1. Let X be a random variable which is uniformly chosen from the set of positive odd numbers less than 100. The expectation, E[X] is
   a. 50
   b. 0
   c. 25
   d. 100

Ans:- a

2. If Y=5X + 20 and X is N(15,25), then mean of Y is
   a. 95
   b. 70
   c. 50
   d. 135

Ans:- a

3. Let Uand V be two independent zero mean Gaussian random variables of variances 1/4 and 1/9 respectively. The probability P(3V >= 2U) is
   a. 0.5
   b. 0.4
   c. 0.9
   d. 0.7

Ans:- a

4. The power spectral density of a signal is given by [sinc(f)]^2, where ‘f’ is frequency. The autocorrelation function of this signal in the time domain is
   a. Triangular
   b. Delta
   c. Rectangular
   d. Sinusoidal

Ans:- a

5. The auto-correlation function of an energy signal has
   a. Even symmetry
   b. Odd symmetry
   c. No symmetry
   d. Can’t comment

Ans:- a

6. The spectrum of a Gaussian pulse is
   a. Gaussian
   b. Rayleigh
   c. Uniform
   d. Delta

Ans:- a

7. The envelope of complex Gaussian is
   a. Rayleigh
   b. Gaussian
   c. Uniform
   d. Rician

Ans:- a

8. If the sample functions of a random process are periodic with period T, the auto correlation function is
   a. Periodic with period T
   b. Periodic with period 2T
   c. Periodic with period T/2
   d. Can't comment

Ans:- a

9. Let X(t) = A cos(wt+ @) Where @ is the phase distributed uniformly in [0, 90 degrees]. The process X(t) is
   a. Strict Sense Stationary
   b. Wide Sense Stationary
   c. Not Wide Sense Stationary
   d. Can't comment

Ans:- c

10. Power spectral density is ---------- function of frequency
    a. Real and even
    b. Real
    c. Even
    d. Odd

Ans:- a

11. Sum of two independent uniform random variables has a ---------- pdf
    a. Triangular
    b. Uniform
    c. Gaussian
    d. Exponential

Ans:- a

12. Suppose a zero mean Gaussian white noise with PSD $N_0/2$ is applied to a low pass filter with a bandwidth of "*B"* and passband amplitude response of 1. Suppose the filter output is sampled at the rate of "2*B"* times per second, the auto correlation function of the sampled output is

    a. Impulse
    b. Gaussian
    c. Exponential
    d. Insufficient information to evaluate

Ans:- a

13. Let X(t) and Y(t) be two independent Poisson processes with parameter λ1 and λ2 respectively. The sum process X(t)+Y(t) is
    a. Poisson
    b. Gaussian
    c. Exponential
    d. Undefined

Ans:- a

14. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

    A)1/2

    B) 2/5

    C) 8/15

    D) 9/20

    Ans:- D

15. A random process is called as stationary in strict sense if
    a. Its statistics vary with shift in time origin
    b. Its statistics does not vary with shift in time origin
    c. Its autocorrelation vary with shift in time
    d. Its autocorrelation does not vary with shift in time

Ans:- b

16. Let X be a continuous random variable distributed uniformly in [0, 10]. The value of P(X=2) is
    a. 0
    b. 0.1
    c. 1
    d. 0.5

Ans:- a

17. The average noise power of white noise is
    a. 0
    b. Infinity
    c. 1
    d. None of the mentioned

Ans:- b

18. According to Parseval's theorem the energy spectral density curve is equal to?
    a. Area under magnitude of the signal
    b. Area under square of the magnitude of the signal
    c. Area under square root of magnitude of the signal

d. None of the mentioned

Ans:- b

19. The binomial distribution is symmetrical if p=?
    A) 2
    B) 1
    C) 1/4
    D) ½

Ans:- D

20. If X and Y are two independent variables, then
    A) E(XY)=E(X)E(Y)
    B) Cov(X,Y)=0
    C) Correlation coefficient =0
    D) All of the Above
    Answer D

21. FM stands for _____
    a) Frequency Modulation
    b) Frequency Moderator
    c) Frequent Moderator
    d) Frequency Demodulation

    Answer: a

22. The minimum height of antenna required for transmission in terms of ʎ is
    a) 3λ/2
    b) λ/4
    c) 2λ
    d) λ

    Answer: b

23. What do you understand by the term analog communication?

a) A continuous signal with varying phase or amplitude

b) A discrete signal

c) A numerical coded signal

d) A suitable method for long distance communication

Answer: a.

