-2008 []
 (A) 15 (B) 12.5 (C) 10 (D) 11
6. A device with input $x(t)$ and output $y(t)$ is characterized by: $y(t) = x^2(t)$. An FM signal with frequency deviation of 90 KHz and modulating signal bandwidth of 5 KHz is applied to this device. The bandwidth of the output signal is GATE -2005 []
 (A) 370 KHz (B) 190 KHz (C) 380 KHz (D) 95 KHz
7. An angle-modulation signal is given by $s(t) = \cos(2\pi \times 2 \times 10^6 t + 2\pi \times 30 \sin 150 t + 2\pi \times 40 \cos 150 t)$. The maximum frequency deviations of $s(t)$ is GATE -2002 []
 (A) 10.5 KHz, 140π rad (B) 6 KHz, 100π rad (C) 7.5 KHz, 100π rad (D) 9 KHz, 100π rad
8. An angle-modulation signal is given by $s(t) = \cos(2\pi \times 2 \times 10^6 t + 2\pi \times 30 \sin 150 t + 2\pi \times 40 \cos 150 t)$. The maximum phase deviations of $s(t)$ is []
 (A) 100π rad (B) 80π rad (C) 140π rad (D) None

9. An FM signal with a modulation index 9 is applied to a frequency tripler. The modulation index in the output signal will be GATE-1996
 (A). 3 (B). 27 (C). 0 (D). 9
10. Consider an FM wave $f(t)=\cos[2\pi f_c t+\beta_1\sin 2\pi f_1 t+\beta_2 2\pi f_2 t]$ []
 The maximum deviation of the instantaneous frequency from the carrier frequency f_c is GATE-2014
 (A). $\beta_1 f_1 + \beta_2 f_2$ (B). $\beta_1 f_2 + \beta_2 f_1$ (C). $\beta_1 + \beta_2$ (D). $f_1 + f_2$
11. $v(t)=5[\cos(106\pi t)-\sin(103\pi t)\times\sin(106\pi t)]$ represents GATE-1994 []
 (A). DSB-SC signal (B). AM signal (C). SSB upper sideband signal (D). NB FM signal
12. An AM signal and a narrow-band FM signal with identical carriers, modulating signals and modulation indices of 0.1 are added together. The resultant signal can be closely approximated by []
 (A). Broadband FM (B). SSB with carrier (C). DSB-SC (D). SSB without carrier
13. The input to a coherent detector is DSB-SC signal plus noise. The noise at the detector output is GATE -2003 []
 (A). in-phase (B). quadrature-component (C). zero (D) the envelope component
14. A message signal with bandwidth 10 KHz is Lower-Side Band SSB modulated with carrier frequency $f_{c1}=10^6\text{Hz}$. The resulting signal is then passed through a narrow-band frequency Modulator with carrier frequency $f_{c2}=10^9\text{Hz}$. The bandwidth of the output would be GATE -2006 []
 (A). $4\times 10^4\text{Hz}$ (B). $2\times 10^6\text{Hz}$ (C). $2\times 10^9\text{Hz}$ (D). $2\times 10^{10}\text{Hz}$
15. A signal $(t)=2\cos(\pi.104t)$ volts is applied to an FM modulator with the sensitivity constant of 10 KHz/volt. Then the modulation index of the FM wave is GATE -1998 []
 (A). 4 (B). $4/\pi$ (C). 2 (D). $2/\pi$
16. FM signal is less affected by []
 (a) loss (d) temperature (c) frequency (d) noise
17. In FM modulation ,when the modulation index increases, transmitted power is []
 (A). constant (B). increased (C). decreased (D). None
18. FM capture effect due to the following effects []
 (A) Limiter (B) AGC (C) Discriminator (D) De emphasis
19. Which functional block readily identifies it is an FM receiver []
 (A). RF amp (B). IF amp (C). Detector (D) mixer
20. The frequency tolerance of the FM broadcast station is []
 (A) 20Hz (B). 200HZ (C) 2000Hz (D). 20KHZ

