UNIT –I
AMPLITUDE MODULATION AND DEMODULATION

1. The process of varying the parameters of high frequency signal according to low-frequency signal is **Modulation**
2. The Bandwidth of Amplitude Modulation is ___
   a) ωm
   b) ωm/2
   c) ωm/4
   d)2 ωm
3. The costas receiver is used for
   a) FM signal
   b) DSB-SC signal
   c) PCM signal
   d) DM signal
4. By suppressing carrier component from AM wave, we have
   a) SSB
   b) VSB
   c) DSB-SC
   d) None
5. The most useful detection method for the Detection of Modulating signal from AM is **Envelope Detection**
6. AM is compared with following FM technique
   a) NBFM
   b) WBFM
   c) Both
   d) None
7. The modulation index AM with carrier voltage Vc and modulating Voltage Vm is __
   a) Ka Vm/Vc
   b) Ka Vc/Vm
   c) Ka Vm
   d) Ka Vc\Vm
8. The condition for AM is_____
   a) μ greater than 1
   b) μ less than 1
   c) μ equal to 1
   d) μ less than or equal to 1
9. The modulation need for ___
   a) Frequency translation
   b) reduced the antenna size
   c) For efficient transmission
   d) all
10. The recovering of Modulating signal from Modulated signal is called as **Demodulation**
11. AM is used for ___
    a) Short – radio wave Propagation
    b) Medium-radio wave Propagation
    c) Long – radio wave Propagation
    d) a&b
12. Product modulators are used in___
    AM-FC
    b) PM
    c) DSB-SC
    d) FM

13. The transmission Band width of DSB is ___
    a) ωm
    b)2ωm
    c) ωm/2
    d) ωm/4
14. The ring modulator is used for which type a modulation ___
    a) AM
    b) b) SSB
    c) **c)** DSB-SC
    d) d) VSB
15. Frequency translation of DSB are ____
    a) **fc±fm**
    b) b) fc –fm
    c) c) fc +fm
    d) d) fc + 2 fm
16. The bandwidth of VSB is ___
    a) fm-fv
    b) fm +fv
    c)fm ±fv
    d) none
17. For Television signal broad casting the following modulation is useful
    a) SSB
    b) DSB-SC
    c) VSB
    d) AM
18. For generation of SSB which method is very useful
    a) Filter method
    b) Phase Method
    c) Weavers Method
    d)None
19. If you want extract upper side band from DSB, the frequency range of filter is
    a) fc –fm ≤ f ≤ fc
    b) fc ≤f ≤ fc + fc
    c) fc ≤ f ≤ fc – fm
    d) fc +fm ≤ f ≤ fc
20. The bandwidth of SSB is ___
    a) ωm
    b) 2 ωm
    c) ω m/2
    d) ωm/4
21. 1. The minimum height of antenna required for transmission in terms of ʎ is _____
    a) 3ʎ2
    b) ʎ/4
    c) 2ʎ
    d) ʎ
    Answer: b

22. What do you understand by the term analog communication?
    a) A method in which one of the properties of a carrier signal varies in proportion to an instantaneous value of modulation signal
    b) A way for data and computer communication
    c) A numerical coded communication
    d) A suitable method for long distance communication

Answer: a

23. What is Demodulation?
a) Process of varying one or more properties of a periodic waveform
b) Recovering information from modulated signal
c) Process of mixing a signal with a sinusoid to produce a new signal
d) Involvement of noise
Answer: b

24. Data transmitted for a given amount of time is called _____
a) Noise
b) Power
c) Frequency
d) Bandwidth
Answer: d

25. Amplitude Modulation suffers from _____
a) Side-band Suppression
b) IntraPulse Modulation
c) Cross Modulation
d) Carrier Suppression
Answer: c

26. Cell phones sent information in form of _____
a) microwaves
b) electrical signals
c) infrared Waves
d) radio waves
Answer: d