24. 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

25. Data transmitted for a given amount of time is called _____

a) Noise

b) Power

c) Frequency

d) Bandwidth

Answer: d

26. Medium which sends information from source to receiver is called _____

a) Transmitter

b) Transducer

c) Receiver

d) Channel

Answer: d

27. Telephones send information through wires in the form of _____

a) radio signals

b) electrical signal

c) electromagnetic waves

d) microwaves

Answer: b

28. Cell phones sent information in the form of _____

a) microwaves

b) electrical signals

c) radio signals

d) electromagnetic waves

Answer: d

29. Ability of receivers to select the wanted signals among various incoming signal is called _____

a) Selectivity

b) Stability

c) Sensitivity

d) Modulation

Answer: a

30. Which device is used for tuning the receiver according to incoming signal (especially in TV)?

a) Low pass filter

b) High pass filter

c) Zener diode

d) Varacter diode

Answer: d

31. In TV transmission, picture signal is_____modulated.

a) Phase

b) Amplitude

c) Frequency

d) Pulse

Answer: b

32. In TV transmission, sound signal is_____modulated.
    a) Phase
    b) Pulse
    c) Frequency
    d) Amplitude

    Answer: c

33. 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

.

34. Ring Modulator is _____
    a) used for DSB-SC generation
    b) used for SSB-SC generation
    c) is a summation modulator
    d) consists three diodes connected in form of a ring

    Answer: a

35. AVC stands for _____
    a) Abrupt Voltage Control
    b) Audio Voltage Control
    c) Automatic Volume Control
    d) Automatic Voltage Control

    Answer: c

36. What is the role of Amplitude limiter in FM receiver?
    a) Filtering

b) Amplification
c) Demodulation
d) Remove amplitude variation due to noise

Answer: d

37. What is Fidelity?
    a) Equally amplifies all the signal frequencies at receiver
    b) Ability of receiver to select wanted signal from various incoming signal
    c) Minimum magnitude of input signal required to produced a specified output
    d) Process of varying one or more properties of carrier signal

    Answer: a

38. In a receiver, noise is usually developed at _____
    a) Audio stage
    b) Receiving antenna
    c) RF stage
    d) IF stage

    Answer: c

39. Which oscillator is used as a local oscillator in radio receiver?
    a) Wien-bridge
    b) Hartley
    c) Crystal
    d) Phase Shift

    Answer: b

40. Figure of merit is _____
    a) Ratio of output signal to noise ratio to input signal to noise ratio
    b) Ratio of input signal to noise ratio to output signal to noise ratio
    c) Ratio of output signal to input signal to a system
    d) Ratio of input signal to output signal to a system

    Answer: a

41. Super-heterodyne principle provides selectivity at _____
    a) RF stage
    b) IF stage
    c) Before RF stage
    d) Audio

    Answer: b

42. Low frequency noise is _____
    a) Flicker noise
    b) Shot noise
    c) Thermal noise
    d) Burst noise

    Answer: a

43. Calculate power in each sideband, if power of carrier wave is 176W and there is 60% modulation in amplitude modulated signal?
    a) 13.36W
    b) 52W
    c) 67W
    d) 15.84W

    Answer: d

44. Maximum power efficiency of an AM modulator is?
    a) 25%
    b) 50%
    c) 75%
    d) 100%

    Answer: b

45. An AM signal is represented by $x(t) = (30 + 2\sin(700\pi t))\cos(2\pi t \times 10^2 t)V$.
    The modulation index is
    a) 0.7
    b) 0.066
    c) 0.341
    d) 0.916

    Answer: b

46. If the modulating frequency of a carrier wave varies between 700Hz and 7KHz, find it's bandwidth?
    a) 10 KHz
    b) 23 KHz
    c) 17.3 KHz
    d) 12.6 KHz

    Answer: d

47. A 400W carrier wave is modulated to a depth of 65%. Find the total power of modulated wave?
    a) 512.5W
    b) 493W
    c) 484.5W
    d) 609.6W

    Answer: c

48. If modulation index of an AM wave is increased from 1.5 to 2, then the transitted power _____
    a) remains same
    b) increases by 20%
    c) increases by 41%
    d) increases by 50%

