

國立臺北科技大學

一百零三學年第二學期電機系博士班資格考試

可用計算機、可參
考書籍和資料作答

交流電機控制 試題

第一頁 共一頁

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注意事項：

1. 本試題共【3】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。

一、(35%) Calculate the d, q voltages ($v_d + jv_q$) in stationary and synchronous frames for a balanced three phase, 300 volt, 50 Hz system. Take the a - b line voltage as the reference quantity (i.e. zero phase cosine wave) and align the phase 'a' voltage with the d -axis for the stationary and synchronous frames. Express results in real variables and in complex form.

二、(35%) Derive the torque equation of three-phase induction motor in terms of the quantities listed below starting from the basic form

$$T_e = \left(\frac{3}{2}\right)\left(\frac{P}{2}\right)L_m [i_{qs}i_{dr} - i_{ds}i_{qr}] = \left(\frac{3}{2}\right)\left(\frac{P}{2}\right)L_m \text{Im}[i_{qdr}^+ i_{qds}]$$

- (a) stator flux and rotor flux
- (b) stator current and air-gap flux

三、(30%) Compare the control techniques of indirect field oriented control and direct field oriented control as applied to an induction motor.