

PRINCIPLES OF ELECTRICAL COMMUNICATION
For Off Campus BSc Computer Science Programme

UNIT 1

1. In electric and electronic communications, all the audio, video and data information like sounds, pictures, typed information, etc., is transformed into electrical signals and then transmitted through_____.

- A. Wires
- B. Fibers
- C. Via wireless
- D. All of the above**

2. What are the basic properties of any electrical signal?

- A. Frequency
- B. Amplitude
- C. Phase
- D. All of the above**

3. Which forms of signals are used to communicate, display, store and manipulate information?

- A. Analog signals
- B. Digital signals
- C. Both (a) and (b)**
- D. Amplitude

4. Name the basic components of any communication system?

- A. Transmitter
- B. transmission medium
- C. Receiver
- D. All of the above**

5. In which type, data is transmitted only in one direction; for example, TV or radio transmission?

- A. Channel links
- B. Full duplex
- C. Half duplex
- D. Simplex**

6. In full duplex, how many wires are needed to transmit data in different directions?

- A. Three
- B. Two

C. Four

D. Five

7. In sound generating machines the small voltages are produced by_____.

A. Microphones

B. Radio

C. Telephone

D. Fax

8. While designing which device one has to ensure that the signals are transmitted accurately so that information is not corrupted when it is sent?

A. Radio

B. Telephones

C. Data packages

D. Fax machines

9. What are designed to set the channel accurately, adjust the volume, etc., by sending signals from the remote to the TV?

A. TV remote

B. Mobile phone

C. Fax machine

D. None of the above

10. Nowadays, signal processing is often done after converting different signals into digital signals—the process referred to as_____.

A. Digital signal processing or DSP

B. Electrical signals

C. Both (a) and (b)

D. None of the above

11. What does digital signal offer with respect to the distortion, attenuation and noise than analog system?

A. Accuracy of the signal

B. Quality of the signal

C. Both (a) and (b)

D. Time of the transmission

12. In digital signal, each pulse represents on or off a binary digit, which is popularly known as _____.

A. Digital signal processing

B. Electrical signals

C. bit

D. None of the above

13. The simplest representation for a signal is to represent the signal as a function of time like_____.

A. Analog signals

B. Digital signals

C. Sinusoidal signals

D. None of the above

14. Binary is two level signals signifying on or off and is represented as_____.

A. 0 or 1

B. 1 or 0

C. 1

D. -1 or 0

15. Bit rate is the number of bits transmitted_____.

A. Per second

B. Per minute

C. Per hour

D. None of the above

16. The PCM system employs how many steps to accomplish its job?

A. Two

B. Three

C. Four

D. One

17. Filtering is applied to filter the frequencies below_____.

A. 400 Hz and above 4400 Hz

B. 100 Hz and above 400 Hz

C. 200 Hz and above 3000 Hz

D. 300 Hz and above 3400 Hz

18. The frequencies below _____ is filtered because they tend to involve mainly electrical noise and therefore causing enormous attenuation and distortion in the transmitted signal because of a number of electrical appliances present in the vicinity.

A. 3400 Hz

B. 200 Hz

C. 300 Hz

D. None of the above

19. The actual bandwidth of the filtered signal is 3100 Hz (3400–300) which is often known as_____.

A. 4 kHz

B. 2 kHz

C. 1 kHz

D. 5 kHz

20. According to the Nyquist theorem, the analog signal is sampled at the rate of the highest frequency of the signal. In this case the higher frequency is 4 KHz, therefore, the analog signal is sampled _____ times per second.

A. 5000

B. 8000

C. 2000

D. 1000

21. Which step involves quantization of the amplitude of the incoming samples to one of 255 amplitudes on a quantizing scale?

A. Quantizing

B. Sampling

C. Filtering

D. None of the above

22. The quantized samples are encoded into a digital bit stream consisting of series of electrical pulses in which a digital encoder recognizes how many different voltage levels of the quantized samples?

B. 245

C. 105

D. 255

23. The digital signal is converted back to its analog form in how many steps?

A. Four

B. Three

C. Two

D. None of the above

24. How many ways are there to communicate, display, store or manipulate information?

A. One

B. Four

C. Three

D. Two

25. Which process is used to smooth out the stream of 8,000 pulses per second into an analog waveform that closely resembles the waveform that was input into the A/D converter at the originating end?

A. Digital-to-analog conversion

B. Filtering

C. Sampling

D. Encoding

26. What deals with data or information transmission?

A. Data communications

B. Networks

C. Both (a) and (b)

D. Signals

27. Analog is best explained by the transmission of signal, such as _____ over an electrified copper wire.

A. Sound

B. Human speech

C. Both (a) and (b)

D. Colour

28. Information which is analog in its native form (audio and image) can vary continuously in terms of _____.

A. Intensity (volume or brightness)

B. Frequency (tone or color)

C. Both (a) and (b)

D. Human speech

29. In its native form, human speech is an oscillatory disturbance in the air, which varies in terms of its _____.

A. Volume or power (amplitude)

B. Pitch or tone (frequency)

C. Both (a) and (b)

D. Analog signals

30. The electromagnetic sinusoidal (waveform) or sine wave can be varied in amplitude at a fixed frequency, using _____.

A. Amplitude Modulation (AM)

B. Frequency Modulation (FM)

C. Cable television (CATV) video channel

D. Band-limiting filters

31. Computers are _____ in nature.

A. Electromagnetic

B. Analog

C. Digital

D. None of the above

32. _____ refers to a path between two or more points along which an electrical current flows.

A. Networks

B. Channels

C. Circuits

D. None of the above

33. The circuit may be a physical path comprising of _____ wires.

A. One or more

B. Two or more

C. Less than two

D. One

34. We can define a periodic function through the following mathematical expression, where t can be any number and T is a positive constant.

A. $f(t) = f(T)$

B. $f(t) = f(T + t)$

C. $f(t) = f(t)$

D. None of the above

35. A signal is formally defined as a function of one or more independent variables, which conveys information on the nature of a physical phenomenon. The variables may be _____.

A. Amplitude

B. Frequency

C. Phase

D. All of the above

36. The impulse signal is also called _____.

A. Delta signal

B. Generalized function

C. Both (a) and (b)

D. Continuous-time signal

37. Who discovered that it is possible to decompose a composite signal into its constituent parts, a set of sine functions, each with a frequency, amplitude, and phase?

A. A programmer named Fourier

B. A mathematician named Frank

C. A mathematician named Fourier

D. None of the above

38. What is the term for the amount of time taken by a signal for one repetition of the signal?

A. Period (T)

B. Phase (ϕ)

C. Frequency

D. None of the above

39. _____ is the range of frequencies contained in a signal.

A. Effective bandwidth

B. Absolute bandwidth

C. Spectrum

D. Fundamental frequency

40. _____ means the facts information statistics or the like derived by calculation or experimentation.

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A. Asynchronous communication

B. Baud Code or International Telegraph Alphabet #2 (ITA#2)

C. Datum

D. None of the above

41. A cable television (CATV) video channel is approximately of _____.

A. 16 MHz

B. 6 MHz

C. 4 MHz

D. 8 MHz

42. The equipment required to convert digital data to analog format and transmitting the digital bit streams over an analog network can be _____.

A. Expensive

B. Susceptible to failure

C. Can create errors in the information

D. All of the above

43. A continuous-time signal $p(t)$ is said to be a _____ if it exists for a definite interval of time.

A. Unit Ramp Function (DT)

B. Pulse signal

C. Ramp signal

D. None of the above

44. A continuous-time sinusoidal signal, in its most general form, may be written as_____.

A. $x(t) = A \sin(\omega_0 t + \phi)$

B. $x(t) = A \cos(\omega t + \phi)$

C. Both (a) and (b)

D. $x(n) = A \cos(\omega n + \phi)$

45._____ is one in which all frequency components of a signal are integer multiples of one frequency.

A. Frequency domain

B. Frequency

C. Absolute bandwidth

D. Fundamental frequency

46. A bandwidth is directly proportional to the capacity of a signal to carry information, and therefore, a _____ always remains thirsty for bandwidth.