    Answer: c

49. Which multiplexing technique transmits digital signals?
    a) FDM
    b) TDM
    c) WDM
    d) Both FDM and TDM

    Answer: b

50. To get constant time delay, we should use _____
    a) FDM technique
    b) WDM technique
    c) Synchronous TDM

d) Non synchronous TDM

Answer: c

51. What is the modulation index for a single tone modulation, given that positive peak of AM wave is 20V and minimum value is 2V?

a) 0.81

b) 0.91

c) 0.73

d) 1

Answer: a

52. Power spectral density of thermal noise remains uniform upto frequency _____

a) 10^{15} HZ

b) 10^{5} HZ

c) 10^{2} HZ

d) 10^{13} HZ

Answer: d

53. Waves of which frequency can penetrate the atmosphere?

a) higher than 10 MHz

b) higher than 20 MHz

c) higher than 30 MHz

d) higher than 100 MHz

Answer: c

54. Which one of the following is analog?

a) PCM

b) PWM

c) Delta modulation

d) Differential PCM

Answer: b

55. Which of the following is used to generate PDM?

a) Mono-stable multi-vibrator
b) Free running multi-vibrator
c) Either mono-stable of free running multi-vibrator
d) JK flip-flop

Answer: a

56. Quantization error occurs in _____
    a) Time Division Multiplexing
    b) Frequency Division Multiplexing
    c) Pulse Code Modulation
    d) Pulse Width Modulation

Answer: c

57. Peak voltage of a carrier is 8kV, each sideband has an amplitude of 800V. Find its modulation index?
    a) 2.8
    b) 0.9
    c) 0.2
    d) 0.8

Answer: c

58. Which modulation technique uses minimum bandwidth?
    a) DSB-SC
    b) SSB-SC
    c) FM
    d) VSB

Answer: b

59. What is the two basic specification of a receiver?
    a) sensitivity and selectivity
    b) superious response and tracking
    c) signal and noise
    d) number of convertors and number of IFs

Answer: a

60. Who invented the super-heterodyne receivers?
    a) Hertz
    b) Armstrong
    c) Foster
    d) Seeley

    Answer: b

61. What conditions must be fulfilled in a good digital communication system?
    a) High data rate
    b) High fidelity
    c) Low transmit power
    d) All of these

    Answer: d

62. Which corrects the sampling time problem in a digital system?
    a) Interpolator
    b) Decimator
    c) Equalizer
    d) Filter

    Answer: a

63. Matched filter technique is used to
    a) Increase SNR
    b) Decrease SNR
    c) SNR is not affected
    d) None of the mentioned

    Answer: a

64. Amplitude distortion occurs when
    a) Impulse response in not constant
    b) Impulse response is constant
    c) Frequency transfer function is constant
    d) Frequency transfer function is not constant

Answer: d

65. Symbol spaced has_____sample per symbol and fractionally spaced has _ samples per symbol.
    a) One, many
    b) Many, one
    c) One, one
    d) Many, many

    Answer: a

66. In differential encoding the_____different between two wave forms is measured.
    a) Magnitude
    b) Frequency
    c) Phase
    d) Time period

    Answer: c

67. As the eye opens, ISI _____
    a) Increases
    b) Decreases
    c) Remains the same
    d) None of the mentioned

    Answer: b

68. For AWGN, the noise variance is
    a) N_0
    b) $N_0/2$
    c) $2N_0$
    d) $N_0/4$

Answer: b

69. A Gaussian distribution into the non linear envelope detector yields
    a) Rayleigh distribution
    b) Normal distribution
    c) Poisson distribution
    d) Binary distribution

    Answer: a

70. When two networks are connected in series, its composite noise figure can be given as
    a) F1+(F2-1)/G1
    b) F1-(F2-1)/G1
    c) F2+(F1-1)/G1
    d) F1G1+(F2-1)

    Answer: a

71. The maximum likelihood function is
    a) Positive
    b) Negative
    c) Any of the mentioned
    d) None of the mentioned

    Answer: a.