27. Ability of receivers to select the wanted signals among various incoming signal is called _____
a) Selectivity
b) Fidelity
c) Sensitivity
d) Modulation
Answer: a

28. In TV transmission, picture signal is _____ modulated.
a) DSB-SC
b) VSB
c) SSB-SC
d) Pulse
Answer: b

29. Square Law modulators are?
a) used for frequency modulation
b) used for pulse width modulation
c) used for amplitude modulation

d) used for phase modulation
Answer: c

30. Ring Modulator is _____
a) used for DSB-SC generation
b) used for SSB-SC generation
c) used for VSB generation
d) used for AM generation
Answer: a

31. What is the maximum transmission efficiency?
a) 67.88%
b) 33.33%
c) 73%
d) 54.03%
Answer: b

32. Relationship between amplitude and frequency is represented by _____
a) Time-domain plot
b) Phase-domain plot
c) Frequency-domain plot
d) Amplitude-domain plot
Answer: c

33.Frequency components of an AM wave are?
a) Carrier frequency (ωc) with amplitude A
b) Lower side band (ωc + ωm) having amplitude mA⁄2
c) Upper side band (ωc – ωm) having amplitude mA⁄2
d) Carrier frequency (ωc/2) with amplitude A

Answer: a

34. Envelope of AM wave has the same shape as the message of baseband signal.
a) True
b) False
Answer: a

35. Synchronous detection of AM signal is considered as a disadvantage. Why?
a) Needs additional system for synchronization of carrier
b) Receiver is available at cheap prices
c) Needs less number of system as estimated for generation of carrier
d) Receiver is not complex
Answer: a

36. Which devices we used for AM Demodulation?
a) Envelope detector and Square law demodulator
b) PLL detector and Foster-Seeley discriminator
c) Ratio detector and Slope detector

d) Only quadrature detector
Answer: a

37. Square Law modulators _____
a) used for amplitude modulation
b) have non linear current-voltage characteristics
c) have non linear current-voltage characteristics as well as used for Amplitude Modulation
d) used for frequency modulation
Answer: c

38. Why AM is used for broadcasting?
a) More immune to noise
b) Less transmitting power is required
c) It has high fidelity
d) Avoids Receivers Complexity
Answer: d

39.Singletone amplitude modulation _____
a) consists of only one frequency component
b) contains a large number of frequency components
c) contains no frequency components
d) contains infinite number of frequency components
Answer: a

40. The minimum channel Bandwidth is used by which modulation technique?
a) VSB
b) SSB-SC
c) DSB-SC
d) AM
Answer: b

UNIT –II
ANGLE MODULATION AND DEMODULATION

I. MULTIPLE CHOICE QUESTIONS:

1. RF amplification is used to amplify the waves_____ **[ ]**

A **before detection** **B** after detection **C** after modulation **D** after AF amplification

2. One of the following gives noiseless reception_____ modulation **[ ]**

A amplitude **B** phase **C** **frequency** **D** amplitude or phase

3. In frequency modulation,_____ of the carrier wave remains constant **[ ]**

A frequency **B** **amplitude** **C** both **D** signal is distorted

4. The process of mixing AF signal and RF waves is known as **[ ]**

A	**modulation**	**B**	demodulation	**C**	oscillation	**D**	amplification

5. The main advantage of frequency modulation over amplitude modulation is _____ **[ ]**

A	no distortion	**B**	information is contained in the side bands	**C**	it uses a wider band of frequencies	**D**	**the elimination of noises**

6. For effective modulation, the degree of modulation should **[ ]**

A	be small	**B**	**never exceed 100%**	**C**	be large	**D**	always more than 100%

7. In super-hetrodyne radio receiver, the frequency of selected radio wave is converted to **[ ]**

A	a higher frequency 2	**B**	**an intermediate frequency**	**C**	an audio frequency	**D**	a microwave frequency

