

國立台灣科技大學九十六學年度碩博士在職專班招生試題

系所組別： 自動化及控制研究所碩士在職專班

科 目： 自動化及控制實務

總分為 100 分，題號請標示清楚。

1. 試簡述 E-automation 之內涵與其重要性? (10%)
2. 試述自動化資料擷取之發展及其關鍵技術為何?(15%)
3. 解釋名詞(自動化及控制領域): 含中英文及解釋(25%)
 - (1) RE (2) CNC (3) AGV (4) GPIB (5) PID
4. Name three performance criteria important in the design of control systems. Explain the significance of each. (15%)
5. Define the transfer function. (5%)
6. What is a root locus? How can you tell from the root locus if a system is unstable? (10%)
7. A dynamometer is a device used to measure torque and speed and to vary the load on rotating devices. The dynamometer operates as follows to control the amount of torque: A hydraulic actuator attached to the axle presses a tire against a rotating flywheel. The greater the displacement of the actuator, the more force is applied to the rotating flywheel. A strain gage load cell senses the force. The displacement of the actuator is controlled by an electrically operated valve whose displacement regulates fluid flowing into the actuator. Draw a functional block diagram of a closed-loop system that uses the described dynamometer to regulate the force against the tire during testing. Show all signals and systems. Include amplifiers that power the valve, the valve, the actuator and load, and the tire. (10%)
8. Find the output y of a system described by the differential equation

$$\frac{d^2y}{dt^2} + 3\frac{dy}{dt} + 2y = 1 + t$$

with the initial conditions $y(0)=0$ and $\frac{dy(0)}{dt} = 1$. (10%)