A. Data communication engineer

B. Communication engineer

C. Computer engineer

D. None of the above

47. A composite signal is defined as a signal made of many_____:

A. Complex sine waves

B. Single sine waves

C. Simple sine waves

D. None of the above

48. Higher frequency signals offer greater_____.

A. Bandwidth

B. Sine waves

C. Transmission

D. None of the above

49. In data communication, there are data communication jargons to contend with such as_____.

A. LAN, WAN, TCP/IP, ISDN

B. Baud rate

C. Modems and routers

D. All of the above

50. Emile Baudot, a Frenchman, prepared a code in which year?

A. 1857

B. 1875

C. 1775

D. 1757

51. In which country is the Baud code sometimes known as the Murray Code?

A. Belgium

B. India

C. USA

D. UK

52. In which year, Alexander Graham Bell's telephone experiments started the history continuous-time sinusoidal signal

A. 1876

B. 1856

C. 1800

D. 1866

53. A telephone is a user-end-instrument to send and receive voice frequency signals. Voice frequency for use in telephone falls between_____.

A. 300 Hz and 3000 Hz band

B. 200 Hz and 2000 Hz band

C. 300 Hz and 5000 Hz band

D. None of the above

54. A telephone connection, therefore, is an analog connection from an end user to the nearest telephone company office, which is popularly known as_____.

A. Central Office (CO) or exchange

B. Public Switched Telephone Network (PSTN)

C. Public Telephone Network (PTN)

D. None of the above

55. Extended Binary-Coded Decimal Interchange Code was developed in which year?

A. 1780s

B. 1960s

C. 1860s

D. 1970

56. ASCII is a 7-bit code, which results in an upper limit of _____characters?

A. 130

B. 128

C. 150

D. 129

57. The first communication satellite was launched during_____.

A. 1970s

B. 1980s

C. 1960s

D. None of the above

58. In the year 1948, Claude Shannon worked for the Bell Telephone Company in which country?

A. United Kingdom

B. United States of America

C. Europe

D. Australia

59. Data circuit terminating equipment is also known as_____.

A. Communications software

B. Data Terminal Equipment

C. Data Communication Equipment

D. None of the above

60. Data is transmitted in one direction at a time, for example, a_____.

A. Fire alarms

B. Door bells

C. Walkie-talkie

D. None of the above

UNIT 2

61. In information technology, a _____ is an element, such as optical fibre, through which a message is communicated?

A. Medium

B. Computer

C. Media

D. None of the above

62. Media is the plural form of_____.

A. Communication

B. Middle

C. Medium

D. Withdrawal

63. Noise is one of the major sources of _____.

A. Errors

B. Miscommunication

C. Both (a) and (b)

D. NULL

64. What travels through the medium?

A. Noise

B. Data transmission

C. Data signals

D. None of the above

65. How many categories of media are there?

A. Multiple

B. Three

C. Two

D. One

66. What travel through the air, and has no boundaries, hence called un-bounded transmission?

A. Microwave

B. Satellite transmissions

C. Both (a) and (b)

D. None of the above

67. Bounded media or wired transmission systems employ _____, which are tangible.

A. Unbounded media

B. Data signals

C. Physical media

D. Both (a) and (b)

68. Which term means that the signal is contained within an enclosed physical path?

A. Bounded media

B. Guided media

C. Both (a) and (b)

D. None of the above

69. The error rate of transmission and the electrical noise is reduced by the _____.

- A. Wrapping
- B. Wired transmission

C. Twisting

D. None of the above

70. Which substance is used for the insulation purposes?

A. Teflon(r) flouropolymer resin

B. Polyvinyl chloride

C. Polyethylene

D. All of the above

71. A *modem* is a device that changes analog signals into digital signals and vice versa. In this category, data rate is restricted to approximately_____.

