

國立臺北科技大學 111 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

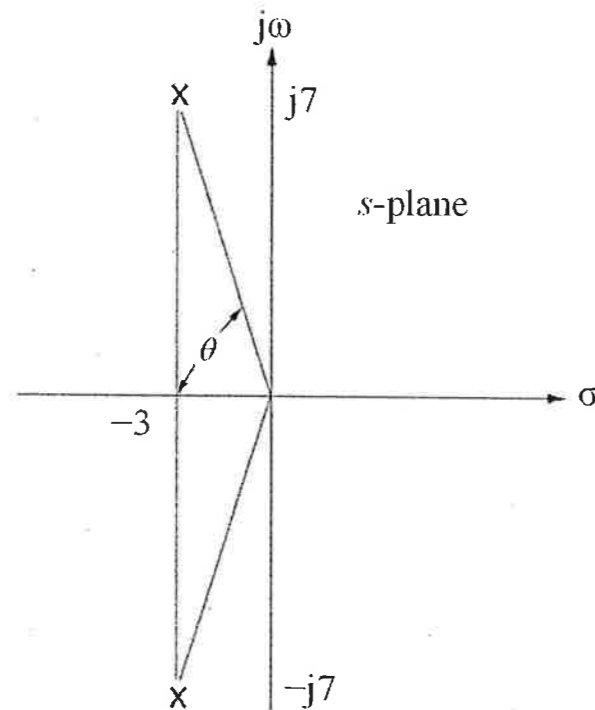
第一節 控制系統 試題 (選考)

第 1 頁 共 1 頁

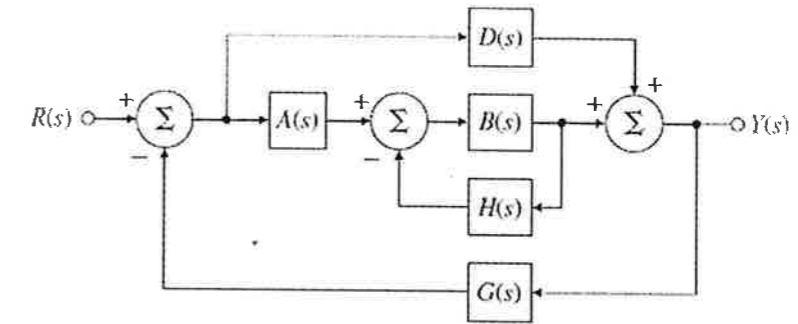
注意事項：

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。

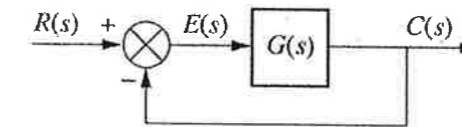
1. Given the pole plot as shown, find the natural frequency, damping ratio, percent overshoot, and peak time. (20%)



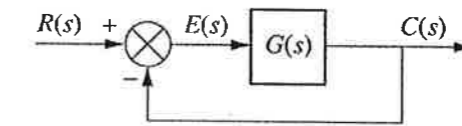
2. Find the transfer function $T(s) = Y(s)/R(s)$ of the following system. (20%)



3. For the following unity feedback system with $G(s) = \frac{K(s+4)}{s(s+0.5)(s+1)(s^2+0.4s+4)}$, find the range of K for stability. (20%)



4. For the following unity feedback system with $G(s) = \frac{10}{s(s+1)(s+2)}$,
- a) Find the steady-state error for a unit step input. (10%)
 - b) Find the steady-state error for a ramp input. (10%)



5. 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 (20%).

