

國立臺北科技大學 101 學年度碩士班招生考試

系所組別：2130 電機工程系碩士班丙組

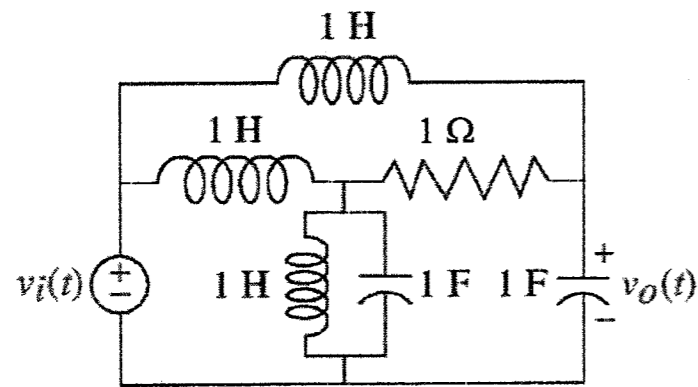
第一節 控制系統 試題

第一頁 共一頁

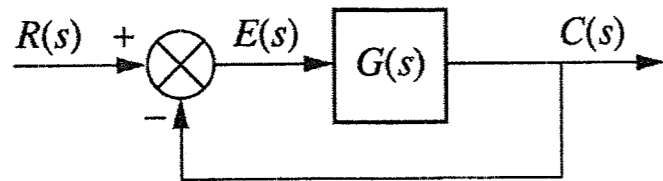
注意事項：

1. 本試題共 5 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

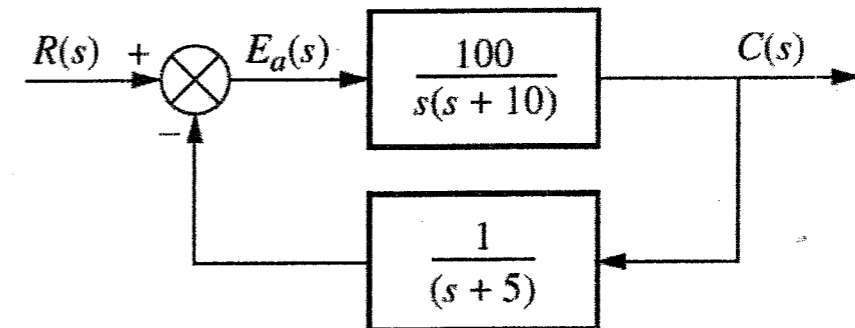
1. Find the transfer function $G(s) = V_o(s)/V_i(s)$ for the following network. (20%)



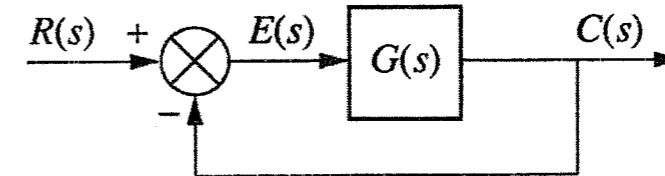
2. For the unity feedback system with $G(s) = \frac{K}{(s+1)^3(s+4)}$.
- a) Find the range of K for stability. (10%)
 - b) Find the frequency of oscillation when the system is marginally stable. (10%)



3. Consider the non-unity feedback system.
- a) Find the steady-state error for a unit step input. (10%)
 - b) Find the steady-state actuating signal for a unit step input. (10%)



4. For a unity feedback system with $G(s) = \frac{K}{s(s+5)(s+15)}$, design a PD controller to reduce the settling time by a factor of 4 while continuing to operate the system with 20% overshoot.
- a) Find the location of the compensator zero. (10%)
 - b) Find the system gain. (10%)



5. Sketch the Bode asymptotic magnitude and asymptotic phase plots for a unity feedback system with $G(s) = \frac{(s+20)}{(s+1)(s+7)(s+50)}$. (20%)

