

BITT POLYTECHNIC, RANCHI
DEPARTMENT OF ELECTRONICS & COMMUNICATION
ENGINEERING

Communication Systems

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Faculty- Anant Kumar

NOISE IN COMMUNICATION
SYSTEM

2Marks Questions and Answers

1. Define noise.

Noise is defined as any unwanted form of energy, which tends to interfere with proper reception and reproduction of wanted signal.

2. Give the classification of noise.

Noise is broadly classified into two types.

They are (i) External noise
(ii) Internal noise.

3. What are the types of External noise?

External noise can be classified into

1. Atmospheric noise
2. Extraterrestrial noises
3. Man –made noises or industrial noises

4. What are types of internal noise?

Internal noise can be classified into

1. Thermal noise
2. Shot noise
3. Transit time noise
4. Miscellaneous internal noise

5. What are the types of extraterrestrial noise and write their origin?

The two type of extraterrestrial noise are solar noise and cosmic noise Solar noise is the electrical noise emanating from the sun. Cosmic noise is the noise received from the center part of our galaxy, other distant galaxies and other virtual point sources.

6. Define transit time of a transistor.

Transit time is defined as the time taken by the electron to travel from emitter to the collector.

7. Define flicker noise.

Flicker noise is the one appearing in transistors operating at low audio frequencies. Flicker noise is proportional to the emitter current and junction temperature and inversely proportional to the frequency.

8. State the reasons for higher noise in mixers.

1. Conversion transconductance of mixers is much lower than the transconductance of amplifiers.
2. If image frequency rejection is inadequate, the noise associated with the image frequency also gets accepted.

9. Define signal to noise ratio.

Signal to noise ratio is the ratio of signal power to the noise power at the same point in a system.

10. Define thermal noise. Give the expression for the thermal noise voltage across a resistor.

The electrons in a conductor possess varying amounts of energy. A small fluctuation in this energy produces small noise voltages in the conductor. These random fluctuations produced by thermal agitation of the electrons are called thermal noise.

11. What is narrowband noise?

The receiver of a communication system usually includes some provision for preprocessing the received signal. The preprocessing may take the form of a narrowband filter whose bandwidth is large enough to pass modulated component of the received signal essentially undistorted but not so large as to admit excessive noise through the receiver. The noise process appearing at the output of such filter is called narrow band noise.

12. Define noise temperature. (In terms of hypothetical temperature)

The available noise power is directly proportional to temperature and it is independent of value of resistance. This power specified in terms of temperature is called as noise temperature. It is denoted by T_e .

13. What is shot noise?

When current flows in electronic device, the fluctuations number of electrons or holes generates the noise. It is called shot noise. Shot noise also depends upon operating conditions of the device.

14. What is White Noise?

Many types of noise sources are Gaussian and have flat spectral density over a wide

frequency range. Such spectrum has all frequency components in equal portion, and is therefore called white noise. The power spectral density of white noise is independent of the operating frequency.

15. Define noise factor.

Noise factor (F) is defined as the ratio of signal to noise power ratio at the input to signal to noise power ratio at the output

16. Give the characteristics of shot noise.

(i) Shot noise is generated due to fluctuations in the number of electrons or holes. (ii) Shot noise has uniform spectral density. (iii) Mean square noise current depends upon direct component of current. (iv) Shot noise depends upon operating conditions of the device.

17. Define noise equivalent bandwidth.

The noise equivalent bandwidth of the filter is defined as the bandwidth of an ideal filter at which the noise power passed by real filter and ideal filter is same.

18. Define threshold effect?

The formula defining the output signal-to-noise ratio of an FM receiver is valid only if carrier-to-noise ratio measured at the discriminator input is large as compared to unity. Experimentally it has been found that as the input noise power is increased the carrier-to-noise power is decreased and the FM receiver breaks. Near the breaking point (SNR)_o, FM fails by predicting the values of output signal-to-noise ratio larger than the actual ones. This phenomenon is called threshold effect.

19. Define Pre-Emphasis?

Pre-Emphasis is the process of boosting the information signal in order to reduce the noise occurrence.

20. Define De-Emphasis?

De-Emphasis is the process in which the boosted signal is brought down to normal information signal present at initial.

10 MARK QUESTIONS

1. Discuss the noise performance of different types of AM receivers in detail.
2. What is noise temperature? Deduce the expression for effective noise temperature for a cascaded system.
3. What is narrowband noise? Discuss the properties of the Quadrature components of a narrowband noise.

4. Derive the noise figure for cascade stages.
5. Explain about thermal noise and Shot noise.
6. Derive the Friis formula.
7. Derive an expression for SNR at input (SNR_c) and output of (SNR_o) of a coherent detector.
8. i) Derive the output SNR for FM reception.
 - ii) Explain the significance of Pre-emphasis and De-emphasis in FM system.
 - iii) Derive the figure of merit of a FM system.
 - iv) Explain FM threshold effect.
9. Summarize the characteristics of various noise found in a communication channel.
10. i) Explain envelope detection with a suitable diagram.
Explain the method of coherent detection.