

國立臺北科技大學
九十九學年第一學期電機系博士班資格考試

電力系統保護與協調 試題

第一頁 共一頁

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注意事項：

1. 本試題共【4】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. Draw the single-line diagram which shows the typical major protection for unit generator and large generator in utility system. Based on the single-line diagram, describe the phase-fault primary and backup protections for generator and unit transformer.(25%)
2. Derive the generator power capability curve equations which contain thermal limits of rotor winding and stator winding. Sketch the capability curve on the complex power plane (P-Q plane) and mapping the curve on the impedance plane (R-X plane). Assume the resistance of stator winding is neglected in the equations. (30%)
3. Draw the circuit diagram to illustrate the fault currents (in per unit) through delta-wye (Δ -Y) transformer bank for the cases of three-phase fault, phase-to-phase fault, and phase-to-ground fault, respectively. The magnitudes of line currents and winding currents should be shown in the diagram. Assume the fault location is at terminal of secondary side, and neglect ground impedance and all the sequence impedances of transformer winding are the same ($X_1=X_2=X_0$). (25%)
4. Answer the following questions concisely: (20%)
 - (1). How to avoid undesired miss-operation of transformer differential relay on the magnetizing inrush current? (10%)
 - (2) Why the high-impedance voltage differential relays are usually used for bus differential protections? (10%)