8. In a super-hetrodyne receiver, the frequency of input fed to the amplifier circuit is **[ ]**

A	600 kHz	**B**	445 kHz	**C**	**455 kHz**	**D**	1055 kHz

9. The process of extracting the signal from the modulated wave is called **[ ]**

A	resonance	**B**	amplification	**C**	**detection**	**D**	modulation

10. FM bandwidth can be approximated by: **[ ]**

A	Armstrong's Rule	**B**	Bessel's Rule	**C**	**Carson's Rule**	**D**	none

11. In PM the information is transmitted using _____ .
    a. Change in frequency
    b. Change in amplitude
    c. Change in phase of the carrier
    d. all
    Ans. (c) Change in phase of the carrier
12. With change in modulating frequency (fm), the modulation index mp of a phase modulated signal will _____.
    a. increase
    b. decrease
    c. remain constant
    d. none
    Ans. (c) remain constant
13. FM can be generated using PM by _____ .
    a. Passing the modulating signal through a low pass filter
    b. Passing the modulating signal through a high pass filter
    c. Using the pre-emphasis
    d. Using the de-emphasis
    Ans. (a) Passing the modulating signal through a low pass filter
14. Noise immunity of PM is _____.
    a. Better than AM and FM
    b. Worse than AM and FM
    C. Better than AM but worse than FM
    d. worse than AM but better than FM
    Ans. (c) Better than AM but worse than FM
15. State true or false – PM is used in the broadcasting application
    Ans. False

16. The frequency deviation in PM is proportional to _____.
    a. Modulating voltage
    b. Modulating frequency
    c. Modulating frequency and voltage
    d. all
    Ans. (c) Modulating frequency and voltage

17. Amplitude of PM wave _____
    a. remain constant
    b. change in proportion with the modulating voltage
    c. change in proportion with the modulating frequency
    d. none
    Ans. (a) remain constant

18. In Frequency Modulation –
    a. Amplitude of the carrier remains same
    b. Frequency of the carrier varies in accordance with the modulating signal
    c. The number of side bands are infinite
    d. All of the above
    ANSWER: (d) All of the above

19. **Frequency deviation in FM is**
    a. Change in carrier frequency to the frequency above and below the centre frequency
    b. Formation of side bands
    c. The variation of the instantaneous carrier frequency in proportion to the modulating signal
    d. All of the above

ANSWER: (d) All of the above

20. **Carrier swing is defined as**
    a. The total variation in frequency from the lowest to the highest point
    b. Frequency deviation above or below the carrier frequency
    c. Width of the side band
    d. None of the above

ANSWER: (a) The total variation in frequency from the lowest to the highest point

21. **The amount of frequency deviation in FM signal depends on**
    a. Amplitude of the modulating signal
    b. Carrier frequency
    c. Modulating frequency
    d. Transmitter amplifier

ANSWER: (a) Amplitude of the modulating signal

22. **Drawbacks of using direct method for generation of FM signal are**
    a. Does not give high stability to FM signal frequency
    b. Distorted FM signal is generated due to harmonics of modulating signal
    c. Cannot be used for high power FM generation
    d. Both a and b

ANSWER: (d) Both a and b

23. **Advantage of using direct method for generation of FM signal is**
    a. It gives high stability to FM signal frequency
    b. Distortion free FM signal is generated

c. High power FM generation is possible

d. None of the above

ANSWER: (c) High power FM generation is possible

24. **What are the disadvantages of using balanced slope detector for demodulation of FM signal?**

a. The detector operates only for small deviation in frequency

b. Low pass filter of the detector produces distortion in the detection

c. Both a and b

d. None of the above

ANSWER: (c) Both a and b

25. **Amplitude** limiter in FM receivers are used to

a. Remove amplitude variations due to noise

b. Filteration

c. Demodulation

d. Amplification

ANSWER: (a) Remove amplitude variations due to noise

26. Pre **emphasis** is done

a. For boosting of modulating signal voltage

b. For modulating signals at higher frequencies

c. In FM before modulation

d. All of the above

ANSWER: (d) All of the above

27. What is the effect on the deviation d of an FM signal when it is passed through a mixer?

a. Doubles

b. Reduces

c. Becomes half

d. Remains unchanged

ANSWER: (d) Remains unchanged

28. Armstrong method is used for the generation of

a. Direct FM

b. Indirect FM

c. SSB-SC

d. DSB-SC

ANSWER: (b) Indirect FM

29. **The modulation index of FM is given by**

a. μ = frequency deviation/ modulating frequency

b. μ = modulating frequency /frequency deviation

c. μ = modulating frequency/ carrier frequency

d. μ = carrier frequency / modulating frequency

ANSWER:(a) μ = frequency deviation/ modulating frequency

30. **According** to Carson's rule, Bandwidth B and modulating frequency fm are related as

a. $B = 2(\Delta f + fm)$ Hz

b. $B = fm$ Hz

c. $B < 2fm$ Hz

d. $B > 2fm$ Hz

ANSWER: (a) $B = 2(\Delta f + fm)$ Hz

UNIT-III

NOISE

1. Base band communication system output signal to noise ratio is ____
   a) PR/2WNO **b) PR/WNO** c) PR/4WNO d) PR/8WNO
2. The output SNR of DSB is ___
   a)PR/2WNO b) PR/WNO c**) PR/4WNO** d) PR/8WNO
3. The output SNR of SSB is ___
   a) PR/2WNO b) PR/WNO c) PR/4WNO **d) PR/8WNO**
4. The output SNR of DSB compared with output SNR of SSB is ___
   a) Greater b) smaller **c) equal** d) none
5. The output SNR of AM with modulation index 'm' is ___
   a) (m2/1+m2) (S/N)b b) (m2/1-m2)(S/N)b
   c) (m2/2+m2)(S/N)b d) (m2/2-m2)(S/N)b
6. The band pass n noise is expressed as **ni(t)cosωct-nq(t)sinωct**
7. The phase of band pass noise is **arc.Tan(nQ(t)/nI(t))**
8. The output of SNR of FM with modulation index β is ___
   a) β 2(S/N)b b) 3/2β 2(S/N)b c) 1/2β 2(S/N)b **d) 3β 2(S/N)b**
9. The output SNR of PM with modulation index β is ___
   a) β 2(S/N)b b) 3/2β 2(S/N)b c) 1/2β 2(S/N)bd) 3β 2(S/N)b
10. The received noise component after demodulation in DSB case is
    a) in-phase component **b) quadrature component** c) both d) none
11. The received noise component after demodulation in SSB case is ___
    a) in-phase component **b) quadrature component** c) both
    d) none
12. The received noise component after demodulation in AM case is ___
    a) in-phase component b) quadrature component
    c) both d) none
13. The received noise component after demodulation in FM case is
    a) in-phase component b) quadrature component **c) both** d) None
14. The received noise component after demodulation in PM case is
    a) in-phase component b) quadrature component **c) both** d) None
15. The output noise power of DSB is ___
    a) WNO **b) 2 WNO** c) 4 WNO d) None
16. The output noise power of SSB is ___
    a) 2WNO b) 4 WNO **c) WNO** d) None
17. 18 The output noise power of AM is ___
    a) WNO **b) 2 WNO** c) 4 WNO d) None
18. The output noise power of PM is___
    a) WN_O/A_C^2 b) $WN_O/2A_C^2$ **c) $2WN_O/A_C^2$** d) $WN_O/3A_C^2$
19. The **threshold effect** in demodulation is the rapid fall on (S/N)b when the (S/N0)o fall below at a particular level
20. Power spectral density of white noise **$N_O/2$.**
21. Which one of the following noise becomes of great importance at high frequencies?
    a) flicker noise
    b) shot noise
    c) impulse noise
    d) transit-time noise