72. The probability of error of DPSK is_____than that of BPSK.
    a) Higher
    b) Lower
    c) Same
    d) Not predictable

    Answer: a

73. For M equally likely messages, M>>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

Answer: a

74. In a communication system, a process in which statistical averages and time averages are equal is called as
    a) Stationary
    b) Ergodic
    c) Gaussian
    d) Poisson

    Answer: b

75. A rectangular pulse of duration T is applied to a matched filter. The output of the filter is a
    a) Rectangular pulse of duration T
    b) Rectangular pulse of duration 2T
    c) Triangular pulse
    d) Sine function

    Answer: c

76. Gaussian noise has_____ power spread_____over all frequencies.
    a) Zero, uniformly
    b) Zero, non uniformly
    c) Infinite, uniformly
    d) Infinite, non uniformly

    Answer: c

77. The filter which is used to recover the pulse with less ISI is called as
    a) Matched filter
    b) Correlator
    c) Matched filter & Correlator
    d) None of the mentioned

    Answer: b

78. The composite equalizing filter is the combination of
    a) Receiving and equalizing filter
    b) Transmitting and equalizing filter
    c) Amplifier and equalizing filter
    d) None of the mentioned

    Answer: a

79. Signal to noise ratio increases as_____increases .
    a) Quantization level
    b) Square of quantization level
    c) Square root of quantization level
    d) None of the mentioned

    Answer: b

80. The capacity relationship is given by
    a) C = W log2 (1+S/N)
    b) C = 2W log2 (1+S/N)
    c) C = W log2 (1-S/N)
    d) C = W log10 (1+S/N)

    Answer: a

81. For a error free channel, conditional probability should be
    a) Zero
    b) One
    c) Equal to joint probability
    d) Equal to individual probability

    Answer: a

82 The detection method where carrier's phase is given importance is called as

    a) Coherent detection

    b) Non coherent detection

    c) Coherent detection & Non coherent detection

d) None of these

Ans:- a

83. Antipodal signal sets are those vectors that can be illustrated as

a) Two 180 opposing vector

b) Two 90 opposing vector

c) Two 360 opposing vector

d) None of these

Ans:- a

84. In amplitude phase keying each phase vector is separated by

a) 90

b) 0

c) 45

d) 180

Ans:- c

85. Which waveforms are also called as line codes?

a) PCM

b) PAM

c) FM

d) AM

Ans:- a

86. When pulse code modulation is applied to non binary symbols we obtain waveform called as

a) PCM

b) PAM

c) M-ary

d) line codes

Ans:- c

87. In PCM encoding, quantization level varies as a function of _____

a) Frequency

b) Amplitude

c) Square of frequency

d) Square of amplitude

Ans:- b

88. What is bit depth?

a) Number of quantization level

b) Interval between two quantization levels

c) Number of possible digital values to represent each sample

d) None of these

Ans:- c

89. DPCM encodes the PCM values based on

a) Quantization level

b) Difference betweent the current and predicted value

c) Interval between levels

d) None of these

Ans:- b

90. For non coherent reception of PSK_____is used.

a) Differential encoding

b) Decoding

c) Differential encoding & Decoding

d) None of these

Ans:- c

91. Which modulation technique have the same bit and symbol error probability?

a) BPSK

b) DPSK

c) OOK

d) All of these

Ans:- d

92. Which modulation is the most efficient one?

a) BPSK

b) BFSK

c) QPSK

d) QAM

Ans:- d

93. Which modulation requires more bandwidth?

a) QPSK

b) OQPSK

c) BPSK

d) BFSK

Ans:- c

94. Which modulation has lower side lobe levels?

a) QPSK

b) OQPSK

c) BPSK

d) MSK

Ans:- d

95. QAM is a combination of

a) ASK and FSK

b) ASK and PSK

c) PSK and FSK

d) None of these

Ans:- b

96. The length of the code-word obtained by encoding quantized sample is equal to

a) l=log(to the base 2)L

b) l=log(to the base 10)L

c) l=2log(to the base 2)L

d) l=log(to the base 2)L/2

Ans:- a

97. The signals which are obtained by encoding each quantized signal into a digital word is called as

a) PAM signal

b) PCM signal

c) FM signal

d) Sampling and quantization

Ans:- b

98. What is necessary for digital communication?

a) Precision timing

b) Frame synchronization

c) Character synchronization

d) All of these

Ans:- d

99. Which system uses digital transmission?

a) ISDN

b) LANs

c) ISDN & LANs

d) None of these

Ans:- c

100. Modulation channel consists of

a) Amplifier

b) Signal processing units

c) Amplifier & Signal processing units

d) None of these

Ans:- c

101. Sampling theorem is used for converting

a) Continuous time signal to discrete

b) Discrete to continuous time signal

c) Both a) and b)

d) None of these

Ans:- c

102. TDMA system uses 25 MHz for the forward link, which is broken into radio channels of 200 kHz. If 8 speech channels are supported on a single radio channel, how many simultaneous users can accommodated?

