

國立臺北科技大學

九十三年學年度自動化科技研究所入學考試

自動控制試題

填准考證號碼

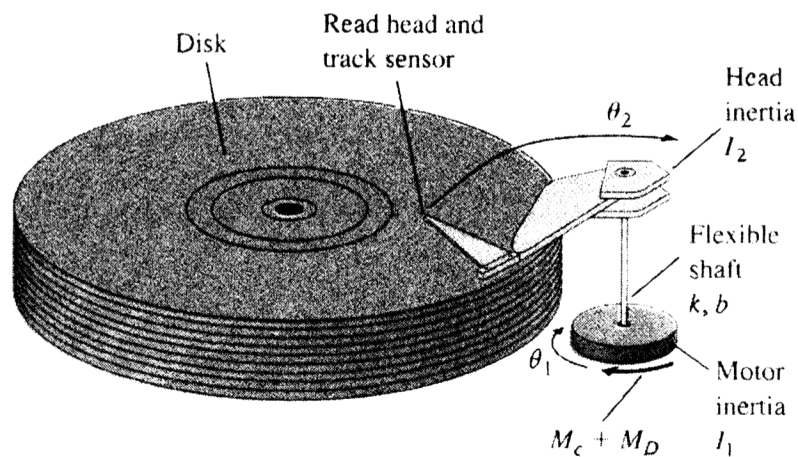
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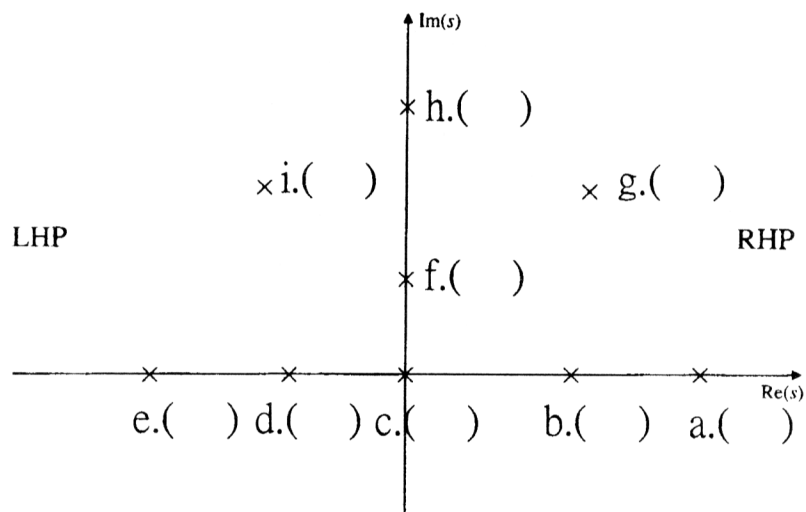
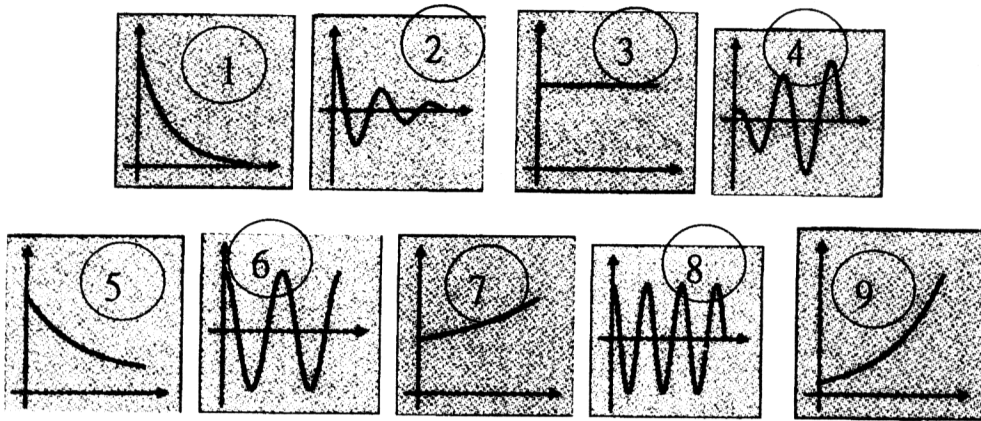
注意事項：

1. 本試題共 4 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

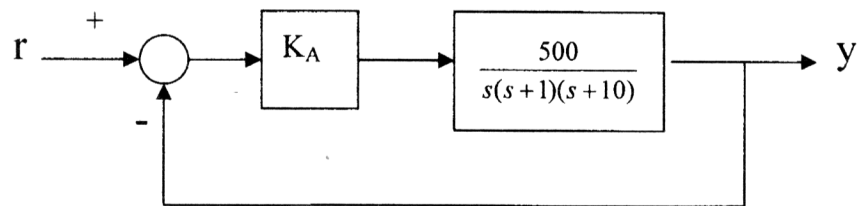
1. Assume there is some flexibility between the read head and the drive motor in the figure below. Find the equation of motion relating the motion of the read head to a torque applied to the base. (25%)



2. Please fill in the number of the associated time functions of natural responses to the pole locations in the s-plane. (20%)



3. Consider a feedback system shown in figure below,



- Please use Routh-Hurwitz criterion to determine the range of the gain K_A for which the system is stable? (15%)
- Let the reference command $r(t)$ be a unit ramp signal and a steady-state error of the overall system within 1% is desired. Please find an appropriate gain K_A to meet the requirement if possible. If not possible, please modify and find out the controller so that steady state error requirement can be satisfied? (15%)

注意：背面尚有試題

4. You are given the experimentally determined Bode plot shown in figure below. Design a compensation that will yield a gain crossover frequency of $\omega_c = 10$ rad/sec with phase margin $PM > 75^\circ$. (25%)

