

Course Title: Control System I

Course Code: EE 411

Sheet #4

1- Draw the polar plot for the following open loop transfer functions.

$$a) G(s) = \frac{K}{(1+s)(1+2s)}$$

$$b) G(s) = \frac{K(1+4s)}{(1+s)(1+2s)}$$

$$c) G(s) = \frac{K}{(1+s)(1+4s)(1+6s)}$$

$$d) G(s) = \frac{K(1+2s)}{(1+1s)(1+4s)(1+6s)}$$

$$e) G(s) = \frac{K}{s(s+10)(s+2)}$$

$$f) G(s) = \frac{K(s+1)}{s(s+2)(s+5)(s+15)}$$

$$g) G(s) = \frac{K}{s^2(s+2)(s+10)}$$

$$h) G(s) = \frac{Ks}{(s+2)(s+5)}$$

$$i) G(s) = \frac{K(1+s)}{s(1+0.5s)(1+0.25s)(1+0.2s)}$$

$$j) G(s) = \frac{K}{s(s+1)(s^2+s+1)}$$

$$k) G(s) = \frac{K(s+1)}{(s-1)(s+5)}$$

$$l) G(s) = \frac{K(s+5)}{(s-1)(s+10)}$$

2- For the problems in (1) and (2) determine the gain and phase margin.

3- For the problems in (2) determine the value of K for

a) Gain margin =20db

b) Phase margin=45°