a) 25

b) 200

c) 1600

d) 1000

Ans: d

103. The most critical feature of TDMA operation is

a) Dividing the carrier channel bandwidth into time-slots
b) Assignment of time-slots among multiple subscribers
c) Time synchronization to the incoming TDMA frame.
d) Providing different access rates to subscribers

Ans: c

104. The guard time between the time slots in a TDMA frame helps in minimizing the interference due to _____along different radio paths in the wireless channel.

a) Propagation delays
b) Adjacent Channel
c) Multipath fading
d) Timing inaccuracies

Ans: a

105. To mitigate the inter-symbol interference problem in TDMA systems,_____technique has to be provided.

a) Source coding
b) Channel coding
c) Interleaving
d) Channel Equalization

Ans : d

106. The differentiation between the carrier frequencies of the forward and reverse channels is an important design parameter related to_____technique

a) FDMA
b) TDMA
c) CDMA
d) SDMA

Ans : a

107. _____is used to improve reception by collecting time delayed versions of the required signal.

a) RAKE receiver

b) Equalizer

c) Frequency modulator

d) High pass filter

Answer: a

108. During the period of call, other users can share the same channel in FDMA. State whether True or False.

a) True

b) False

Answer: b

109. In Frequency Selective Fading, the

a. Coherence Bandwidth of the channel is less than bandwidth of transmitted channel

b. Coherence Bandwidth of the channel is more than bandwidth of transmitted channel

c. Coherence Bandwidth of the channel is equal to bandwidth of transmitted channel

d. None of these

Answer: a

110. If coherence time of the channel is smaller than the symbol period of the transmitted signal, it is

a. Fast fading

b. Slow fading

c. Frequency selective fading

d. Frequency non selective fading

Answer: a

111. The power delay profile helps in determining

a. Excess delay

b. rms delay spread

c. Excess delay spread

d. All of these

Answer: d

112. GMSK is a_____of MSK.

a) Integral

b) Opposite

c) Derivative

d) Similar

Answer: c

113. Which of the following is not a property of MSK?

a) Variable envelope

b) Spectral efficiency

c) Good BER performance

d) Self synchronizing capability

Answer: a

114. MSK is a special form of OQPSK. State whether True or False.

a) True

b) False

Answer: a

115. The name minimum phase shift keying implies minimum _____

a) Frequency separation

b) Amplitude separation

c) Phase change

d) Amplitude deviation

Answer: a

116. MSK stands for _____

a) Maximum shift keying

b) Minimum shift keying

c) Minimum space keying

d) Maximum space keying

Answer: b

117. The technique that may be used to reduce the side band power is

a. MSK

b. BPSK

c. Gaussian minimum shift keying

d. BFSK

Answer: c

118. QPSK is a modulation scheme where each symbol consists of

a. 4 bits

b. 2 bits

c. 1 bits

d. M number of bits, depending upon the requirement

Answer: b

119. The propagation path loss

a) increases with frequency of transmission but decreases with the distance

b) decreases with frequency of transmission as well as the distance

c) increases with frequency of transmission as well as the distance

d) is always constant, independent of frequency of transmission and distance

Answer: c

120. As the Eb/No ratio increases, the bit rate

a) increases

b) decreases

c) remains same

d) approaches infinity

Answer: b

121. A_____is the one which passes all spectral components with approximately equal gain and linear phase and without any distortion

a) Rayleigh Fading Channel

b) Rician Fading Channel

c) Frequency-selective channel

d) Flat Channel

Answer: d

122. _____occurs when the radio path between a transmitter and receiver is obstructed by a surface with sharp irregular edges

a) Scattering

b) Refraction

c) Reflection

d) Diffraction

Answer: d

123. It is difficult to achieve accurate timing, synchronization and phase recovery at the mobile receiver. It is attributed mainly to the effect of

a) Doppler spread of the received signal

b) multipath propagation reception

c) scattering of the transmitted signal

d) non line of sight propagation

Answer: a

124. Constant envelope modulation techniques occupy_____bandwidth than linear modulation schemes.

a) Larger

b) Smaller

c) Same

d) Twice

Answer: a

125. The phase difference between a direct line of sight path and diffracted path is function of _____

a) Height and position of obstruction

b) Only height

c) Operating frequency

d) Polarization

Answer: a

126. Path loss in free space model is defined as difference of _____

a) Effective transmitted power and gain

b) Effective received power and distance between T-R

c) Gain and received power

d) Effective transmitter power and receiver power

Answer: d

127. When probability of error during transmission is 0.5, it indicates that
   a. Channel is very noisy
   b. No information is received
   c. Errors are low
   d. Channel allows max transmission rate

