DEPARTMENT OF ELECTRONIC & TELECOMMUNICATION ENGINEERING

MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY, JAMSHORO

Control Engineering-I

Q#1: - Tick the most accurate answer. **[4 Marks]**

I. When Impulse signal is applied to the input of an integrator, the signal produced at the output is
(a) Impulse (b) Ramp (c) Parabolic (d) step

II. If all the poles of the system lie in R.H.P the system is said to be
(a) Linear (b) Stable (c) Non-linear (d) Un-stable

III. In over damped system
(a) $\zeta > 1$ (b) $\zeta < 1$ (c) $\zeta = 1$ (d) $\zeta = 0$

IV. What is the type number of the system having the transfer function

$$G(S) = \frac{(S+1)}{S^2 (S^2+3S+1)}$$

(a) One (b) Two (c) Three (d) Four

V. The part of the time response after the transient is called
(a) Transient response (b) Steady state response (c) Zero state response (d) Finite response

VI. The phase angle of a pole at origin is
(a) -180° (b) -90° (c) 180° (d) 90°

VII. If phase margin of a system is negative the system is said to be
(a) Minimum phase (b) non-minimum phase (c) Stable
(d) Unstable

VIII. Which of the following signals are used as typical test signal in control systems (choose all that apply).
(a) step signal (b) Impulse signal (c) Ramp signal
(d) Parabolic signal

IX. Routh Hurwitz criteria is used to determine the _____ of the system.
(a) State (b) Final value (c) Stability
(d) Initial value

X. We can decrease the steady state error by using (choose all that apply)
(a) Integrator (b) Differentiator (c) Amplifier
(d) Rectifier

Q#2: - Determine whether the following sentences are true or false. [4 Marks]

I. The point at which the gain crosses zero db axes is called gain cross-over. ( )

II. Type number of a control system is the number of poles at origin. ( )

III. The roots of denominator polynomial are called poles. ( )

IV. An oscillatory response is observed if poles are located on imaginary axis. ( )

V. If any of the poles lie in R.H.P the system is said to unstable. ( )

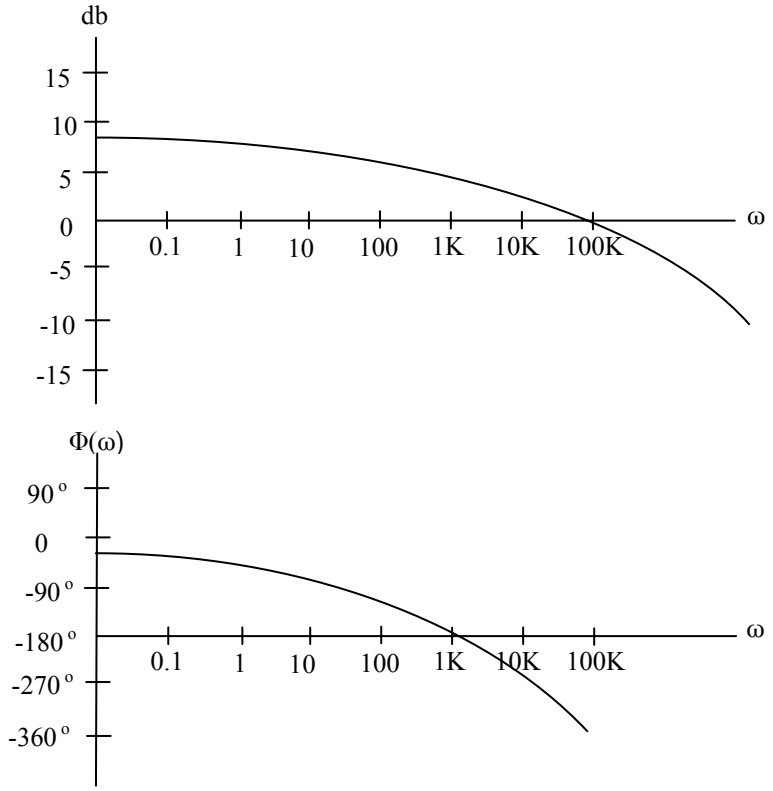
VI. Pole is a critical frequency at which transfer function becomes infinite. ( )

VII. Zero is the frequency at which the transfer function becomes zero. ( )

VIII. If a system has two poles at origin its type number is three. ( )

IX. If $\zeta = 0$ an oscillatory response is observed is observed. ( )

X. Infinite steady state error is observed if unit step signal is applied to a type zero system. ( )

Q#3: - List the advantages and disadvantages of closed loop control system. [1Mark]

Q#4: - Locate the gain cross-over & phase cross over points on the following plots and determine the gain margin and phase margin. [1 mark]