076/2024

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Source A emits sound of frequency 510 Hz. It is heard by B, who is a distance of 200 m. Take the speed of sound to be 340 ms^{-1}. How many wavelengths fit in this distance? What is the wavelength?

(A) 340 ; 0.667 m
(B) 510 ; 1.5 m
(C) 200 ; 3/2 m
(D) 300 ; 2/3 m

2. The Victoria memorial at Kolkatta is famous for the whispering gallery effect. This phenomenon occurs due to :

(A) Reflection
(B) Refraction
(C) Polarisation
(D) Diffraction

3. In tuning a keyboard instrument we must decide :

(i) The pitch level to be set
(ii) Temperament

(A) Either (i) or (ii)
(B) Both (i) and (ii)
(C) Only (i)
(D) Only (ii)

4. The sound intensity level of threshold of pain at 1 kHz is 120 dB. What is its tone intensity?

(A) 10^{-12} Wm^{-2}
(B) 120 Wm^{-2}
(C) 1 Wm^{-2}
(D) 10 Wm^{-2}

5. Match the following :

(1)	Sound absorption	–	(i)	Mach
(2)	Loudness level	–	(ii)	Sone
(3)	Subjective loudness	–	(iii)	Sabin
(4)	Supersonic	–	(iv)	Phon

(A) (1)-(iv), (2)-(iii), (3)-(i), (4)-(ii)
(B) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)
(C) (1)-(iii), (2)-(ii), (3)-(iv), (4)-(i)
(D) (1)-(ii), (2)-(iii), (3)-(iv), (4)-(i)

6. A set of statements are given. Choose the best classification:

(i) Reverberation time is the time required for the intensity of a sound to drop to 1 part of 100000 of its original intensity

(ii) The size and shape of the room influence the sound in an auditorium

(iii) To achieve a good focus the reflector must have circular shape.

(iv) Clarity refers to the amount of reflected sound intensity relative to the intensity of the direct sound.

(v) To hear a distinct echo the time interval between the original sound and the reflected one must be at least 0.1s.

(A) (i)-True, (ii)- True, (iii)-True, (iv)- False, (v)-False

(B) (i)- True, (ii)- True, (iii)- False, (iv)- True, (v)-False

(C) (i)-True, (ii)- True, (iii)- False, (iv)- True, (v)-True

(D) (i)- False, (ii)- True, (iii)- False, (iv)- False, (v)-True

7. The maximum frequency of sound waves :

(A) 12.5 THz (B) 1.25 THz

(C) Infinity (D) 20 kHz

8. Choose the best option for the sound wave in a stretched wire :

(i) The period is proportional to the square of the length of the wire

(ii) It requires 4 times as much tension to raise the frequency to twice its original value.

(iii) The frequency will double if the linear density becomes 2 times greater.

(iv) The period is proportional to the diameter of the wire

(A) All statements are correct

(B) Both (ii) and (iv) are correct

(C) Both (i) and (ii) are correct

(D) The statement (iv) is incorrect

9. Which among the following is not associated with the acoustic suspension speaker?

(i) Relatively inefficient to convert electrical energy to sound energy

(ii) Relatively rapid falloff in output level at frequencies below about 60 to 100 Hz

(iii) Simple and smaller enclosure

(iv) Interference of the waves from the front and rear of the speaker occurs.

(A) (ii) (B) (i) and (iv)

(C) (iv) (D) (i)

10. Which among the following is the frequency domain representation of triangle wave?

(A) $a_n = \frac{2A}{n\pi}\sin(n\pi d)$ (B) $a_n = \frac{4A}{(n\pi)^2}(C)$

(C) $a_n = \frac{2A}{n\pi}\sin\left(\frac{n\pi}{2}\right)$ (D) $a_n = \frac{-4A}{\pi(4n^2-1)}$

11. Which of the statements regarding Pressure Gradient microphone are correct?

Statement 1 : This type of microphones are omni directional

Statement 2 : Only one side of microphone is exposed to Sound

(A) (1) and (2) (B) (1) only

(C) (2) only (D) Neither (1) nor (2)

12. Ribbon microphones are :

(A) Bi-directional (B) Omni-directional

(C) Highly directive in one direction (D) None of the above

13. Among the following microphones the one which is least common is :

(A) Moving coil microphone (B) Ribbon Microphone

(C) Ceramic Microphone (D) Condensor Microphone

14. Two primary types of dynamic transducers used in microphones are :

(A) Moving Coil and Moving Conductor

(B) Moving Coil and Static Conductor

(C) Moving Coil and Moving Capacitor

(D) Moving Coil and Moving Capacitor

15. Which of the given statements are most correct with respect to Pressure Gradient Microphone converts?

(A) Air pressure variations near the diaphragm is converted to electrical signals

(B) Air pressure difference on one side of diaphragm is converted to electrical signals

(C) Air pressure difference of two sides of diaphragm is converted to electrical signals

(D) Summation of air pressure of both sides of diaphragm are converted to electrical signals

16. Microphone converts :

(A) Electrical signal to sound pressure variation

(B) Sound pressure variation to electrical signals

(C) Sound signals to air pressure variation

(D) Sound pressure variation to air pressure variation

17. Binaural microphones make use of :

(A) Two microphones for recording

(B) Single microphone with stereo capacity for recording

(C) Multiple (more than two) microphones for recording

(D) None of the above

18. Condenser microphones :

(A) Require external power sources

(B) Does not require external power source

(C) Use self produced electric signals for operation

(D) None of the above

19. Condenser microphones are also called :

(1) Capacitor microphone

(2) Dynamic microphone

(3) Static microphone

(4) Dual microphone

(A) Both (1) and (2)

(B) Both (1) and (3)

(C) (1), (2) and (4)

(D) All of the above

20. Which among the following are type of electret microphone?

(1) Dc-biased microphone

(2) RF Microphone

(3) HF Microphone

(4) LF Microphone

(A) Only (1)

(B) Both (1) and (2)

(C) (1), (2) and (3)

(D) (1), (2), (3) and (4)

21. Wired Lavaliere Microphones are called :

(A) Lapel Microphone
(B) Laptop microphone
(C) Dynamic microphone
(D) None of the above

22. The classed of Power amplifiers :

(1) Class A
(2) Class B
(3) Class C
(4) Class AB

(A) All the above
(B) (1), (2) and (3)
(C) (1) and (2)
(D) None of the above

23. What is the ideal response of headphone?

(A) 10 Hz to 10 kHz
(B) 20 Hz to 20 kHz
(C) 30 Hz to 30 kHz
(D) 50 Hz to 50 kHz

24. Signal to Noise ratio of amplifier is supposed to be :

(A) Medium
(B) High
(C) Low
(D) None of the above

25. Which of the following with respect to loudspeakers are correct?

(A) Bass corresponds to high-frequency and treble corresponds to low-frequency
(B) Bass corresponds to low-frequency and treble corresponds to mid-frequency
(C) Bass corresponds to mid-frequency and treble corresponds to high-frequency
(D) Bass corresponds to low-frequency and treble corresponds to high-frequency

26. Headphone converts :

(A) Electrical signal to sound pressure variation
(B) Sound pressure variation to electrical signals
(C) Sound signals to air pressure variation
(D) Sound pressure variation to air pressure variation

27. The type of microphone used for Lecture delivery is :

(A) Dynamic microphone
(B) Lapel Microphone
(C) Ribbon Microphone
(D) None of the above

28. Which of the microphones are usually used in television interviews and operated by crew?

(A) Shotgun
(B) Condensor
(C) Electret
(D) None of the above

29. Howling is produced in Speakers due to :

(1) Audio feedback from Speakers to microphone
(2) Peaking of audio signals at certain frequencies
(3) Sinusoidal signals present at input
(4) Unwanted input noise

(A) (1) and (4)
(B) (2) and (4)
(C) (1), (2), (3) and (4)
(D) (1) and (2)

30. Loudspeakers are positioned ideally at :

(A) Middle of the hall
(B) Corners of halt
(C) Positions depending on the possible echos
(D) None of the above

31. Preamplifiers are :

(A) Used before power amplifier stage
(B) Used prior to audio reception by microphone
(C) Used for Increasing SNR
(D) None of the above

32. Ohms law states that :

(A) $V = Ldi/dt$
(B) $P = VI$
(C) $V = IR$
(D) None of the above

33. The theorem that is used for impedance matching is :

(A) Pascal's Theorem

(B) Maximum power transfer theorem

(C) Minimum error prorogation theorem

(D) Nyquist criterion

34. As the noise increase the Signal to Noise Ratio (SNR) :

(A) Increases

(B) First increases reaches maximum and then decreases

(C) Decreases

(D) First decreases reaches minimum and then increases

35. Microphones are usually kept away from speakers while operating :

(A) To reduce noise

(B) To reduce magnetic induction

(C) To reduce Feedforward

(D) To reduce signal from Speaker enter the microphone

36. To generate video game footage the optimum frame rate could be :

(A) 24 fps (B) 12 fps

(C) 30 fps (D) 60 fps

37. Slow motion videos require a frame rate of :

(A) 24 fps (B) 12 fps

(C) 30 fps (D) 60 fps

38. Digital tools that are not used for audio post-production are :

(A) Audible (B) Adobe Audition

(C) Logic Pro (D) Audacity

39. In DCP (Digital Cinema Package) Video is encrypted in the format :

(A) JPEG (B) JPEG 2000

(C) JPEG 2020 (D) MPEG

40. In DCP, compression is accomplish using the technology :

(A) Wavelet (B) STFT

(C) Fourier transform (D) None of the above

41. In stereoscopic (3D films) the frame size used is :

(A) 12 fps (B) 24 fps

(C) 48 fps (D) None of the above

42. In DCP, audio and video are encrypted using :

(A) AES (B) DES

(C) RSA (D) None of these

43. A Nagra Analogue sound recorder uses 24 bit PCM with 96 KHz sampling rate. The bit rate of the system is :

(A) 64 Kbps (B) 1.2 Mbps

(C) 2.3 Mbps (D) None of the above

44. The audio encryption standard used in classical films is :

(A) PSK (B) DM

(C) ADM (D) PCM

45. The digital interface used in classical audio workflow is :

(A) DES (B) AES

(C) YIF (D) SPDIF

46. Example of flatbed editor is :

(A) Steenbeck (B) Dolby

(C) Atmos (D) None of these

47. Steenbeck uses AI powered analysis systems for :

(A) Generating low resolution video

(B) Generating high resolution video

(C) Generating digital audio

(D) Generating full length video

48. PAL stands for :

(A) Phase And Line
(B) Phase Alteration Line
(C) Phase Alternating Line
(D) None of these

49. SECAM uses :

(A) 24 fps
(B) 30 fps
(C) 25 fps
(D) 60 fps

50. NTSC uses :

(A) 24 fps
(B) 30 fps
(C) 25 fps
(D) 60 fps

51. In Telecine, 2:3 pull down is used :

(A) Make the aspect ratio 2:3
(B) Increase the frame rate from 25 fps to 30 fps
(C) Change the frame rate from 25 fps to 60 fps
(D) None of these

52. In the following the television broadcasting system is :

(A) PAL
(B) PAL-C
(C) NTSC-M
(D) NTSC

53. PAL plus incorporates :

(A) Encryption
(B) Hidden signalling
(C) Augmented signals
(D) None of these

54. ATSC standards are standards for :

(A) Multimedia recording
(B) Audio recording
(C) Broadcasting
(D) None of the above

55. The symbols used for broadcasting are :

(A) From A-N
(B) From A-K
(C) A, N and M
(D) A-Z

56. Which of the following functions does the PAD switch perform on a typical audio mixer?

(A) Boost the audio signal level by 30 dB

(B) Attenuate the audio signal level by 20 dB

(C) Boost the audio signal level by 10 dB

(D) Attenuate the audio signal level by 5 dB

57. Which of the following connectors on an audio mixer has to be *necessarily balanced*?

(A) Mic input

(B) Line input

(C) Aux output

(D) Direct output

58. The electrical parameter that corresponds to the audio signal level displayed in the meter of an audio mixer or recorder is :

(A) Current

(B) Power

(C) Resistance

(D) Voltage

59. If the manual of an audio mixer specifies it as a *powered mixer*, what does it imply?

(A) The mixer does not require any external power to function

(B) The mixer has a built-in audio amplifier

(C) The mixer provides an enhanced audio output

(D) All the input channels provide phantom power

60. With what aspect of an audio mixer is the term VCA associated :

(A) Aux output level

(B) Equalization

(C) Pan control

(D) Fader automation

61. If the audio level meter of a mixer is calibrated in dBu, what is the implied *standard reference level*?

(A) 0.775 Volts

(B) .0775 Volts

(C) 1.775 Volts

(D) 1 Volt

62. Which of the following statements is *not true* with respect to a VU meter?

(A) VU meters have a slow rise time and a slow fall time

(B) VU meters denote the average values of an audio signal

(C) VU meters have a fast rise time and a slow fall time

(D) VU meters do not respond to peak signal levels

63. Pick the odd one out from among the following :

(A) Compressors
(B) Limiters
(C) Expanders
(D) Equalizers

64. Which of the following parameters of an audio signal is *not* affected when it passes through an equalizer?

(A) Phase
(B) Frequency response
(C) Dynamic range
(D) Wave shape

65. The audio level meter on a digital audio mixer is calibrated in :

(A) dBV
(B) dBFS
(C) dBm
(D) dBu

66. The *digital audio interface* that is commonly seen on a digital audio mixer and used for transferring digital audio signals to and from *consumer systems* is :

(A) AES
(B) SDI
(C) S/PDIF
(D) ADAT

67. The standard impedance of the mic input of an audio console is :

(A) 600 ohms
(B) 500 ohms
(C) 400 ohms
(D) None of the above

68. If the compression ratio of a compressor is set at 5 : 1 and the threshold is set at 50 dB. What does it imply?

(A) The compressor will increase the overall signal level by 5 times beyond 50 dB
(B) The compressor will reduce the signal level by 1/5 for every 5 dB increase beyond 50 dB
(C) For every 5 dB increase in signal level beyond 50 dB, there will be an increase of only 1 dB
(D) For every 1 dB increase in signal level beyond 50 dB, there will be an increase of 5 dB

69. The reference clock signal that is used for ensuring synchronization between the electronic components of interconnected *digital audio devices* is :

(A) SMPTE timecode
(B) Word clock
(C) Black burst
(D) Dante

70. What is the main requirement for a digital audio mixer to function as a control surface of a DAW?

(A) It must have an AES output
(B) A communication protocol for communicating with the DAW
(C) The same timecode must be fed to both the devices
(D) All the above

71. The first medium on which an analogue recording was made is :

(A) Gramophone disk
(B) Cylindrical disk
(C) Magnetic tape
(D) Optical sound film

72. Which of the following is *not true* with regard to analogue recording?

(A) An analogue signal is discontinuous in time
(B) An analogue signal cannot be recorded randomly
(C) An analogue signal necessarily requires a bias signal to be recorded onto a magnetic tape
(D) The quality of an analogue signal is very much dependent on the nature of the medium

73. Pick out the *true statement* from among the following :

(A) A bias frequency is an integral part of digital audio recording
(B) A bias frequency is a necessity as far as analogue recording goes
(C) A bias frequency helps in increasing the signal level of an analogue recording
(D) The bias frequency lies within the audible range

74. The mathematical relationship between the RMS and peak values of a sine wave is :

(A) RMS = $0.707 \times$ Peak
(B) RMS = $2 \times$ Peak
(C) RMS = $1.414 \times$ Peak
(D) RMS = $1.7 \times$ Peak

75. Which of the following terms denotes the alignment of the magnetic head of an analogue tape recorder with the edge of the tape?

(A) Height
(B) Zenith
(C) Azimuth
(D) Wrap

76. Which of the following is *true* with regard to the magnetic head of an analogue tape recorder?

(A) The smaller the width of the head gap, the better will be the high frequency response
(B) The bigger the head gap, the better the high frequency response
(C) The recording quality will be better if the head gap is aligned parallel to the direction of motion of the magnetic tape
(D) The head gap has nothing to do with frequency response

77. The pre-amplifier in the mic input circuit of any audio recorder or mixer amplifies the weak mic signal to a level of :

(A) 0.3 volts
(B) 0.2 volts
(C) 1 volt
(D) 1 millivolt

78. Which of the following statements is /are TRUE?

(1) An optical sound track recorded on sound film is inferior in terms of frequency response, to a recording done on magnetic tape
(2) The high frequency response of an optical film recording is poor, compared to that of a magnetic tape recording
(3) A magnetic tape recording needs to be processed in a lab if it is to be played back

(A) (1) and (2) only
(B) (2) and (3) only
(C) (2) only
(D) All the above

79. If an analogue signal is sampled at 48000 Hz (48 KHz) and quantized to 16 bits per sample, the amount of storage space that is required for storing one second of a *stereo file* is :

(A) 48 KHz × 16 bits
(B) 2 × [48 KHz × 16 bits]
(C) 2 × [48 KHz/16 bits]
(D) 48 KHz/16 bits

80. Which of the following aspects of a digital recording has a bearing on its' *dynamic range*?

(A) Sampling Rate
(B) Oversampling rate
(C) Quantization size
(D) Storage space

81. Which of the following phenomenon makes it possible to listen to audio continuously from a hard disk based recording system?

(A) Sampling
(B) Buffering
(C) Dithering
(D) Quantization

82. Name the component that is at the heart of real time signal processing in a digital audio workstation (DAW) :

(A) CPU
(B) RAM
(C) DSP
(D) ROM

83. As per the Nyquist theorem, what should be the *minimum* sampling frequency when an analogue signal that is subjected to sampling as part of the analogue to digital conversion?

(A) $1.8 \times$ the highest audio frequency to be sampled
(B) $2 \times$ the highest audio frequency to be sampled
(C) $1.5 \times$ the highest audio frequency to be sampled
(D) $2.2 \times$ the highest audio frequency to be sampled

84. How many bits are there in one frame of SMPTE timecode?

(A) 45
(B) 80
(C) 75
(D) 7

85. What is the *first* process that takes place when an analogue audio signal is sampled?

(A) Pulse Amplitude Modulation
(B) Pulse Code Modulation
(C) Dithering
(D) Oversampling

86. What is the level at which the surround sound loudspeakers in a theatre are calibrated?

(A) 85 dB SPL
(B) 82 dB SPL
(C) 90 dB SPL
(D) 95 dB SPL

87. Of the following surround sound formats, pick out the one that has all the channels matrix encoded onto *two optical* tracks on 35 mm film :

(A) Dolby Stereo
(B) Dolby SR
(C) Dolby Atmos
(D) Dolby Digital

88. If a viewer is seated at the sweet spot of a 5.1 surround sound theatre, what is the approximate angle subtended at the left ear of the viewer by the left surround speaker?

(A) 180 to 185 degrees
(B) 60 to 80 degrees
(C) 270 to 290 degrees
(D) 110 to 120 degrees

89. In which of the following are the 5.1 surround sound tracks stored on a CD?

(A) DTS
(B) Dolby Stereo
(C) Dolby Digital
(D) SDDS

90. Why is the LFE channel of a 5.1 surround system denoted as a 0.1 channel?

(A) Because its output level is the highest of all the five channels
(B) Because it is insignificant compared with the other channels
(C) Because it is designed only to handle one octave in the audible range
(D) Because it requires additional processing

91. What is the frequency at which the X curve starts deviating from a flat characteristic?

(A) 1 KHz
(B) 3 KHz
(C) 5 KHz
(D) 2 KHz

92. Which of the following is *not true* with regard to the loudspeakers in a 5.1 surround sound theatre?

(A) All the loudspeakers are full range speakers
(B) The surround sound speakers are not full range speakers
(C) The front speakers are full range speakers
(D) The subwoofer handles only the extreme low frequencies

93. The format which has a 7.1 surround track encoded digitally on both sides of a 35 mm film is :

(A) Dts
(B) Dolby Digital
(C) SDDS
(D) Dolby stereo

94. Why aren't all the loudspeakers in a 5.1 / 7.1 surround sound theatre calibrated at the same level?

(A) It would increase the overall level

(B) To prevent damage to the speakers

(C) To adhere to sound pollution norms

(D) To prevent the generation of room modes

95. Which of the following films has been released in the *surround sound format*?

(A) Oklahoma (B) The Sound of Music

(C) Pather Panchali (D) Citizen Kane

96. Name the acoustic phenomenon which has a bearing on the way the human ear perceives the direction of sound :

(A) The Haas Effect (B) Resonance

(C) The Principle of Superposition (D) Diffraction

97. The visible part of the human ear is called :

(A) Cochlea (B) Pinna

(C) Tympanic membrane (D) Stapes

98. Which part of the human hearing system works as an 'impedance matching' device?

(A) Outer ear (B) Auditory canal

(C) Basilar membrane (D) Middle ear

99. What is the name given to the set of equal loudness curves that denote the frequency response of the human ear?

(A) Fletcher-Munsor curves (B) HRTF curves

(C) NC curves (D) STC curves

100. Which part of the human ear converts the sound vibrations into nerve firings?

(A) Middle ear (B) Inner ear

(C) Malleus (D) Concha

SPACE FOR ROUGH WORK

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