

國立臺北科技大學

九十六學年第一學期電機系博士班資格考試

軌道電力系統試題(公告用)

填學生證號碼

第一頁 共一頁

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注意事項：

1. 本試題共【5】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. Describe the circuit scheme and advantages of rail traction power system with drain auto-transformers (ATs). (20%)
2. What is the most serious problem of traction power system with boost transformers (BTs)? How to mitigate this problem by installing some improvement devices? For Taiwan railway system, BTs are almost removed due to their high failure rate and difficult to maintenance. What changes of circuit scheme had been adopted in traction power system for replacing BTs. (20%)
3. Draw the winding connection diagrams of Scott-connected transformer and Le Blanc-connected transformer. Illustrate their principles of transferring balanced three-phase (3Φ) system to balanced two-phase (2Φ) system in rail traction power system by phasor diagram or deriving the voltage and current phasor equations. (20%)
4. Consider the metro-rapid-transit system (MRTS) with DC traction power supplied by four sets of 6-pulse rectifier in each traction power substation. How to eliminate the harmonic currents at AC side by two three-winding transformers such that only the harmonic currents of 24-pulse rectifier are existed ? (20%)
5. Sketch the stray current collection system (SCCS) for a MRTS with drain diodes for rail grounding. Describe the performances of such SCCS both for stray current collection and rail potential-to-ground suppression. (20%)