- 21 The frequency tolerance of the FM broadcast station is
Receiving end Transmitting end In the Channel Before Demodulation []
- 22 De-emphasis circuit resembles a
LPF HPF BPF BEF
- 23 The carrying efficiency is best in []
(A) AM (B).FM (C) AM-SC (D).PM
- 24 Which of the following processes is a linear modulation process []
(A) NBFM (B).WBFM (C) NBPM (D)none
- 25 FM broadcast band lies in []
(A) VHF (B).UHF (C) SHF (D)none
- 26 An increase in the modulation index leads to increase in bandwidth in case of []
(A) AM (B).FM (C) PM (D).NONE
- 27 In NBFM, the maximum modulation frequency is 3KHz and maximum deviation is 5KHz. []
The modulation index is
(A) less than 1 (B).greater than 1 (C) equal to 1 (D).NONE
- 28 In commercial FM broadcasting, the audio frequency range handled is only up to []
(A) 15 khz (B).5khz (C) 3.5khz (D).NONE
- 29 The transmission bandwidth required for commercial FM broadcasting is []
(A) 75 khz (B).10khz (C) 200khz (D).220khz
- 30 The standard intermediate frequency used in the super hetrodyne FM receiver is []
(A) 88Mhz (B).455 Mhz (C) 15Mhz (D).1.7Mhz
- 31 From bandwidth point of view, NBFM is equivalent to []
(A) AM (B).PM (C) SSB (D).NONE
- 32 Let $x(t)=5\cos(20t+\sin 5t)$. Its instantaneous frequency (in rad/s) at $t=0$ has the value []
(A) 5 (B).50 (C) 55 (D).250
- 33 The signal $\cos w_c t + 0.5 \cos w_c t * \sin w_c t$ is []
(A) AM (B).FM (C) Both (D).NONE
- 34 $v(t)=5[\cos(10^6 \pi t) - \sin(10^3 \pi t) * \sin(10^6 \pi t)]$ represents []
(A) AM (B).DSB-SC (C) SSB (D).NBFM
- 35 frequency modulation has []
(A) One carrier (B).one carrier with two side bands (C) one carrier with infinite frequencies (D).None

- frequencies
- 36 Modulation index for FM modulation is []
 (A) $\Delta f/f_m$ (B) $\Delta f * f_m$ (C) Δf (D) A_m/f_m
- 37 β in NBFM is []
 (A) $\beta < 1$ (B) $\beta \leq 1$ (C) $\beta \geq 1$ (D) $\beta > 1$
- 38 β in WBFM is []
 (A) $\beta < 1$ (B) $\beta \leq 1$ (C) $\beta \geq 1$ (D) $\beta > 1$
- 39 Bandwidth of NBFM []
 (A) Same as AM (B) Same as SSB (C) Same as DS SC (D) Both A & C
- 40 The max change in instantaneous frequency from avg frequency is called []
 (A) frequency deviation (B) frequency modulation (C) modulation index (D) all index

UNIT –III

1. The capacity of an analog communication channel with 4 kHz bandwidth and 15dB SNR is []
 (a) 20000bps (b) 16000bps (c) 10000bps (d) 8000bps
2. The Signal to Noise of Fm at modulation index = 5 is _____ factor of S/N of AM []
 (a) 57 (b) 70 (c) 75 (d) 81
3. S/N ratio improvement is proportional to the square of the bandwidth of transmission in []
 (a) FM (b) Conventional AM (c) AM-DSB-SC (d) AM-SSB-SC
4. The Signal to Noise ratio of DSB-SC Scheme is []
 a) 3 (b) 2 (c) 1 (d) Zero
5. Which of the following demodulation methods exhibit threshold effect []
 (a) Synchronous demodulation of AM (b) Envelope detection of AM
 (c) Square law detector (d) Balanced demodulator
6. Noise performance of conventional AM, when compared with that of suppressed carrier systems is []
 (a) Superior (b) Inferior (c) Same (d) Can't be compared
7. TDM can be implemented using []

