

大同大學 九十四 學年度碩士班入學考試試題

考試科目: 電力系統

所別: 電機工程研究所

第 1/1 頁

註: 本次考試 不可以 參考自己的書籍及筆記

不可以 使用字典

可以 使用計算器

1. The $\lambda - i$ characteristic of a nonlinear singly-excited magnetic circuit is given by

$$\lambda = \frac{2.8i}{0.12 + i}$$

Find the energy (W_{fld}) and the coenergy (W'_{fld}) for the magnetic circuit corresponding to a current of 0.1 A. (15%)

2. A RL circuit is connected to a DC source as shown in Fig.

2. Switch S is initially closed and is opened at time $t = 0$. (15%)

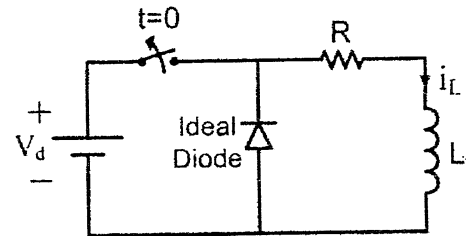


Fig. 2

- (a) Find the inductor current $i_L(t)$ for $t \geq 0$.
- (b) What are the initial and final values of the stored energy in the inductor?
- (c) What is the total energy dissipated in the resistor?

3. A 460 V cable circuit is rated at 235 A but is carrying a load of 300 A at 0.7 power factor. What kVAR of capacitors is required to reduce the current to 235 A? (10%)

4. A 1000 kW turbine-generator set (turbine capability of 1250 kW) is already operating at rated load, 1250 kVA and 0.8 power factor. An additional load of 170 kW at 0.85 power factor is to be added. What value of capacitors is required so that neither the turbine nor the generator will be overloaded? (15%)

5. An industrial plant has cogeneration system with generation of $28 + j14$ p.u. to supply its own loads of $20 + j8$ p.u., and sell the surplus power to the Taiwan Power Company (TPC) through a transformer with impedance of $j0.01$ p.u. as shown in Fig. 5. (25%)

- (a) If the terminal voltage of generator (Bus #2) is 1.0 p.u., determine the voltage at TPC side (Bus #1),
- (b) if the voltage at TPC side is remained as constant as the result of part (a), the plant is requested that no reactive power should be delivered to the TPC system. How should the plant operator adjust the generator voltage?

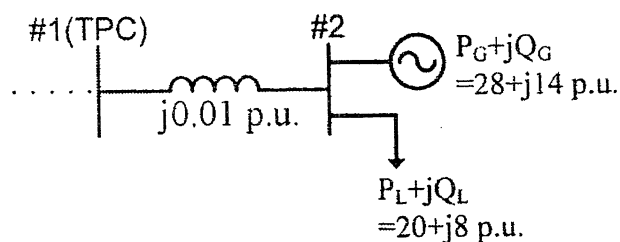


Fig. 5

6. A 2.0 kVA, 200 V/500 V, single-phase transformer has the following test data. (20%)

open-circuit test	short-circuit test
$V_{OC} = 1.0$ p.u.	$V_{SC} = 0.02$ p.u.
$I_{OC} = 0.04$ p.u.	$I_{SC} = 1.0$ p.u.
$P_{OC} = 0.005$ p.u.	$P_{SC} = 0.01$ p.u.

- (a) Find the parameters of the equivalent circuit of the transformer referred to secondary side. (in Ω).
- (b) Find the voltage at primary side to keep the secondary voltage of 500 V if the transformer is connected to a load of 1.0 p.u. at 0.85 PF lagging.