

## **Session 2 HW**

### **Other Questions:**

2- The speed of the motor could be controlled using PWM signal such that the difference in duty cycle of the pulse would result in average voltage corresponding to that duty cycle resulting in a certain speed for the motor.

3- No, we do not need fly-back diodes in case of using L293D motor driver.

4- If so, we should put two diodes on each output terminal of each terminal, one diode's anode connected to the output terminal and the cathode is connected to the  $V_s$ . The other diode's cathode is connected to the output terminal and the anode is connected to ground. The same procedure is applied to the other motor output terminal as well.

Bonus: MLCC could fail short because cracks often occur in the ceramic substrate between the capacitor's electrodes causing short circuit. This happens due to reasons as cracks in the ceramic substrate between the capacitor's electrodes, or electrical overstress, or heat stress beyond maximum limits of the capacitor all causing breaking down in the ceramic which might cause short circuit failure.