113 EE 04

國立臺北科技大學 113 學年度碩士班招生考試

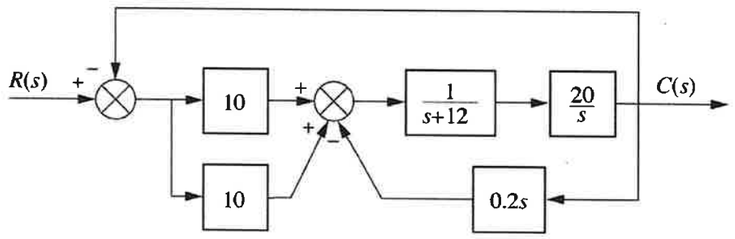
系所組別：2132 電機工程系碩士班丙組

第一節　控制系統　試題（選考）

注意事項：

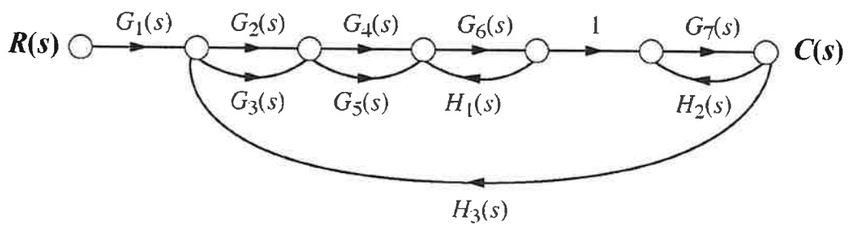
1. 本試題共 5 題，每題 20 分，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. For the system,

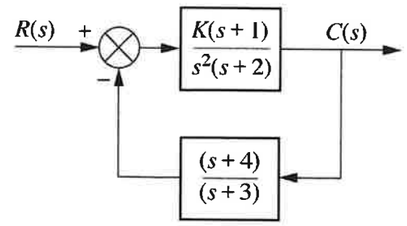


(a) Find the transfer function $T(s)=C(s)/R(s)$. (10%)
(b) Find the natural frequency (5%), and damped frequency of oscillation. (5%)

2. Using Mason's rule, find the transfer function $T(s)=C(s)/R(s)$. (20%)



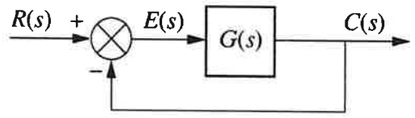
3. For the system,



(a) Find the steady-state error for a unit step input. (10%)
(b) Find the steady-state error for a ramp input. (10%)

4. For the following unity feedback system with $G(s)=\dfrac{K}{s(s+1)(s+2)(s+5)}$,

(a) Find the range of K for stability. (10%)
(b) Find the actual location of closed-loop poles when the system is marginally stable. (10%)



5. For the following unity feedback system with $G(s)=\dfrac{K}{(s+1)(s+4)}$, design a PID controller to yield a peak time of 1.047 seconds and a damping ratio of 0.8, with zero error for a step input. (20%)