



Bode Plots – Question Bank

1. If the constant 'k' is positive, then what would be its contribution on the phase plot?
 - a. ☐ 0°
 - b. ☐ 45°
 - c. ☐ 90°
 - d. ☐ 180°
2. If the unity feedback system is given by the open loop transfer function $G(s) = ks^2 / [(1 + 0.3s)(1 + 0.05s)]$, what would be the initial slope of magnitude plot?
 - a. ☐ 20 dB/decade
 - b. ☒ 40 dB/decade
 - c. ☐ 60 dB/decade
 - d. ☐ Unpredictable
3. The system is said to be marginally stable, if gain margin is _____.
 - a. ☐ 0
 - b. ☒ 1
 - c. ☐ $+\infty$
 - d. ☐ None of the above
4. If the phase angle at gain crossover frequency is estimated to be -105° , what will be the value of phase margin of the system?
 - a. ☐ 23°
 - b. ☐ 45°
 - c. ☐ 60°
 - d. ☒ 75°
5. At which frequency does the magnitude of the system becomes zero dB?
 - a. ☐ Resonant frequency
 - b. ☐ Cut-off frequency
 - c. ☒ Gain crossover frequency
 - d. ☐ Phase crossover frequency
6. The frequency at which the phase of the system acquires _____ is known as 'Phase crossover frequency'.
 - a. ☐ 90°
 - b. ☐ -90°
 - c. ☐ 180°
 - d. ☒ -180°
7. If a pole is located at origin, how does it get represented on the magnitude plot?
 - a. ☐ $-10 \log(\omega)$ dB
 - b. ☒ $-20 \log(\omega)$ dB



- c. $-40 \log (\omega)$ dB
- d. $-60 \log (\omega)$ dB

8. According to the principle of log-scales, if the ratio between two points is same, then the two points get _____ equally.

- a. United
- ☒ b. Separated
- c. Multiplexed
- d. Mixed

9. In an octave frequency band, the ratio of f_2 / f_1 is equivalent to _____

- ☒ a. 2
- b. 4
- c. 8
- d. 10

10.) Which unit is adopted for magnitude measurement in Bode plots?

- a. Degree
- b. Decimal
- ☒ c. Decibel
- d. Deviation

11. A system has poles at 0.01 Hz, 1 Hz and 80 Hz, zeroes at 5 Hz, 100 Hz and 200 Hz. The approximate phase of the system response at 20 Hz is :

- ☒ a. -90°
- b. 0°
- c. 90°
- d. -180°

12. In a bode magnitude plot, which one of the following slopes would be exhibited at high frequencies by a 4th order all-pole system?

- ☒ a. -80 dB/decade
- b. -40 dB/decade
- c. 40 dB/decade
- d. 80 dB/decade

13. Frequency range of bode magnitude and phases are decided by :

- ☒ a. The lowest and higher important frequencies of dominant factors of the OLTF
- b. The lowest and highest important frequencies of all the factors of the open loop transfer function
- c. Resonant frequencies of the second factors
- None of the above



14.If a Zero is located at origin, how does it get represented on the Phase plot?

- a. -90°
- b. 0°
- ☒ c. 90°
- d. -180°

15.If a pole is located at origin, how does it get represented on the Phase plot?

- ☒ a. -90°
- b. 0°
- c. 90°
- d. -180°

16.If a Zero is S^2 , how does it get represented on the Phase plot?

- ☒ a. 180°
- b. 0°
- c. 90°
- d. -180°

17.If a pole is $1/S^2$, how does it get represented on the Phase plot?

- a. -90°
- b. 0°
- c. 90°
- ☒ d. -180°

18.OLTF contains one zero in right half of s-plane then

- a. Open loop system is unstable
- b. Close loop system is unstable
- ☒ c. Close loop system is unstable for higher gain
- d. Close loop system is stable

19.The critical value of gain for a system is 40 and gain margin is 6dB. The system is operating at a gain of:

- ☒ a. 20
- b. 40
- c. 80
- d. 120

20.The roots of the characteristic equation of the second order system in which real and imaginary part represents the :

- a. Damped frequency and damping
- ☒ b. Damping and damped frequency



- c. Natural frequency and damping ratio
- d. Damping ratio and natural frequency

Assertion (A): The natural frequency of a system reduces due to the presence of

Reason (R): The natural frequency of a system is independent of the damping ratio

- a. Both A and R are true and R is correct explanation of A
- b. Both A and R are true but R is not correct explanation of A
- c. A is true but R is false
- d. A is false but R is true

22. Assertion (A): The phase angle plot in Bode diagram is not affected by the variation in the gain of the system.

Reason(R): The variation in the gain of the system has no effect on the phase margin of the system.

- a. Both A and R are true but R is correct explanation of A
- b. Both A and R are true but R is correct explanation of A
- c. A is true but R is false

23. Frequency range of bode magnitude and phases are decided by :

- a. The lowest and higher important frequencies of dominant factors of the OLTF
- b. The lowest and highest important frequencies of all the factors of the open loop transfer function
- c. Resonant frequencies of the second factors
- d. None of the above

24. OLTF contains one zero in right half of s-plane then

- a. Open loop system is unstable
- b. Close loop system is unstable
- c. Close loop system is unstable for higher gain
- d. Close loop system is stable

25. The critical value of gain for a system is 40 and gain margin is 6dB. The system is operating at a gain of:

- a. 20
- b. 40



- c. 80
- d. 120

26. The roots of the characteristic equation of the second order system in which real and imaginary part represents the :

- a. Damped frequency and damping
- ☒ b. Damping and damped frequency
- c. Natural frequency and damping ratio

27. What does a Bode plot represent?

- a. Time-domain response of a system
- ☒ b. Frequency response of a system
- c. Stability of a system
- d. Root locus of a system

28. Which axes are used in a Bode plot?

- a. Linear scale for magnitude and phase, log scale for frequency
- ☒ b. Log scale for magnitude and frequency, linear scale for phase
- c. Log scale for both magnitude and frequency
- d. Linear scale for both magnitude and phase

29. What is the formula to convert gain G into decibels (dB)?

- a. $\text{dB} = 10 \log 10G$
- ☒ b. $\text{dB} = 20 \log 10G$
- c. $\text{dB} = 10G$
- d. $\text{dB} = 20G$

30. In a Bode plot, what does the slope of the magnitude plot indicate?

- a. The system's bandwidth
- b. The stability margins
- ☒ c. The order of the system
- d. The damping ratio of the system

31. What is the phase margin in a Bode plot?

- a. The distance from the 0 dB point to the gain crossover frequency
- ☒ b. The distance from -180 degrees to the phase at the gain crossover frequency
- c. The difference between gain margin and phase angle



- d. The maximum phase that can be achieved before instability
- 32.**How can high-order transfer functions be effectively plotted using Bode plots?
- ☒ a. By plotting each term separately and adding them graphically
 - b. By calculating numeric values at discrete points
 - c. By fitting a polynomial curve
 - d. By converting them to state-space form
- 33.**What type of response does a Bode plot specifically analyze?
- a. Step response
 - b. Transient response
 - c. Steady-state response
 - ☒ d. Frequency response
- 34.**Which of the following parameters does a Bode plot not directly provide information about?
- a. Gain crossover frequency
 - ☒ b. Time constant
 - c. Phase crossover frequency
 - d. Stability margins
- 35.**In Bode plots, how is a first-order system represented in terms of its slope on the magnitude plot?
- a. 10 dB/decade
 - ☒ b. 20 dB/decade
 - c. 30 dB/decade
 - d. 40 dB/decade
- 36.**When is a Bode plot considered to indicate a stable system?
- a. When the gain margin is greater than 1
 - ☒ b. When the phase margin is positive
 - c. When the output does not vary
 - d. When the magnitude plot approaches infinity
- 37.**What is the corner frequency in a Bode plot?
- a. The frequency at which the gain is maximum
 - b. The frequency at which the phase shift is -90 degrees
 - ☒ c. The frequency at which the slope of the magnitude plot changes
 - d. The frequency at which the gain crosses 0 dB



38. In a Bode plot, what effect does adding a zero at the origin have on the magnitude plot?
- a. No effect
 - ☒ b. Increases slope by 20 dB/decade
 - c. Decreases slope by 20 dB/decade
 - d. Flattens the slope
39. According to the principle of log-scales, if the ratio between two points is same, then the two points get equally.
- a. United
 - ☒ b. Separated
 - c. Multiplexed
 - d. Mixed
40. What does the term 'gain margin' refer to in a Bode plot?
- a. The frequency response beyond the cutoff frequency
 - b. The maximum gain that a system can tolerate before becoming unstable
 - c. The slope of the magnitude plot at the bandwidth
 - ☒ d. The average gain over all frequencies
41. How does a second-order system appear on a Bode plot?
- a. As a constant value
 - ☒ b. With a slope that changes at two distinct frequencies
 - c. With a single continuous line
 - d. As two separate straight lines
42. In a Bode magnitude plot, which one of the following slopes would be exhibited at high frequencies by a 4th order all-pole system?
- ☒ a. -80dB/decade
 - b. -40 dB/decade
 - c. 40 dB/decade
 - d. 80 dB/decade
43. log scale is used for the frequency for
- a. no specific reason
 - b. magnitude compression
 - ☒ c. accommodating a large range of frequencies