

國立臺北科技大學

九十七學年第一學期電機系博士班資格考試

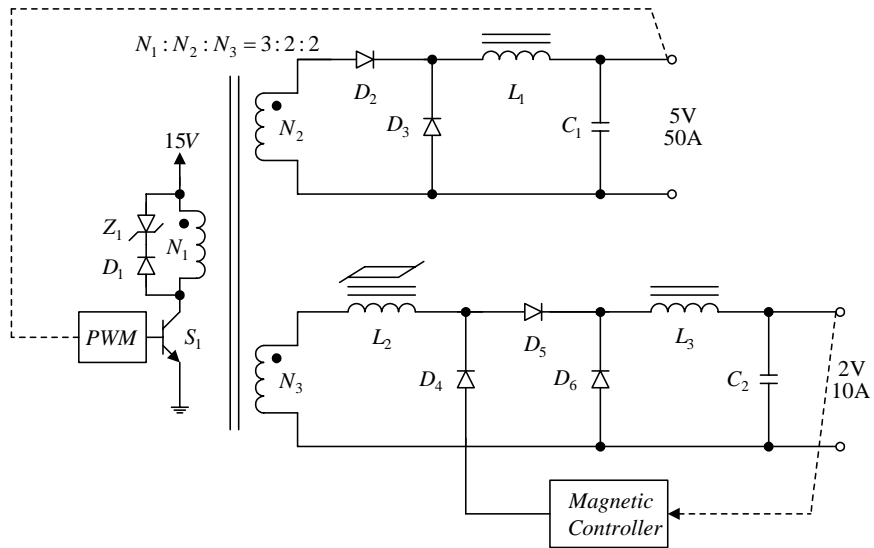
電力電子元件試題

第一頁 共一頁

注意事項：

1. 本試題共【10】題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。
4. 考試時間：二小時。

1. How to model the capacitor with parasitic elements considered? (10%)
2. What is the dissipation factor of the capacitor? (10%)
3. What is the dielectric absorption of the capacitor? (10%)
4. What factors affect both of the turn-on resistance and the breakdown voltage of the MOSFET? (10%)
5. What basic factors should we take into account in selecting a suitable drive for a MOSFET? (10%)
6. What are the effects of the parasitic inductance on the MOSFET? (10%)
7. What factors affect the values of the reverse recovery time? (10%)
8. How to reduce the noise effect of the reverse recovery time of the diode on the output? (10%)
9. If this converter operates in CCM at rated load and the corresponding switching frequency is 100kHz, please find the controlled voltage provided by the magnetic controller on condition that the Zener breakdown voltage is 12V, the main switch has zero turn-on voltage and each diode has zero forward voltage. (10%)



10. As shown in the following figures where each diode has zero forward voltage, if each inductor current slew rate is $\frac{di}{dt} = -8\text{A}/\mu\text{s}$ during the turn-off interval of the corresponding main switch, then how about the voltage across each main switch during the turn-off interval? (5%, 5%)