- (a) AM (b) PAM (c) FM (d) VSB-AM
8. $f_s \gg 2f_m$ results in []
 (a) Aliasing (b) Distortion (c) Inefficient Channel utilization (d) Attenuation
9. Which functional block readily identifies it is an FM receiver []
 (a) RF amp (b) IF amp (c) detector (d) mixer
10. The width (τ) of a sample of a base band signal of band limited frequency f_m can have a value []
 (a) $\tau < 1/f_m$ (b) $\tau > 1/f_m$ (c) $\tau = 1/f_m$ (d) $\tau \geq 1/f_m$
11. The Signal to Noise ratio of SSB-SC scheme is (a)3 (b) 2 (c) 1 (d) 0 []
12. Noise voltage varies in resistor is []
 (a) $4KTR_b$ (b) $\sqrt{4KTR_b}$ (c) $2KTR_b$ (d) $\sqrt{2KTR_b}$
13. Which one of the following types of noise gain importance at high frequency? []
 (a) Shot noise (b) Random noise (c) Impulse Noise (d) Transit-time noise
14. The capacity of an analog communication channel with 4kHz bandwidth and 15dB SNR is approximately []
 (a) 20000bps (b) 16000bps (c) 10000bps (d) 8000bps
15. Anti-aliasing filter is a _____ filter []
 (a) LPF (B) HPF (C) BPF (d) All
16. The Signal to Noise ratio of VSB-SC scheme is []
 (a) 3 (b) 2 (c) 1 (d) zero
17. Noise performance of AM-DSB-SC signal is same as that of AM-SSB-SC system due to []
 (a) More i/p signal power (b) More bandwidth (c) Less i/p signal power (d) Less Noise power
18. The Figure of Merit of FM is []
 (a) $(3/2) * \beta^2$ (b) $(2/3) * \beta^2$ (c) $(3/2) * \beta$ (d) $1/3$
19. The S/N ratio of FM to S/N ratio of AM is []
 (a) $\sqrt{3}$ modulation index of FM (b) modulation index of FM / $\sqrt{3}$ (c) $\sqrt{3}$ modulation index of AM (d) 1
20. The ratio of S/N of PM to S/N of AM is given by []
 (a) $f_m / \Delta f$ (b) $\Delta f / f_m$ (c) $f_m * \Delta f$ (d) $\Delta f + f_m$
21. Noise performance of AM-DSB-SC signal is same as that of AM-SSB-SC system due to []

- (a) More i/p signal power (b) More bandwidth (c) Less i/p signal power (d) Less Noise power
22. The Signal to Noise ratio of FM demodulator is []
 (a) $3 K_f^2$ (b) K_f (c) $2 K_f^2$ (d) K_f^2
23. The S /N ratio of FM to S/N ratio of AM is []
 (a) $\sqrt{3}$ modulation index of FM (b) modulation index of FM / $\sqrt{3}$ (c) $\sqrt{3}$ modulation index of AM (d) 1
24. The ratio of S/N of PM to S/N of AM is given by []
 (a) $f_m / \Delta f$ (b) $\Delta f / f_m$ (c) $f_m \times \Delta f$ (d) $\Delta f + f_m$
25. In PM, the power spectral density of the O/P noise, varies with frequency as []
 a. Parabola b. Hyperbola c. Uniform d. circle
26. For a modulation index $\beta > 0.5$ the noise performance of FM when compared to AM is []
 a. Better b. Same c. worst d. Can't be compared
27. In PM, the power spectral density of the O/P noise, varies with frequency as []
 (a) Parabola (b) Hyperbola (c) Uniform (d) circle
28. For a modulation index $\beta > 0.5$ the noise performance of FM when compared to AM is []
 (a) Better (b) Same (c) worst (d) Can't be compared
29. Threshold improvement in FM is due to []
 (a) Pre-emphasis at the Tx end (b) De-emphasis at the Rx end
 (c) Pre-emphasis at the Rx end (d) De-emphasis at the Tx end
30. In FM, the power spectral density of the O/P noise, varies with frequency as []
 (a) Parabola (b) Hyperbola (c) Uniform (d) circle
31. The SNR of PM over AM is _____ of BW of Transmission []
 (a) Same (b) double (c) square (d) quadruple
32. Broadcast transmitters are designed for transmitting []
 (a) Coded signal (b) Telephone signal (c) Speech or music (d) Continuous carrier
33. The Signal to Noise of FM at modulation index = 5 is _____ factor of S/N of AM []
 (a). 57 (b) 70 (c) 75 (d) 81
34. S/N ratio improvement is proportional to the square of the bandwidth of transmission in []

