

## 國立台灣科技大學九十八學年度碩博士在職專班招生試題

系所組別：電機工程系碩士在職專班乙組

科目：電力電子學

(總分為 100 分)

- Explain the following terminologies.
  - Reverse recovery (of power diode) (4 %)
  - Switching loss (4 %)
  - Conduction loss (4 %)
  - Snubber circuit (4 %)
  - Synchronous Rectifier (4 %)
- Assuming the voltage contains only fundamental component ( $v(t) = V_1 \cos(\omega t - \theta_v)$ ) and the load is a nonlinear dynamic load ( $i(t) = \sum_{n=1}^{\infty} I_n \cos(n\omega t - \theta_{i_n})$ ), derive the expression of power factor. (15 %)
- Consider the inductor with air gap of Fig. P3.
  - What is the inductance of this inductor? (10 %)
  - What is the function of the air gap? (5 %)

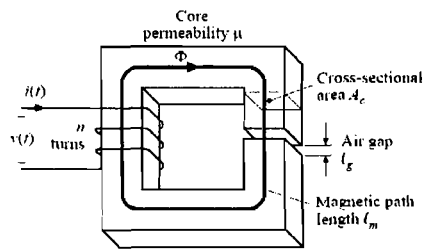


Fig P3

- For the block diagram shown in Fig. P4.
  - Derive the transfer function  $\frac{V_{out}(s)}{V_{in}(s)}$  (7 %)
  - Discusses the conditions to sustain self-oscillations? (8 %)

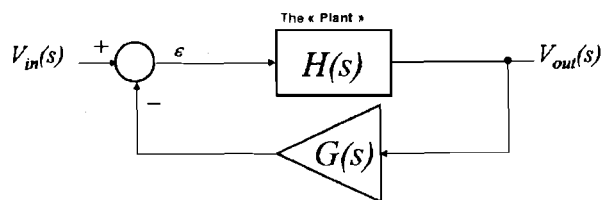


Fig P4

15



國立台灣科技大學九十八學年度碩博士在職專班招生試題

系所組別： 電機工程系碩士在職專班乙組

科 目： 電力電子學

(總分為 100 分)

5. Find the proper relation between the time domain diagrams [(a)-(f)] and frequency domain diagrams [(1)-(6)]. (15%)

(a)	(b)	(c)	(d)	(e)	(f)
(1)	(2)	(3)	(4)	(5)	(6)

6. For the flyback circuit as shown in Fig. P6a,

(a) What voltage-rating MOSFET X3 should be used ? (10%)

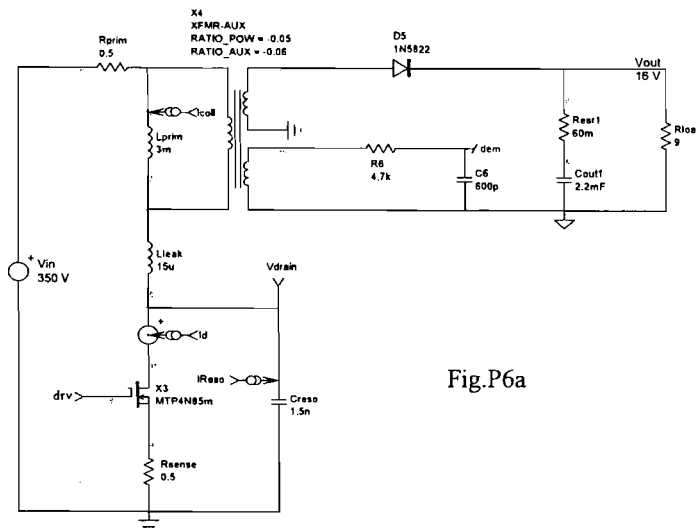


Fig.P6a

(b). What are the components involved for the ringing waveforms as shown in Fig. P6b if the converter shown in P6a operated in DCM? (10%)

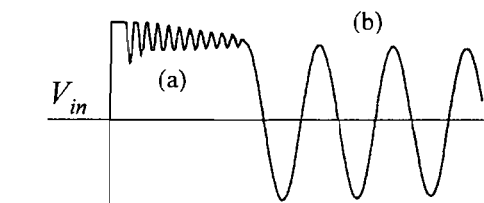


Fig.P6b