Ans:- b

128. The capacity of Gaussian channel is
   a. $C = 2B(1+S/N)$ bits/s
   b. $C = B^2(1+S/N)$ bits/s
   c. $C = B(1+S/N)$ bits/s
   d. $C = B(1+S/N)^2$ bits/s

Ans:- c

129. For M equally likely messages, the average amount of information H is
   a. $H = \log_{10}M$

b. $H = \log_2 M$
c. $H = \log_{10} M^2$
d. $H = 2\log_{10} M$

Ans:- a

130. When X and Y are statistically independent, then I (x,y) is
a. 1
b. 0
c. ln 2
d. Cannot be determined

Ans:- b

131. Lempel-Ziv algorithm is
a. Variable to fixed length algorithm
b. Fixed to variable length algorithm
c. Fixed to fixed length algorithm
d. Variable to variable length algorithm

Ans:- a

132. Which is more efficient method?
a. Encoding each symbol of a block
b. Encoding block of symbols
c. Neither of the other options

Ans:- b

133. Entropy of a random variable is
a. 1
b. 0
c. Infinity
d. Cannot be determined

Ans:- b

134. Mutual Information is
a. Symmetric
b. Always non-negative
c. Neither Symmetric nor non-negative

d. Symmetric and non-negative

Ans:- d

135. Entropy and Mutual Information are related as :

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. $I(X;Y) = H(Y) - H(X)$

Ans:- A

136. For hamming distance dmin and t errors in the received word, the condition to be able to correct the errors is .

a. Only $2t + 1 \leq dmin$
b. Only $2t + 2 \leq dmin$
c. Only $2t + 1 \leq 2dmi$
d. $2t + 1 \leq dmin$ and $2t + 2 \leq dmin$

Ans:- d

137. ISI may be removed by using

a. Differential coding
b. Manchester coding
c. Polar NRZ
d. Bipolar RZ

Ans:- a

138. If each pulse of the sequence to be detected is in_____shape, the pulse can be detected without ISI

a. Sine
b. Cosine
c. Sinc
d. Rectangular

Ans:- c

139. The minimum nyquist bandwidth for the rectangular spectrum in raised cosine filter is

a. 2T
b. 1/(2T)
c. T^2
d. 2/T

Ans:- b

140. Roll off factor is the fraction of
   a. Excess bandwidth and absolute bandwidth
   b. Excess bandwidth and minimum nyquist bandwidth
   c. Absolute bandwidth and minimum nyquist bandwidth
   d. None of the mentioned

Ans:- b

141. The time interval over which the received signal may be sampled without error may be explained by
   a. Width of eye opening of eye pattern
   b. Rate of closure of eye of eye pattern
   c. Height of the eye opening of eye pattern
   d. Excursion over the eye

Ans:- a

142. To guarantee detection of up to "S" errors in all cases, minimum hamming distance in a block code must be
   a. S
   b. S +1
   c. S -1
   d. 0

Ans:- b

143. In a linear block code, exclusive OR (XOR) of any two valid code words creates
   a. valid codeword
   b. invalid codeword
   c. valid data
   d. invalid data

Ans:- a

144. Entropy is
   a. Information in a signal
   b. Average information per message
   c. Amplitude of signal
   d. Power of signal

Ans:- b

145. 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. $H(P)^2 - 1$

Ans:- a

146. There is no error in received code word, if syndrome is

a. maximum
b. minimum
c. 0
d. 1

Ans:- c

147. Which value of r (roll off factor) is considered as Nyquist minimum bandwidth case?

a. 0
b. 1
c. Infinity
d. None of the mentioned

Ans:- a

148. Zero forced equalizers are used for

a. Sampling
b. Reducing ISI to zero
c. Quantization
d. Filtering out audio

Ans:- b

149. The event with minimum probability has least number of bits.

a. True
b. False

Ans:- b

150. Assuming that the channel is noiseless, if TV channels are 8 kHz wide with the bits/sample = 3Hz and signaling rate = 16 x 10^6 samples/second, then what would be the value of data rate?

a. 16 Mbps
b. 24 Mbps
c. 48 Mbps
d. 64 Mbps

Ans:- c

151. In digital communication system, smaller the code rate, _____ are the redundant bits w.r.t. the data bits.

a. Less
b. More
c. Equal
d. Indeterminate

Ans:- b