- (a) FM (b) Conventional AM (c) AM-DSB-SC (d) AM-SSB-SC
35. The Signal to Noise ratio of DSB-SC Scheme is []
 (a). 3 (b) 2 (c) 1 (d) Zero
36. Which of the following demodulation methods exhibit threshold effect []
 (a) Synchronous demodulation of AM (b) Envelope detection of AM
 (c) Square law detector (d) Balanced demodulator
37. Noise performance of conventional AM, when compared with that of suppressed carrier systems is []
 (a) Superior (b) Inferior (c) Same (d) Can't be compared
38. The Signal to Noise ratio of SSB-SC scheme is []
 (a) 3 (b) 2 (c) 1 (d) zero
39. The Signal to Noise ratio of VSB-SC scheme is []
 (a) 3 (b) 2 (c) 1 (d) zero
40. To undo the distortion caused by the channel, which of the following can be used []
 (a) Amplifier (b) Equalizer (c) Attenuator (d) Clamper

UNIT –IV

1. A PAM signal may be generated using []
 (a) Impulse sampling (b) A sample and hold circuit (c) Natural sampling (d) A clipper circuit
2. The impulse response function, $h(t)$, of a zero-order-hold circuit is []
 (a) an impulse (b) A rectangular pulse (c) A triangular pulse (d) None
3. A band limited low pass signal is sampled at twice its nyquist rate with $f_s=2000$ sps. The signal is band limited to []
 (a) 250Hz (b) 1000Hz (c) 500Hz (d) 2000Hz
4. A PAM signal may be demodulated using []
 (a) A LPF (b) A differentiator followed by a LPF (c) An integrator (d) A LPF followed by an equalizer
5. Aliasing occurs due to which of the following []
 (a) $f_s = 2 f_m$ (b) $T_s = 2 f_m$ (c) $f_s = 1 / 2 f_m$ (d) $T_s = f_m$

6. A Pulse width modulated signal can be generated by []
(a) An astable multivibrator (b) A monostable multivibrator
(c) Integrating the signal (d) Differentiating the PPM signal
7. PWM can be demodulated using []
(a) Integrator and LPF (b) Differentiator and LPF (c) Integrator and HPF (d) Differentiator and HPF
8. PPM can be generated from []
(a) AM (b) FM (c) PWM (d) PM
9. Quantizing noise in a PCM system can be reduced by []
(a) Decreasing the number of standard levels (b) Having more no.of samples per second
(c) Using low noise circuitry in PCM receiver (d) Increasing the number of standard levels
10. In an FM receiver the stage between IF amplifier and detector is called []
(a) Mixer (b) Limiter (c) local Oscillator (d) AF amplifier
11. FM capture effect is due to the following circuit []
(a) Limiter (b) AGC (c) Discriminator (d) Deemphasis
12. Which of the following is used to convert PPM into PWM []
(a) Clipping Circuit (b) Bi-stable Multi-vibrator (c) Astable Multi-vibrator (d) Clamping
13. Harmonic generator is operated as a _____ amplifier []
(a) C (b) A (c) AB (d) B
14. Pulse communication system that is inherently highly immune to noise is []
(a) PWM (b) PAM (c) PPM (d) PCM
15. A PWM signal can be generated by []
(a) mono-stable Multi-vibrator (b) Astable multi-vibrator
(c) Integrating the PPM signal (d) Differentiating the PPM signal
16. Pulse communication system that is high inherently noise is []
(a) PAM (b) PWM (c) PPM (d) PCM
17. Quantization noise can be reduced by increasing the no. of samples per seconds. It is true []
(a) Yes, it is (b) No, it is (c) Not necessarily (d) None of these
18. In pulse modulation, the no. of samples required to ensure no loss of information is given by []
(a) Nyquist theorem (b) Parseval's theorem (c) Fourier Transform (d) All of the
19. Aliasing occurs if []
A) $f_s > 2f_m$ B) $f_s = 2f_m$ C) $f_s < 2f_m$ D) none
- 20) PWM and PPM are the forms of []

