1. a). poles: $-3, 2$ unstable

b) poles: $-3, -2$ stable

c) poles: $-3, 2 \pm 3j$ unstable

d)

s^4	1	1	4
s^3	3	2	0
s^2	1/3	4	
s^1	-34		
s^0	4		

→ unstable

e). $H(s) = \dfrac{8s^2+2s-4}{s(s^4+2s^3-2s^2+3s+2)}$

pole at $s=0 \Rightarrow$ not stable

use Routh test on $s^4+2s^3-2s^2+3s+2$

to see if any poles are unstable

s^4	1	-2	2
s^3	2	3	
s^2	$-7/2$	2	
s^1	$29/7$		
s^0	2		

→ unstable

2. a) $H(s) = \dfrac{10s+2}{s^3+3s^2+4s+K}$

s^3	1	4
s^2	3	K
s^1	$\frac{12-K}{3}$	0
s^0	K	

$0 < K < 12$

b) $H(s) = \dfrac{10}{s^2+(2+K)s+4}$

s^2	1	4
s^1	$2+K$	0
s^0	4	

$-2 < K$

c) $H(s) = \dfrac{K(s-1)}{s^2+(2+K)s+2-K}$

s^2	1	$2-K$
s^1	$2+K$	
s^0	$2-K$	

$-2 < K < 2$