Answer: d

22. Which one of the following statement is false?
    a) High Frequency mixers are generally noisier
    b) Voltage of impulse noise is independent of bandwidth

c) Thermal noise is not dependent on frequency
d) Flicker noise occurs at low frequency

Answer: b

23. Which of broad classifications of noise are most difficult to treat?
    a) noise generated in the receiver
    b) noise generated in the transmitter
    c) external noise
    d) internal noise

Answer: a

24. What points must be important to remember, when we deal with random noise calculations?
    a) all calculations are based on peak to peak values
    b) calculations are based on quantised values
    c) calculations are based on average values
    d) calculations are based on RMS values

Answer: d

25. Which of the following statement is true?
    a) Random noise power is inversely proportional to bandwidth
    b) Flicker noise occurs at high frequency
    c) Noise mixers are caused by inadequate image frequency rejection
    d) A random voltage across a resistance cannot be calculated

Answer: c

26. If the value of a resistor creating thermal noise is doubled. The noise power generator is therefore _____
    a) unchanged
    b) doubled
    c) quadrupled
    d) halved

Answer: a

27. Which one of the following is not a useful quantity for comparing the noise performance of receivers?
    a) Input noise voltage
    b) Signal To Noise Ration
    c) Noise Figure
    d) Figure of merit

Answer: a

28. Which of the following is the most generally used term for comparing amplifier noise characteristics?
    a) signal to noise ratio
    b) equivalent noise
    c) noise factor
    d) figure of merit

Answer: c

29. What is the probability density function of thermal noise?
    a) Poisson
    b) Gaussian
    c) Binomial
    d) Bessel

Answer: b

30. What is the spectral density of white noise?
    a) varies with bandwidth
    b) varies with frequency
    c) constant
    d) infinite

Answer: c

31. Which is the true statement about noise performance of wideband FM system?

a) it is independent of modulation index
b) more prone to noise interference
c) it is independent of signal to noise ratio
d) it exhibits a threshold

Answer: d

32. What is the probability density function of thermal noise?
    a) Poisson
    b) Gaussian
    c) Binomial
    d) Bessel

Answer: b

33. The ionosphere consists of _____ layer.
    a) negative charge
    b) positive charge
    c) no charge
    d) neutral

Answer: a

34. Which system is free from noise?
    a) FM
    b) AM
    c) PCM
    d) PM

Answer: a

35. In AM receiver, the oscillator frequency is always _____
    a) lower than signal frequency
    b) higher than signal frequency
    c) equal to signal frequency
    d) equal to 1KHz

Answer: b

36. Any signal and its Hilbert transform are mutually orthogonal.
    a) True
    b) False

Answer: a

37. In systems, pre-emphasis is used to amplify _____
    a) high frequency
    b) low frequency
    c) phase
    d) amplitude

Answer: a

38. In frequency modulation, noise gets decreased if we decrease deviation.
    a) True
    b) False

Answer: b

39. Which device is most commonly used for detection in radio receiver?
    a) Triode
    b) Capacitor
    c) Diode
    d) Transistor

Answer: c

40. De-emphasis circuit is used _____
    a) before detection
    b) after detection
    c) before encoding
    d) after encoding

    Answer: b

Unit-IV
Analog pulse modulation schemes

1) In Pulse Position Modulation, the drawbacks are
a) Synchronization is required between transmitter and receiver
b) Large bandwidth is required as compared to PAM
c) None of the above
d) Both a and b

2) In PWM signal reception, the Schmitt trigger circuit is used
a. To remove noise b. To produce ramp signal
c. For synchronization d. None of the above

3) In pulse width modulation,
a) Synchronization is not required between transmitter and receiver
b) Amplitude of the carrier pulse is varied
c) Instantaneous power at the transmitter is constant
d) None of the above