- A) PAM B) PCM C) PTM D) QAM
- 21)..... is known as Nyquist rate. []
 A) $f_s=2f_m$ B) $f_s>2f_m$ C) $f_s<2f_m$ D) none
- 22) In a super heterodyne radio receiver
 A) RF amplifier normally operates at 455 kHz above carrier frequency
 B) mixer input must be tuned to the signal frequency
 C) local oscillator operates below signal frequency
 D) local oscillator frequency is double the IF
- 23) Which of the following is correct (FDM means Frequency Division Multiplexing and TDM means Time Division Multiplexing)?
 A) FDM requires lower bandwidth but TDM has more noise immunity
 B) FDM has more noise immunity and requires lower bandwidth than TDM
 C) FDM requires channel synchronization while TDM has more noise immunity
 D) FDM requires more multiplexing while TDM requires band pass filter
- 24)..... Modulation is mostly effected by noise. []
 A) PTM B) PAM C) PCM D) PPM
- 25) To generate PWM signal is used. []
 A) AMV B) BMV C) MMV D) NONE
- 26) Transmitter power remains constant in Pulse modulation. []
 A) PAM B) PWM C) PPM D) PTM
- 27) Band-width remains constant in Pulse modulation. []
 A) PAM B) PPM C) PTM D) NONET
- 28) To demodulate PWM is used. []
 A) Integrator B) differentiator C) Schmitt-trigger D) none
- 29) At receiver to avoid aperture effect Is used after LPF. []
 A) Equalizer B) integrator C) Schmitt-trigger D) none
- 30) Find the sampling frequency f_s for the given message signal $m(t)=\text{Sinc}^2 500t$. []
 A) 50 B) 500 C) 1000 D) none
- 31) Find the sampling frequency f_s for the given message signal $m(t)= 5 \text{Cos } 2\pi 3000t$. []
 A) 5000 B) 6000 C) 1500 D) none
- 32) Find the sampling frequency f_s for the given message signal $m(t)= 10\text{Cos}^2 2\pi 4000t$. []
 A) 5K B) 8K C) 16KD) 4K
- 33) A PPM signal can be converted into PWM signal by using []
 A) AMV B) BMV C) MMV D) NONE
- 34) To generate PPM signal, first PWM signal is generated then differentiator followed by []
 A) Clamper B) clipper C) flip-flop D) NONE.

- 35) What is Multiplexing? []
- 36) What is FDM? []
- 37) Four messages band limited to W , W , $2W$ and $3W$ respectively are to be multiplex using Time Division Multiplexing (TDM). The minimum bandwidth required for transmission of this TDM signal is []
A) W B) $3W$ C) $6W$ D) $7W$
- 38) PPM and PDM systems suffer from a _____ similar to that experienced in FM System. []
A) threshold effect B) Aliasing effect C) Crosstalk D) None
- 39)..... Modulation is mostly affected by noise. []
A) PTM B) PAM C) PCM D) PPM
- 40) To generate PWM signal is used. []
A) AMV B) BMV C) MMV D) NONE

UNIT -V

- 1) The message occurring frequently can be assigned short code words, whereas message which occur rarely are assigned long code word, such coding is called ____ []
- 2) The capacity of Gaussian channel is []
a. $C = 2B(1+S/N)$ bits/s b. $C = B2(1+S/N)$ bits/s
c. $C = B(1+S/N)$ bits/s d. $C = B(1+S/N)2$ bits/s
- 3) For M equally likely messages, the average amount of information H is []
a. $H = \log_{10}M$ b. $H = \log_2M$
c. $H = \log_{10}M^2$ d. $H = 2\log_{10}M$
- 4) The channel capacity is []
a. The maximum information transmitted by one symbol over the channel
b. Information contained in a signal
c. The amplitude of the modulated signal
d. All of the above
- 5) The capacity of a binary symmetric channel, given $H(P)$ is binary entropy function is []
a. $1 - H(P)$ b. $H(P) - 1$
c. $1 - H(P)^2$ d. $H(P)^2 - 1$
- 6) According to Shannon Hartley theorem, []
a. The channel capacity becomes infinite with infinite bandwidth
b. The channel capacity does not become infinite with infinite bandwidth
c. Has a tradeoff between bandwidth and Signal to noise ratio
d. Both b and c are correct
- 7) The negative statement for Shannon's theorem states that []
a. If $R > C$, the error probability increases towards Unity
b. If $R < C$, the error probability is very small
c. Both a & b
d. None of the above

