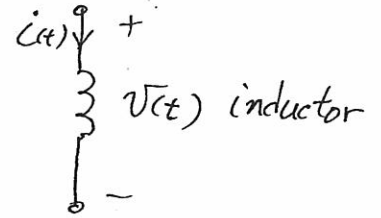
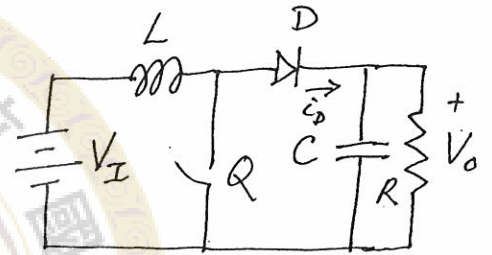


1. When the inductor voltage $v(t)$ (8%) is positive at a particular instant, what's the sign of the current $i(t)$? Is it positive or negative? Explain why.



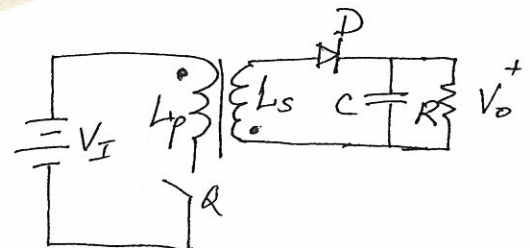
2. (a) What's the average diode current i_D ? (8%)

(b) Check the mode of operation, continuous mode or discontinuous mode? (7%)



$V_I = 100V$, $L = 100\mu H$,
 $R = 10\Omega$, C very large, $V_o = 40V$
 ideal switches, $f_s = 100KHz$

3. (a) What's the peak current of transistor Q? (6%)



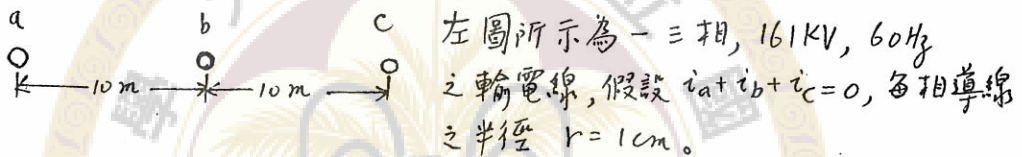
(b) What's the peak voltage of Q? (5%)

$V_I = 100V$, $V_o = 50V$, $L_p = 400\mu H$
 $L_s = 100\mu H$, ideal switches, C very large, $f_s = 100KHz$ and $R = 5\Omega$,

見背面

4. Explain the principle of the production of a rotating magnetic field by means of 3-phase windings. (10分)
5. The rotor of a six-pole synchronous generator is rotating at a mechanical speed of 1200 rpm (rotation per minute). What is the frequency of the generated voltage in Hz (hertz)? (10分)
6. Draw the torque-slip curve for induction motors. (13分)

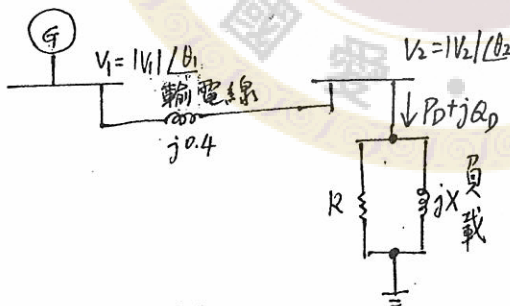
7.



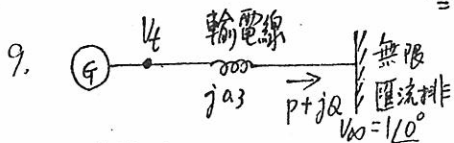
(a) 當三相線路未换位 (UNTRANSPOSED) 時, $\begin{bmatrix} \lambda_a \\ \lambda_b \\ \lambda_c \end{bmatrix} = L_{abc} \begin{bmatrix} i_a \\ i_b \\ i_c \end{bmatrix}$, 試求電感矩陣 L_{abc} 。(6%)

(b) 將三相線路完全换位 (COMPLETELY TRANSPOSED), 以便將 L_{abc} 變成一個 DIAGONAL MATRIX L_{abc}' , 試求 L_{abc}' 。(6%)

8.



假設 $|V_1|$ 固定為 1.03, 負載之 $\frac{R}{X}$ 固定為 0.25, 輸電線之電阻及電容可忽略不計。試求 P_0 之最大值。(11%)



有一圓極同步發電機, 其同步電抗 $X_s = 0.7$, 電樞電阻可忽略不計,

發電機端電壓 V_t 之大小為 $|V_t| = 1.03$ 。此發電機經由一輸電線供電給無限匯流排, 假設輸電線之串聯電抗為 0.3, 電阻及電容可忽略不計。無限匯流排之電壓 $V_\infty = 1\angle 0^\circ$, 有效電力 $P = 1$ 。試求同步發電機之開路電壓 (OPEN-CIRCUIT VOLTAGE)。(10%)