4) Flat-top sampling leads to ____
a) an aperture effect b) aliasing c) loss of signal d) none

5) In Pulse time modulation (PTM)
a) Amplitude of the carrier is constant
b) Position or width of the carrier varies with modulating signal
c) Pulse width modulation and pulse position modulation are the types of PTM
d) All of the above

6) The PWM needs
a) more power than PPM b) more samples per second than PPM
c) more bandwidth than PPM d) none of the above

7) Pulse time modulation (PTM) includes
a) Pulse width modulation b) Pulse position modulation
c) Pulse amplitude modulation **d)** Both a and b

8) In pulse amplitude modulation,
a) Amplitude of the pulse train is varied b) Width of the pulse train is varied
c) Frequency of the pulse train is varied d) None of the above

9) The PAM signal can be detected by ___
a) bandpass filter b) bandstop filter c) high pass filter **d)** low pass filter

10) The sampling technique having the minimum noise interference is
a) Instantaneous sampling **b)** Natural sampling
c)Flat top sampling d) All of the above

11) PPM can be generated from ___ signals
a) PAM **b)** PWM c) both a and b d)none

12) The techniques used for sampling are
a) Instantaneous sampling b) Natural sampling
c) Flat top sampling **d)** All of the above

13) The minimum band width required to transmit the PAM signal with frequency fm is ___
a) fm **b)** 2fm c) 4fm d) 8fm

14 The holding circuit is used in ___ of PAM signals
a) Generation b) demodulation c) both a and b d) none

15) A Modulation technique where only the relative positions of the pulses move, according to the intelligence amplitude
a) PWM **b)** PPM c) PAM d) PFM

16) A distorted signal of frequency fm is recovered from a sampled signal if the sampling frequency fs is
a) fs > 2fm **b)** fs < 2fm c) fs = 2fm d) fs ≥ 2fm

17) The pulse modulation technique in which the width of the carrier is varied according to the instantaneous value of the message signal is called **pulse Width modulation**

18) The spectrum of the sampled signal may be obtained without overlapping only if
a) fs ≥ 2fm b. fs < 2fm c. fs > fm d. fs < fm

19) The guard time between pulses increases transmission efficiency (False)

20) Noise can be reduced by increasing sampling rate (**False**)

21. a) Gives rise to aperture effect
    b) Implies over sampling
    c) Leads to aliasing
    d) Introduces delay distortion
    View Answer
    Answer: a
22. A PAM signal can be detected using
    a) Low pass filter
    b) High pass filter
    c) Band pass filter
    d) All pass filter
    View Answer
    Answer: a
23. The use of non uniform quantization leads to
    a) Reduction in transmission bandwidth
    b) Increase in maximum SNR
    c) Increase in SNR for low level signals
    d) Simplification of quantization process
    View Answer
    Answer: c
24. Which of the following requires a synchronizing signal?
    a) Single channel PPM system
    b) PAM
    c) DM
    d) All of the mentioned
    View Answer
    Answer: b
25. A PWM signal can be generated by
    a) An astable multi vibrator
    b) A monostable multi vibrator
    c) Integrating a PPM signal
    d) Differentiating a PPM signal
    View Answer
    Answer: b
26. TDM is less immune to cross-talk in channel than FDM.
    a) True
    b) False
    View Answer
    Answer: b
27. TDM requires
    a) Constant data transmission
    b) Transmission of data samples
    c) Transmission of data at random
    d) Transmission of data of only one measured
    View Answer
    Answer: b
28. In PWM signal reception, the Schmitt trigger circuit is used

a. To remove noise
b. To produce ramp signal
c. For synchronization
d. None of the above
ANSWER: a

29. In pulse width modulation,
a. Synchronization is not required between transmitter and receiver
b. Amplitude of the carrier pulse is varied
c. Instantaneous power at the transmitter is constant
d. None of the above
Answer a

