

**Microprocessor Principles and Applications**  
**Final (Hands-on Exam)**  
**Jan. 6, 2021**

1. Servomotor controller

(a) (10%) Set up a system that uses adjustable resistor to control the direction of servomotor.

(b) (15%) Change the degree of servomotor's direction from  $-90^\circ$  to  $+90^\circ$ .

**Note: Do not set  $-90^\circ$  and  $+90^\circ$  only. You should deal with each degree, which means you should set the degree of servomotor according to the ratio of output of adjustable resistor to high potential.**

2. Please implement a UART by using the keyboard to control Question1's servomotor:

(a) (5%) The CLI can show what you type.

(b) (10%) Design a "motor" mode. Type "motor" to enter this mode.

In the "motor" mode, computer should show the value of servomotor's degree.

Pressing "e" will allow you to exit this mode

(c) (10%) Design a "degree" mode. Type "degree" to enter this mode.

In the "degree" mode, we change the degree of servomotor through UART ranged from  $-90^\circ$  to  $+90^\circ$ . For example, type "90" and press "enter", the servomotor will turn to 90 degree.

Pressing "e" will allow you to exit this mode