MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY, JAMSHORO
DEPARTMENT OF ELECTRONIC & TELECOMMUNICATION
ENGINEERING FIRST TERM THIRD YEAR (**03ES** BATCH) B.E REGULAR
PRACTICAL EXAMINATION, 2005

SUBJECT: **CONTROL ENGINEERING-I** **ID.NO.**

DATE: ---------- **TIME ALLOWED: 30 MIN**

MAX.MARKS: 10

MARKS OBTAINED:

IN WORDS: ----------

Signature

1. Internal Examiner----------

2. External Examiner----------

SECTION#01 (MULTIPLE CHOICE QUESTIONS) [2 marks]

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

ii. If all the zeros of the system lie in R.H.P the system is said to be
(a) Stable (b) Un-Stable (c) marginally Stable (d) none of these

iii. 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

iv. The point at which the magnitude plot cuts 0db axes is called _____.
(a) Critical point (b) Gain cross-over point
(c) Phase cross-over point (d) Gain margin

v. 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

vi. The part of the time response when time reaches to infinity is called
(a) Transient response (b) Steady state response (c) Finite response
(d) Critical response

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

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

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

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

ix. 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

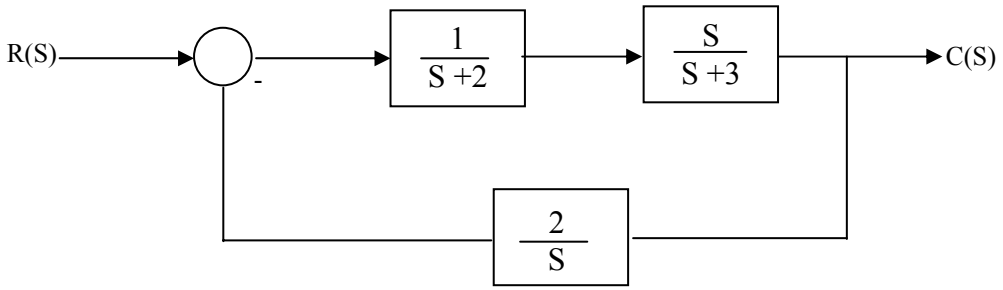
x. The phase angle of a zero at origin is
(a) -180° (b) -90° (c) 180° (d) 90°

SECTION#02 (TRUE/FALSE) [2 marks]

i. Phase cross-over point is that point at which phase curve crosses -180° line.( )
ii. If any of the zeros lie in R.H.P the system is said to unstable. ( )
iii. Infinite steady state error is observed if unit ramp signal is applied to a type zero system. ( )
iv. The system is said to be marginally stable if magnitude curve crosses the 0db axis. ( )
v. Pole is a critical frequency at which transfer function becomes infinite. ( )
vi. Transfer function is said to be improper if number zeros are greater than the number of poles. ( )
vii. If $\zeta = 0$ an oscillatory response is observed is observed. ( )
viii. If $\zeta < 1$ under damping is observed. ( )
ix. If a system has three poles at origin its type number is three. ( )
x. Infinite steady state error is observed if unit step signal is applied to a type zero system. ( )

SECTION#03 (MATLAB PROGRAM) [2 marks]

Q#1: - Reduce the following block diagram into a single block and find out the closed loop transfer function.

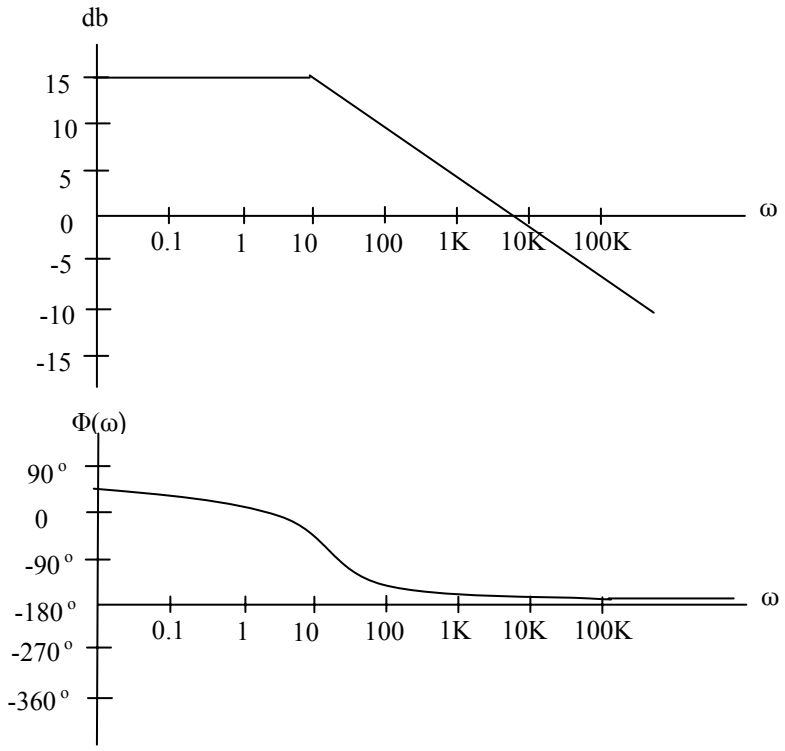


(a) Write down the MATLAB program to find out the poles and zeros of the system. Also write the command to draw the pole zero map.

(b) Write down the MATLAB program for the step, impulse and ramp responses.

SECTION#4 (Frequency Domain plots) [2 marks]

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



SECTION#5 (Basic terms and Definitions) [2 marks]

Q#5: - Define following terms.

i. Resonant Peak
ii. Rise time
iii. Phase cross over frequency (ω_g)
iv. Natural un-damped frequency (ω_n)

THE END