A. 20Kbps

B. 8Kbps

C. 28Kbps

D. 18Kbps

72. In Asymmetric Digital Subscriber Lines (ADSL) technology, a new technique was introduced which intended to use two copper loops at a data rate of_____:

A. 100 Kbps

B. 1.544Mbps

C. 600 Kbps

D. None of the above

73. How many categories of twisted pair cables are there?

A. Two

B. Three

C. One

D. Many

74. What was shown as a copper medium which was first used in telephone systems by Alexander Graham Bell?

A. IBM connector

B. Shielded Twisted Pair (STP)

C. Unshielded Twisted Pair (UTP)

D. All of the above

75. A UTP cable contains _____twisted pairs.

A. 1 to 400

B. 2 to 4200

C. 2 to 4000

D. 7 to 4200

76. What is a measure of the thickness of the conductor?

A. Bandwidth

B. Configuration

C. Gauge

D. None of the above

77. A layer of dielectric (non-conductive) material such as _____ protects the entire cable.

A. Teflon

B. PVC

C. Both (a) and (b)

D. IBM cable

78. In which year IBM developed its own cabling system called the IBM Cabling System (ICS)?

A. 1966

B. 1977

C. 1984

D. 1988

79. Which cable consists of two twisted-pair cables with one shield?

A. Type 9

B. Type 6

C. Type 5

D. Type 4

80. _____ is the change in shape or form of a signal when a signal travels through an electronic circuitry or a transmission medium.

A. Distortion

B. Attenuation

C. Noise

D. None of the above

81. In data communication, the signal has to travel through the transmission media that may be _____.

A. Wired

B. Wireless

C. Twisted

D. Both (a) and (b)

82. Channel noise is the unwanted electrical or electromagnetic energy that carries no data or information but interferes with the_____.

A. Information

B. Data

C. Both (a) and (b)

D. None of the above

83. Noise degrades the quality of information and data by affecting data and all types of communication including_____:

A. Text and programs

B. Audio

C. Images

D. All of the above

84. Channel bandwidth may be simply defined as the size of the range of frequencies that can be transmitted through a_____.

A. Channel

B. Media

C. Bandwidth

D. None of the above

85. Microwave radio is a form of radio transmission that uses_____.

A. Neutral frequencies

B. High frequencies

C. Ultra-high frequencies

D. None of the above

UNIT 3

86. _____ which are also called baseband signals, are incompatible for over the media.

A. General sound

B. Video

C. Data signals

D. All of the above

87. How many types of basic modulation techniques are there?

A. One

B. Two

C. Three

D. Four

88. Which methods are used to encode digital information in an analog communication system?

A. Amplitude Modulation

B. Modulation techniques

C. Frequency Modulation

D. None of the above

89. For digital communications, this intelligence is in the form of _____.

A. 1s and 0s

B. 0s and 1s

C. 1s

D. 0s

90. What amounts to imposing a signal on the amplitude of a frequency?

A. Amplitude Modulation

B. Modulation techniques

C. Frequency Modulation

D. None of the above

91. _____ is the act of extracting or retrieving the original information bearing signal from a modulated carrier wave.

A. Demodulation

B. Double Side Band-Amplitude Modulation

C. Quadrature Amplitude Modulation

D. None of the above

92. Vestigial Side band transmission is usually found in _____ broadcasting.

A. Data

B. Radio

C. Television

D. Cable

93. Amplitude modulation is rarely used individually as it is highly sensitive to the impacts of _____.

A. Attenuation

B. Line noise

C. Both (a) and (b)

D. Filtering

94. Under the high level modulation, if the transmitter power is 1500 W and the modulation index is 1 then the modulation power is _____.

A. 500 W

B. 400 W

C. 200 W

D. 600 W

95. Generation of AM wave is done in how many parts?

A. Two

B. Three

C. Four

D. One

96. Single-sideband modulation (SSB), which is a refinement of AM, helps to utilize _____ more efficiently.

A. Electric power

B. Bandwidth

C. Both (a) and (b)

D. Sideband

97. In which year D.K. Weaver developed the *third method* of generating SSB?

A. 1955

B. 1988

C. 1950

D. 1910

98. _____ is the medium that transports the modulated signal to the receiver.

A. Transmitter

B. Channel

C. Receiver

D. Amplifier

99. In radio and signal processing, heterodyning is the generation of new frequencies by mixing (multiplying), _____ oscillating waveforms.

A. Five

B. Four

C. Three

D. Two

100. In normal reception, FM signals are almost totally free from noise while AM signals are subject to _____.

A. Cracking noises

B. Whistles

C. Both (a) and (b)

D. Audio signals

101. If the deviation is 40 kHz and the highest audio frequency is 10 kHz, the modulation index is $40/10=4$: a modulation index of 4 equates to ____ significant sidebands.

A. 14

B. 4

C. 10

D. None of the above

102. Since FM signal has a larger band width there is likelihood that more _____ will be encountered.

A. Frequency

B. Bandwidth

C. Noise

D. None of the above

103. Compared to the AM receiver, the tuning range of the incoming carrier frequencies for FM receiver is _____.

A. Small

B. Medium

C. Large

D. None of the above

104. AM receiver operates in _____ bands

A. MW

B. SW

C. FM

D. Both (a) and (b)

105. Under the Single-Sideband Modulation (SSB) technique, the one of the two carrier sidebands are suppressed to save _____.

A. Amplitude

B. Current

C. Power

D. Cost

106. In communication engineering, the message signal (also called baseband signal) is basically voice, video, etc., is technically known as_____.

A. High-frequency carrier signal

B. Modulating signal

C. Modulated signal

D. None of the above

107. Demodulation is done in the_____.

A. Sinusoidal carrier

B. Antenna

C. Receivers

D. None of the above

108. Amplitude modulation is simple to_____.

A. Carry

B. Receive

C. Design

D. None of the above

109. What amounts to imposing a signal by altering the frequency which takes very high frequency to modulate either audio or video signals?

A. Phase modulation

B. Amplitude modulation

C. Frequency modulation

D. None of the above

110. All the three modulation techniques employ a carrier signal which has a single frequency to carry the_____.

A. Intelligence

B. Data

C. Information

D. All of the above

111. In digital communications, _____ involves modifying the amplitude of the carrier to represent 1s and 0s.

A. AM

B. PM

C. FM

D. None of the above

112. Compared to what, FM has greater immunity to noise on transmission medium?

A. AM

B. FM

C. PM

D. None of the above

113. In which modulation, a signal is always present and loss of signal is easily detected.?

A. AM

B. FM

C. PM

D. Both (a) and (b)

114. A **modem** is a contraction of the terms and.

A. **M**odulator

B. **D**emodulator

C. **M**odulation

D. Both (a) and (b)

115. To generate and detect phase changes complex _____ is required?

A. Carrier wave

B. Demodulator

C. Circuitry

D. None of the above

116. Generation of AM wave is done in how many parts?

A. Two

B. Three

C. Four

D. One

117. Single-sideband modulation (SSB), which is a refinement of AM, helps in utilizing what more efficiently?

A. Bandwidth

B. Electric power

C. Both (a) and (b)

D. Baseband signal

118. What is used for long distance telephone transmissions lines, as part of frequency-division multiplexing (FDM) technique?

A. Class C amplifier

B. Single-sideband modulation

C. Low level modulator

D. High level modulation

119. A disadvantage of which type of receivers is the possibility of spurious responses due to frequency conversion?

A. IF amplifier

B. Detection

C. Heterodyne

D. None of the above

120. A typical value of IF for an AM receiver is _____.

A. 450 kHz

B. 455 kHz

C. 355 kHz

D. 405 kHz

UNIT 4

121. _____ is the physical transfer of data in the form of a digital bit stream over a point-to-point or point-to-multipoint communication channel.

A. Data communication

B. Digital communications

C. Electro-magnetic communications

D. None of the above

122. In digital communications, data is transmitted in the form of electro-magnetic signals like an _____.

A. Electrical voltage

B. Microwave or infra-red signals

C. Radio-waves

D. All of the above

123. Digital transmission is the transfer of discrete _____.

A. Messages

B. Pulses

C. Both (a) and (b)

D. Signals

124. The passband modulation and the corresponding demodulation (also known as detection) is carried out by the _____.

A. Data source

B. Key board

C. Modem equipment

D. Computer equipment

125. According to the most common definition, both baseband and passband signals representing bit-streams are considered as _____.

A. Digital transmission

B. Digital modulation method

C. Digital messages

D. None of the above

126. Corresponding demodulation is also known as_____.

A. Detection

B. Bit streams

C. Line code

D. None of the above

127. Data transmitted may be digital messages originating from a data source such as_____.

A. Computer

B. Keyboard

C. Both (a) and (b)

D. Mouse

128. In digital communications, transmission of information takes place in_____.

A. Computer form

B. Analog form

C. Digital form

D. None of the above

129. The major reason of growth of digital communication recently is the availability of wide-band channels such as_____.

A. Optical fibers

B. Satellite channels

C. Both (a) and (b)

D. Mobile phones

130. What can be transmitted using binary digits?

A. Voice

B. Video

C. Photo

D. All of the above

131. By using error correcting and error detecting codes, we can improve the _____ performance of system.

A. Noise

B. Video

C. Photo

D. None of the above

132. In digital system, the systems are very _____.

A. Simple

B. Complex

C. Fast

D. Modern

133. Digital signal are based on _____.

A. 1s and 0s

B. 0s only

C. 1s only

D. 0s and 1s

134. Transmitting and receiving analog signals is usually less _____.

A. Critical

B. Complicated

C. Expensive

D. None of the above

135. Analog signal required lesser _____ capacity than digital capacity.

A. Sound wave

B. Noise

C. Digital signal

D. Bandwidth

136. What work using digital signals?

A. PCs

B. Computers

C. Both (a) and (b)

D. Microwaves

137. A message signal originates from a _____.

A. Digital source

B. Analog source

C. Both (a) and (b)

D. Sound transmission

138. Which is the first process performed in analog-to-digital conversion?

A. Sampling process

B. Pulse Code Modulation

C. Frequency-Division Multiplexing

D. Time-Division Multiplexing

139. Sampling is accomplished by _____.

A. Pulse Amplitude Modulation (PAM)

B. Pulse Code Modulation

C. Frequency-Division Multiplexing

D. Time-Division Multiplexing

140. What moves at a constant frequency, known as the sampling frequency?

A. Analog signal

B. Digital signal

C. Pulse train

D. None of the above

141. The analog voice signal can be sampled at a _____.

A. Million times per second

B. Two to three times per second

C. Both (a) and (b)

D. Four to five times per minute

142. Who discovered that the original analog signal can be reconstructed if enough number of samples are taken?

A. Harry Nyquist

B. Harry Yquist

C. Harris Nyquist

D. None of the above

143. After filtering and sampling (through PAM) an input analog voice signal, the next step is to digitize these samples for transmission over which network?

A. Digital

B. Internet

C. Mobile

D. Telephone

144. The process of digitizing analog voice signals is called_____.

A. Frequency-Division Multiplexing

B. Time-Division Multiplexing

C. Pulse Code Modulation

D. None of the above

145. If an input analog signal is sampled 8000 times per second and each sample is given a code word that is eight bits long, then the maximum transmission bit rate for telephone systems using PCM is_____.

A. 64,000 bits per second

B. 60,000 bits per second

C. 54,000 bits per second

D. 44,000 bits per second

146. _____ is the process of converting each analog sample value into a discrete value that can be assigned a unique digital code word,

A. Digitizing the signal

B. Sampling

C. Quantization

D. None of the above

147. Therefore, an increase in quantization noise degrades the quality of a_____.

A. Video signal

B. Computer

C. Voice signal

D. Sample

148. What is the single most important factor that affectsvoice quality in uniform quantization?

A. PCM

B. SNR (including quantization noise)

C. PAM

D. None of the above

149. Which law are audio compression schemes (codecs) defined by Consultative Committee for International Telephony and Telegraphy (CCITT)?

A. A-law

B. U-law

C. Digitization law

D. Both (a) and (b)

150. Limiting the linear sample values to _____ magnitude bits, the A-law compression is defined by this equation, where A is the compression parameter ($A = 87.7$ in Europe), and x is the normalized integer to be compressed.

A. 8

B. 12

C. 10

D. 6

151. u-law is used by _____

A. North America

B. Japan

C. Europe

D. Both (a) and (b)

152. A-law standard is primarily used by _____.

A. Europe and rest of the world

B. USA

C. India

D. Australia

153. A-law and u-law both break a dynamic range into a total of _____ elements.

A. 10

B. 16

C. 15

D. 12

154. Both A-law and U-law use a similar approach to coding the _____ word.

A. 8-bit

B. 4-bit

C. 6-bit

D. 10-bit

155. A-law requires _____ for a uniform PCM equivalent.

A. 4-bits

B. 12-bits

C. 13-bits

D. 10-bits

156. ASCII character would actually be transmitted using _____.

- A. 7-bits
- B. 18-bits
- C. 12-bits
- D. 10-bits**

157. Which theorem allows quantify the complexity of a given message source, and allows us to exploit that complexity by source coding (compression).

- A. Source Coding Theorem**
- B. Noisy Channel Coding Theorem
- C. Both (a) and (b)
- D. None of the above

158. _____ is a waveform coding technique that attempts to code signals without any knowledge about how the signal was created?

- A. Pulse Code Modulation
- B. Differential Pulse Code Modulation (DPCM)
- C. Adaptive Differential Pulse Code Modulation (ADPCM)**
- D. None of the above

159. Which modification of DM in which the step size is not fixed. Rather, when slope overload occurs, the step-size becomes progressively larger?

- A. Adaptive Delta Modulation (ADM)**
- B. Bit-rate
- C. Output signal power
- D. Pulse Code Modulation

160. Even though analog communications are cheaper, digital communications offer better_____.

- A. Efficiency
- B. Higher performance
- C. Greater flexibility
- D. All of the above**

UNIT 5

161. The techniques used to modulate digital information to make it transmissible via _____ are different to that of analog transmission.

A. Microwave

B. Satellite

C. Cable

D. All of the above

162. The same techniques used to transmit analog signals are used to transmit _____.

A. Microwave signals

B. Digital signals

C. Satellite signals

D. None of the above

163. The equipment used to convert digital signals into analogue format is called _____.

A. Transmitter

B. Coordinator

C. Modulator

D. Modem

164. Communication channels like telephone lines are usually _____.

A. Social media

B. Digital media

C. Analog media

D. None of the above

165. In the case of telephone lines the usable bandwidth for analog media falls in the range of _____.

A. 300 Hz to 3300 Hz

B. 200 Hz to 1300 Hz

C. 3000 Hz to 3300 Hz

D. 500 Hz to 3300 Hz

166. Digital information signals have the shape of _____ and represented by 0 and .1

A. Pulse

B. Telephone

C. Tree

D. None of the above

167. The technique that enables digital signals to be converted into analog signals is called _____.

A. Shift keying

B. Modulation

C. Both (a) and (b)

D. Space keying

168. Modems with data rate up to what Kbps are available?

A. 66

B. 50

C. 56

D. 46

169. What describes the technique the carrier wave is multiplied by the digital signal $f(t)$?

A. Quadrature Amplitude Modulation

B. Differential Phase Shift Keying

C. Amplitude Shift Keying (ASK)

D. None of the above

170. The main advantage of the ASK technique is _____.

A. Easy to produce signals

B. Easy to detect signals

C. Both (a) and (b)

D. Easy to see the signals

171. Telephone lines limit amplitude changes to some _____ changes per second.

A. 3000

B. 2000

C. 1000

D. 4000

172. In which technique the frequency of the carrier signal is changed according to the data?

A. Frequency Shift Keying (FSK)

B. Amplitude Shift Keying (ASK)

C. Phase Shift Keying (PSK)

D. None of the above

173. FSK describes the modulation of a carrier (or two carriers) by using a different frequency for a _____.

A. 1

B. 0 or 1

C. 1 or 0

D. None of the above

174. Mathematically, the modulated wave $y(t)$ can be shown as $y(t) = f_1(t) \sin(2\pi f_{c1}t + j) f_2(t) \sin(2\pi f_{c2}t + j)$ where f_{c1} and f_{c2} are different carrier frequencies of _____ different signals.

A. Four

B. Three

C. Two

D. One

175. What is the term used to describe an FSK signal whose carrier frequencies are separated by less than the width of the spectrum than ASK for the same modulation.

A. Narrow-band keying

B. Narrow-band PSK

C. Narrow-band ASK

D. Narrow-band FSK

176. Today the FSK technique is used in low rate asynchronous modems up to _____ only.

A. 3200 baud

B. 2200 baud

C. 1200 baud

D. 1000 baud

177. Which of the following statements is correct?

(i) Analog media is a bandwidth-limited channel.

(ii) FSK is a technique, which shifts the period of a wave.

