國立臺北科技大學 112 學年度碩士班招生考試

系所組別：1302 車輛工程系碩士班

第二節　自動控制　試題 (選考)

注意事項：

1. 本試題共 10 題，每題 10 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. The unit step response is $y(t) = \frac{1}{6} - \frac{1}{2}e^{-2t} + \frac{1}{3}e^{-3t}$, find Laplace transform of system? (10%)

A:

2. Find the Laplace transform of the function? (10%)
$$f(t) = 5(1 - sint)$$

A:

3. Find the inverse Laplace transform of the function?. (10%)
$$F(s) = \frac{s - 6}{s(s^2 + 3)}$$

A:

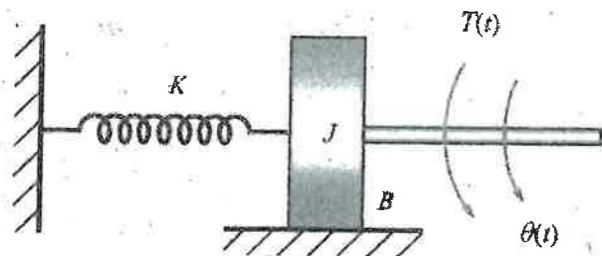4. Find the transfer function of the Fig. 1? (10%)

Fig. 1

A:

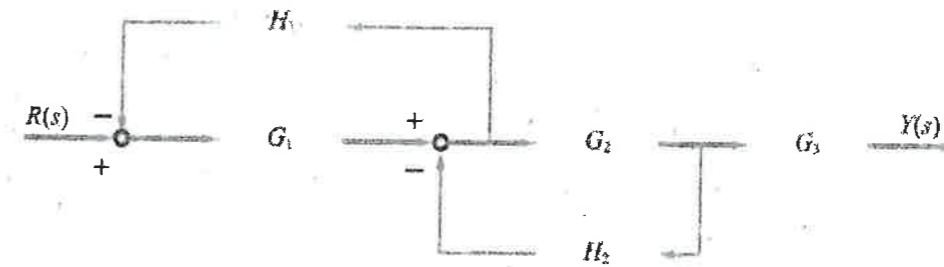5. Find the transfer function of the Fig. 2? (10%)

Fig. 2

A:

6. The transfer function of a standard second-order system. Find the <u>damping ratio (ζ)</u> and <u>maximum overshoot (M_0)</u> of the transfer function? (10%)
$$G(s) = \frac{36}{s^2 + 5s + 36}$$

A:

7. The transfer function of a standard second-order system. Find the <u>setting time (T_s)</u> and <u>peak time (T_p)</u> of the transfer function? (10%)
$$G(s) = \frac{25}{s^2 + 4s + 25}$$

A:

8. The input signal is a unit step function. Find the steady state error of the Fig. 3? (10%)
$$G(s) = \frac{s + 2}{s^2 + 4s + 5} \quad \text{、} \quad H(s) = 1.5$$
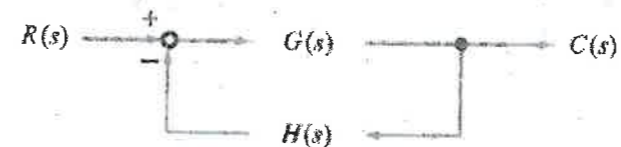

Fig. 3

A:

9. The open loop transfer function of a negative feedback system is $G(s) = \frac{K}{s(s^2 + 6s + 13)}$. Find the angle of departure of the root locus under the $s = -3 + j2$? (10%)

A:

10. The Bode diagram of a minimal phase system is shown in Fig. 4. Find the **a** and **b** of the transfer function $G(s)$? $\quad G(s) = \frac{a}{s+b} \quad$ (10%)
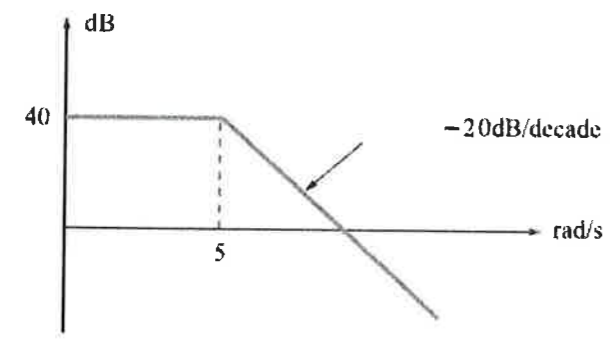
注意：背面尚有試題

Fig. 4

A: