Two Marks

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 External noise and 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. 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.

9. Define noise figure.

Nose figure F $= S/Nat\ the\ input\ /\ S/Nat\ the\ output$

10. Explain thermal noise.

Thermal noise is the name given to the electrical noise arising from the random motion of electrons in a conductor.

11. Give the expression for noise voltage in a resistor.

The mean square value of thermal noise voltage is given by

V_n^2 = 4 K T B R

K – Boltz man constant

R – resistance

T – obsolute temperature

B – Bandwidth

12. Explain 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.

13. 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.

14. Give the expression for equivalent noise temperature in terms of hypothetical temperature.

The expression for equivalent noise temperature in terms of hypothetical

Temperature is Te = (F- 1) T0 .Where, F is the noise figure and T0 absolute temperature.

15. Give the Friss formula in terms of noise temperature.

The Friss formula in terms of noise temperature is

Te = T1 + T2 / G1 + T3 / G1 G2 + ……

G1 , G2 ,… Gain of amplifiers

16. Define Partition noise.

In an electron tube having one or more positive grids, this noise is caused by irratic partition of the cathode current among the positive electrodes.. In a transistor, the partition noise is created from the random fluctuation in the division of current between the collector and base.

17.What is the figure of merit of DSBSC system ?

The figure of merit of DSBSC signal is unity.

18.Compare the noise performance of an AM and FM system?

The figure of merit of AM system is 1/3 when the modulation is 100 percent and that of FM is(3/2)$mf2$ The use of FM offers improved noise performance over AM when (3/2) $mf2$> 1/3.mf –modulation index in FM.

19.What is Capture effect?

When the interference signal and FM input are of equal strength, the receiver fluctuates back and froth between them .This phenomenon is known as the capture effect.

20.What is threshold effect?

When a carrier to noise ratio becomes less than unity an impulse of noise is generated. This noise impulse appears at the output of the FM discriminator in the form of click sound. But when the carrier to noise ratio is further decreased the spikes are generated rapidly and the clicks merge into a sputtering sound. This phenomenon is known as threshold effect in FM.

21.How is threshold reduction achieved in FM system?

Threshold reduction is achieved in FM system by using an FM demodulator with negative feedback or by using a phase locked loop demodulator.

22. What is Pre-emphasis?

Pre emphasis is a circuit which boosts the signal amplitude of higher frequency component in the message band at the transmitter before modulation.

23. Define de-emphasis.

The artificial boosting given to the higher modulating frequencies in the process of Pre emphasis is nullified or compensated at the receiver by a process called De-Emphasis.De-Emphasis circuit is used to bring back the artificially boosted high frequency signal to their original amplitude.

24.Define Sampling theorem.

A band limited signal of finite energy, which has no frequency components higher than fm Hertz may be completely recovered from a knowledge of its samples taken at the rate of 2fm samples per second.

25.What do you infer from the receiver output of a coherent detector?

The output equation y(t)=1/2Cacm(t) +1/2nI(t) indicates that the message signal and in-phase noise component of the filtered noise appear additively at the receiver output. The quadrature component of the narrow band noise is completely rejected by the coherent detector.

26.When is the figure of merit of SSBSC system 1?

For the same average transmitted signal power and the same average noise power in the message bandwidth ,an SSB receiver will have exactly the same output signal to noise ratio as a DSB-SC receiver when both receivers use coherent detection for the recovery of the message signal.

27.Compare the noise performance of AM receiver with that of DSB-SC receiver.

The figure of merit of DSB-SC or SSB-SC receiver using coherent detection is always unity, the figure of merit of AM receiver using envelope detection is always less than unity. Therefore noise performance of AM receiver is always inferior to that of DSBSC due to the wastage of power for transmitting the carrier.

28.What is the figure of merit of a AM system with 100 percent modulation?
The figure of merit of a AM system with 100 percent modulation is 1/3.This means that other factors being equal an AM system must transmit three times as much average power as a suppressed system in order to achieve the same quality of noise performance.

29.Why is equivalent noise temperature used for noise measurement?
For low noise devices the noise figure is close to unity, which makes the comparison difficult and hence it is preferable to use equivalent noise temperature.

BIG QUESTIONS
1. Derive the effective noise temperature of a cascade amplifier and explain how various noises are generated in the method of representing them. (16)
2. Explain how various noises are generated and the method of representing them. (16)
3. Write notes on noise temperature and noise figure. (16)
4. Derive the noise figure for cascade stages. (16)
5. What is narrowband noise? Discuss the properties of the quadrature components of a narrowband noise? (16)
6. Write short notes on thermal noise and short noise. (16)
7. Discuss the noise performance of AM system using envelope detection. (16)
8. Explain the FM threshold effect and capture effect in FM. (8)
9. Compare the noise performance of AM and FM systems. (16)
10. Calculate the noise power of a DSB-SC system using coherent detection. (16)
11. Discuss in detail the noise performance in SSB-SC receiver. (16)
12. Explain the significance of pre-emphasis and de-emphasis in FM system. (16)
13. Derive the noise power spectral density of the FM demodulation and explain its performance with diagram. (16)