30. In different types of Pulse Width Modulation,
a. Leading edge of the pulse is kept constant
b. Tail edge of the pulse is kept constant
c. Centre of the pulse is kept constant
d. All of the above
Answer d

31. In Pulse time modulation (PTM),
a. Amplitude of the carrier is constant
b. Position or width of the carrier varies with modulating signal
c. Pulse width modulation and pulse position modulation are the types of PTM
d. All of the above
Answer d

32. The sampling technique having the minimum noise interference is
a. Instantaneous sampling
b. Natural sampling
c. Flat top sampling
d. All of the above
Answer b

33. A distorted signal of frequency fm is recovered from a sampled signal if the sampling frequency fs is
a. $fs > 2fm$
b. $fs < 2fm$
c. $fs = 2fm$
d. $fs \geq 2fm$
Answer b

34. The process of using a pulse signal to represent information is called _____
a) Pulse modulation
b) Frequency modulation
c) Amplitude modulation
d) Phase modulation
View Answer

Answer: a

35. Power consumption is low in pulse modulation.
a) True
b) False
Answer: a

36. Which pulse modulation technique is least expensive?
    a) Pulse amplitude modulation
    b) Pulse width modulation
    c) Pulse position modulation
    d) Pulse code modulation
    Answer: a
37. The process of signal compression and expansion used to reduce distortion and noise is called _____
    a) Amplification
    b) Companding
    c) Compressing
    d) Modulating
    Answer: b
38. What type of digital modulation is widely used for digital data transmission?
    a) Pulse amplitude modulation
    b) Pulse width modulation
    c) Pulse position modulation
    d) Pulse code modulation
    Answer: d
39. Which of the following is not an advantage of undersampling?
    a) Slower ADC
    b) Less power
    c) Fast microprocessors
    d) Low memory capacity
    Answer: c
40. What causes a new signal with frequency fs-fm to be created near the original signal?
    a) Attenuation
    b) Imaging
    c) Aliasing
    d) Distortion
    Answer: c

UNIT - V
Information & channel capacity

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 **variable length coding**

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 = log10M **b.** H = log2M
c. H = log10M2 d. H = 2log10M

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>>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

9) For M equally likely messages, M>>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 techniques

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 log21/P b. I = k log2P c. I = k log21/2P d. I = k log21/P2

21) The unit of average mutual information is
a) Bits
b) Bytes
c) Bits per symbol
d) Bytes per symbol
Answer: a

22) The event with minimum probability has least number of bits.
a) True
b) False
Answer: b

23) When the base of the logarithm is 2, then the unit of measure of information is
a) Bits
b) Bytes
c) Nats
d) None of the mentioned
Answer: a

24) Entropy of a random variable is
a) 0
b) 1
c) Infinite
d) Cannot be determined
Answer: c

25) Which is more efficient method?
a) Encoding each symbol of a block
b) Encoding block of symbols
c) Encoding each symbol of a block & Encoding block of symbols
d) None of the mentioned
Answer: b

26) In channel coding theorem, channel capacity decides the _____permissible rate at which error free transmission is possible.

a. Maximum
b. Minimum
c. Constant
d. None of the above

Answer a

27) In digital communication system, smaller the code rate, _____are the redundant bits.

a. less
b. more
c. equal
d. unpredictable

Answer b

28) In discrete memoryless source, the current letter produced by a source is statistically independent of _____

a. Past output
b. Future output
c. Both a and b
d. None of the above

Answer c

29) Which decoding method involves the evaluation by means of Fano Algorithm?

a. Maximum Likelihood Decoding
b. Sequential Decoding
c. Both a and b
d. None of the above

Answer b

30) For fixed symbol rate, increase in bits/symbol ultimately improves rb/B bits/s/Hz & hence, regarded as _____.

a. Power efficiency
b. Spectral efficiency
c. Transmission efficiency
d. Modulation eficiency

Answer b