- 8) For M equally likely messages, $M \gg 1$, if the rate of information $R \leq C$, the probability of error is []
- a. Arbitrarily small b. Close to unity
 c. Not predictable d. Unknown
- 9) For M equally likely messages, $M \gg 1$, if the rate of information $R > C$, the probability of error is []
- a. Arbitrarily small b. Close to unity
 c. Not predictable d. Unknown
- 10) The channel capacity according to Shannon's equation is []
- a. Maximum error free communication b. Defined for optimum system
 c. Information transmitted d. All of the above
- 11) The technique that may be used to increase average information per bit is []
- a. Shannon-Fano algorithm b. ASK c. FSK d. Digital modulation
- 12) The expected information contained in a message is called []
- a. Entropy b. Efficiency c. Coded signal d. None of the above
- 13) Code rate r, k information bits and n as total bits, is defined as []
- a. $r = k/n$ b. $k = n/r$ c. $r = k * n$ d. $n = r * k$
- 14) The channel capacity according to Shannon's equation is []
- a. Maximum error free communication b. Defined for optimum system
 c. Information transmitted d. All of the above
- 15) Information rate is defined as []
- a. Information per unit time b. Average number of bits of information per second
 c. rH d. All of the above
- 16) The mutual information []
- a. Is symmetric b. Always non negative
 c. Both a and b are correct d. None of the above
- 17) The relation between entropy and mutual information is []
- a. $I(X;Y) = H(X) - H(X/Y)$ b. $I(X;Y) = H(X/Y) - H(Y/X)$
 c. $I(X;Y) = H(X) - H(Y)$ d. $I(X;Y) = H(Y) - H(X)$
- 18) Entropy is []
- a. Average information per message b. Information in a signal
 c. Amplitude of signal d. All of the above
- 19) The memory less source refers to []
- a. No previous information b. No message storage
 c. Emitted message is independent of previous message
 d. None of the above

- 20) The information I contained in a message with probability of occurrence is given by (k is constant) []
 a. $I = k \log_2 1/P$ b. $I = k \log_2 P$ c. $I = k \log_2 1/2P$ d. $I = k \log_2 1/P^2$
21. What is information source used in radio broadcasting []
 (a) Audio (b) Music (c) Video (d) A & B
22. When the sources are analog signal then the source are called []
 (a) Analog source (b) digital source (c) Both (d) None
23. When the sources are producing discrete output, then they are called []
 (a) Analog source (b) digital source (c) Both (d) None
24. An analog source can transform to discrete source by []
 (a) Sampling (b) Quantization (c) Both (d) None
25. Set of source symbols is called []
 (a) Source alphabet (b) Symbols (c) letters (d) All
26. The elements of set of source symbols called []
 (a) Source alphabet (b) Symbols (c) letters (d) All
27. DMS stands []
 (a) Dynamic Memory System (b) Discrete Memory less Source
 (c) Discrete Memory Source (d) Dynamic Memory less System
28. In $I(x_i) = -\log_b P(x_i)$, if $b=2$, the units for $I(x_i)$ []
 (a) Bits (b) Nats (c) Hartley (d) No units
29. Mutual information between pair of events can be either []
 (a) +ive (b) -ive (c) Zero (d) All
30. Entropy satisfies. []
 (d)
 (a) $0 < H(x) < \log_2 m$ (b) $0 \geq H(x) \geq \log_2 m$ (c) $0 \leq H(x) \leq \log_2 m$ $0 > H(x) > \log_2 m$
31. A pure AC signal is called a []
 (a) sine wave (b) square (c) rectangular (d) Triangular
32. One of the following system is analog []
 (a) PCM (b) Delta (c) DPCM (d) PAM
33. In $I(x_i) = -\log_b P(x_i)$, if $b=e$, the units for $I(x_i)$ []
 (a) Bits (b) Nats (c) Hartley (d) No units
34. Average information can be represents (units) []

- (a) Bits-symbols (b) Bits per symbols (c) Bits-sec (d) Bits per Sec
35. Mutual information between pair of event can be either []
 (a) +ive (b) -ive (c) Zero (d) Either
36. In $I(x_i) = -\log_b P(x_i)$, if $b=10$, the units for $I(x_i)$ []
 (a) Bits (b) Nats (c) Hartley (d) No units
37. Information rate denotes []
 (a) $R = r/H(s)$ (b) $R = r*H(s)$ (c) $R = H(s)$ (d) $R = 1/H(s)$
38. The units for information rate []
 (a) Symbols per Sec (b) Symbols per Bits (c) Bits-sec (d) Bits per Sec
39. The time rate at which source X emits symbols is 'r', the units for 'r' []
 (a) Symbols per Sec (b) Symbols per Bits (c) Bits-sec (d) Bits per Sec
40. What is information source used in radio broadcasting []
 (a) Audio (b) Music (c) Video (d) A & B

Prepared by: