Department of E&TC (Mock Paper for September 2020)

Principles of Communication Engineering

1) Calculate the minimum sampling rate to avoid aliasing when a continuous time signal is given by x(t) = 5 cos 250πt (2)

a. 100 Hz
b. 200 Hz
c. 400 Hz
d. 250 Hz

2) At a room temperature of 300K, calculate the thermal noise generated by resistor of 20 KΩ when the bandwidth is 10 KHz. (2)

a. 5.757 * 10^{-6} V
b. 5.77 * 10^{-6} V
c. 2.356 * 10^{-6} V
d. 1.66 * 10^{-6} V

3) The noise temperature at a resistor depends upon (1)

a. Resistance value
b. Noise power
c. Both a and b
d. None of the above

4)FM is disadvantageous over AM signal because (1)

a. much wider channel bandwidth is required

b. FM systems are more complex and costlier

c. Adjacent channel interference is more

d. Both a and b

5) A 100MHz carrier is frequency modulated by 1KHz wave. For a frequency deviation of 500 KHz, calculate the modulation index of the FM signal. (2)

a. 500

b. 50

c. 70

d. 90

6) For a FM signal v(t) = 20 cos (10 * 108t + 30 sin 3000t), calculate the power dissipated by the FM wave in a 20Ω resistor. (2)

a. 100 Watts

b. 10 Watts

c. 200 Watts

d. 20 Watts

7) For a FM signal v(t) = 25 cos (15 * 108t + 10 sin 1500t), calculate Modulation index & Maximum frequency deviation(2)

a. 10, 2388.5Hz

b. 20, 1550.9Hz

c. 10, 2465.9Hz

d. 10, 2000.0Hz

8) For a FM signal v(t) = 15 cos (10 * 10^5t + 10 sin 1220t), calculate (2)

1. Carrier frequency
2. Modulating frequency

a. 159.1MHz, 194.1Hz

b. 185.5MHz, 200.15Hz

c. 350.1MHz, 200.1Hz

d. 159.2KHz, 194.1Hz

9) The ratio of maximum peak frequency deviation and the maximum modulating signal frequency is termed as (2)

a. Frequency deviation

b. Deviation ratio

c. Signal to noise ratio

d. Frequency spectrum

10) Change in instantaneous phase of the carrier with change in amplitude of the modulating signal generates (1)

a. Direct FM

b. Indirect FM

c. SSB-SC

d. DSB-SC

11) In Pulse Position Modulation, the drawbacks are (1)

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

12) In PWM signal reception, the Schmitt trigger circuit is used (1)

a. To remove noise

b. To produce ramp signal

c. For synchronization

d. To reduce the amplitude

13) The sampling technique having the minimum noise interference is (1)

a. Instantaneous sampling

b. Natural sampling

c. Flat top sampling

d. Ideal sampling

14) VCO is used to generate (2)

a. Direct FM

b. Indirect FM

c. SSB-SC

d. DSB-SC

15)Armstrong method is used for the generation of (1)

a. Direct FM

b. Indirect FM

c. SSB-SC

d. DSB-SC

16)Pre emphasis is done before (1)

a. Before modulation

b. Before transmission

c. Before detection at receiver

d. After detection at receiver

17) Amplitude limiter in FM receivers are used to (1)

a. Remove amplitude variations due to noise

b. Filtration

c. Demodulation

d. Amplification

18)Modulation is the process of (1)

A. generating constant-frequency radio waves

B. combining audio and radio-frequency waves at the transmitting end of a communication system

C.reducing distortion in RF amplifiers

D.improving thermal stability of a transistor

19)The difference between phase and frequency modulation(1)

A. is purely theoretical because they are the same in practice

B. is too great to make the two systems compatible

C. lies in the poorer audio responses of phase modulation index

D. lies in the different definition of the modulation index

20)Advantage of using direct method for generation of FM signal is(1)

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

21) Vestigial side band signals are detected by(1)

a. Filters

b. Synchronous detection

c. Balanced modulator

d. None of the above

22)The process of recovering information signal from received carrier is known as(1)

a. Detection

b. Modulation

c. Demultiplexing

d. Sampling

23) AM demodulation techniques are(1)

a. Square law demodulator

b. Envelope detector

c. PLL detector

d. Both a and b are correct

24) An oscillator for an AM transmitter has a 100μH coil and a 10nF capacitor. If a modulating frequency of 30 KHz modulates the oscillator, find the

frequency range of the side bands. (2)

a. 149 KHz to 169 KHz
b. 184 KHz to 296 KHz
c. 238 KHz to 296 KHz
d. 129 KHz to 189 KHz

25) USB (Upper Side Band) is the band of frequency(1)

a. Above the carrier frequency
b. Includes the carrier frequency
c. That lies in AM spectrum
d. Both a and c are correct

26) The minimum antenna height required for transmission in reference to wavelength λ is (1)

a. λ
b. λ/4
c. λ/2
d. 4 λ

27) Analog signal may be converted into digital signal by (1)

a. Sampling
b. Amplitude modulation
c. Filtering
d. Mixing

28) What is the effect on the transmitted power of AM signal when the modulation index changes from 0.5 to 1? (2)

a. 0.1364
b. 0.3856
c. 0.3333
d. 0.5

29) Calculate the power in a DSB SC signal when the modulation is 60% with a carrier power of 800W. (2)

a. 600 W

b. 540 W

c. 108 W

d. 144 W

30) An AM transmitter has an antenna current changing from 5 A unmodulated to 5.8 A. What is the percentage of modulation? (2)

a. 38.8%

b. 83.14%

c. 46.8%

d. 25.2%

31) Calculate the modulation index when the unmodulated carrier power is 15KW, and after modulation, carrier power is 17KW. (2)

a. 68%

b. 51.63%

c. 82.58%

d. 34.66%

32) Calculate the side band power in an SSBSC signal when there is 50% modulation and the carrier power is 100W. (2)

a. 50 W

b. 25 W

c. 6.25 W

d. 12.5 W

33) The antenna current of the transmitter is 10A. Find the percentage of modulation when the antenna current increases to 10.4A. (2)

a. 32%

b. 28.5%

c. 64%

d. 40%

34) Calculate the power saved in an Amplitude Modulated wave when it is transmitted with 45% modulation

- Without carrier

- Without carrier and a sideband (2)

a. 90%, 95%

b. 82%, 91%

c. 82%, 18%

d. 68%, 16%