A. (ii) only

B. (i) only

C. Both are correct

D. None is correct

178. In PSK, For a 0, a 0 degrees phase sine wave is transmitted. For a 1, a _____ degrees sine wave is transmitted.

A. 90

B. 180

C. 45

D. 270

179. In the case of two possible phases shift the modulation will be called _____.

A. Binary PSK

B. Binary ASK

C. Binary FSK

D. None of the above

180. For a given bit-rate, what requires half the bandwidth of PSK and is widely used for this reason?

- A. Quadrature Amplitude Modulation
- B. Quadrature frequency-shift-keying (QFSK)
- C. Quadrature amplitude-shift-keying (QASK)
- D. Quadrature phase-shift-keying (QPSK)**

181. Transitions in the data cause the carrier to shift by either_____.

- A. 90 or 180 degrees**
- B. 90 or 270 degrees
- C. 180 or 45 degrees
- D. 180 degrees only

182. In QPSK, the four angles are usually out of phase by_____.

- A. 90 degrees**
- B. 180 degrees
- C. 270 degrees
- D. 45 degrees

183. The efficient design of an RF amplifier with a sufficient linear range has always been_____.

- A. Easy
- B. Problematic**
- C. Complex
- D. None of the above

184. M-PSK modulation schemes do possess_____ power efficiency than M-QAM.

- A. Smaller**
- B. Larger
- C. Problematic
- D. None of the above

185. The M-PSK Modulator Baseband block modulates using the _____phase shift keying method.

- A. P-ary
- B. N-ary
- C. M-ary**
- D. All of the above

186. In QASK, how many identical carriers, shifted 90° with respect to each other, are modulated by two independent data streams, usually at the same transmission rate?

- A. Two**

- B. Three
- C. Four
- D. One

187. The QASK modulator consists of two identical binary ASK modulators, driven by the same oscillator, but with signals shifted _____ in phase.

- A. 90 degrees**
- B. 100 degrees
- C. 75 degrees
- D. 80 degrees

188. The signal space of QASK consists of how many orthogonal ASK spaces?

- A. Three
- B. Two**
- C. Four
- D. One

189. What causes interference between channels, because of which orthogonality is lost and part of the energy of one channel is demodulated by the detector of the other channel?

- A. Slight misalignment
- B. Jitter
- C. Both (a) and (b)**
- D. Incoherent detection

190. _____ represents a method of reducing the bandwidth required for the transmission of digital data.

- A. ASK
- B. QASK**
- C. M-PSK
- D. M-QAM

191. In _____, the frequency of a constant amplitude carrier signal is switched between two values according to the two possible message states (called high and low tones) corresponding to a binary 1 or 0.

- A. QASK
- B. BFSK**
- C. MPSK
- D. None of the above

192. The way of representing a bit stream—changing the bit changes the sign of the transmitted signal ---is known as _____.

- A. QASK

B. MFSK

C. Datarate R

D. BPSK

193. Nowadays, Multiple Frequency Shift Keying is mainly used by amateur_____.

A. TV experimenters

B. Radio experimenters

C. Media experimenters

D. None of the above

194. MFSK (multiple frequency shift keying) is a signal modulation method in which discrete _____ bursts of various frequencies transmit digital data.

A. Video tone

B. Audio noise

C. Audio tone

D. None of the above

195. MFSK (multiple frequency shift keying) was originally used by_____.

A. European government

B. British government

C. Both (a) and (b)

D. Indian government

196. The most common form of MFSK uses tones of 16 frequencies and is called_____.

A. MFSK10

B. MFSK15

C. MFSK16

D. MASK16

197. In Binary Phase Shift Keying (BPSK) modulation is carried out in how many possible phases? shift

A. More than two

B. Four

C. Three

D. Two

198. Quadrature amplitude modulation (QAM) is a form of digital modulation where the digital information is contained in the_____.

A. Amplitude

B. Phase of the carrier wave

C. Both (a) and (b)

D. Magnitude

199. Which of the statement is correct?

- (i) M-ary signaling schemes transmit bits at a time
- (ii) M-ary signaling schemes work on increased bandwidths

A. Both (i) and (ii) are correct

B. Only ii is correct

C. Only i is correct

D. None of them are correct

200. The **datarate R** of a digital communication system is about how frequently _____ is transmitted.

A. Data

B. Information bit

C. Digital analog

D. Audio wave