

國立臺北科技大學

九十八學年第一學期電機系博士班資格考試

電力系統品質試題

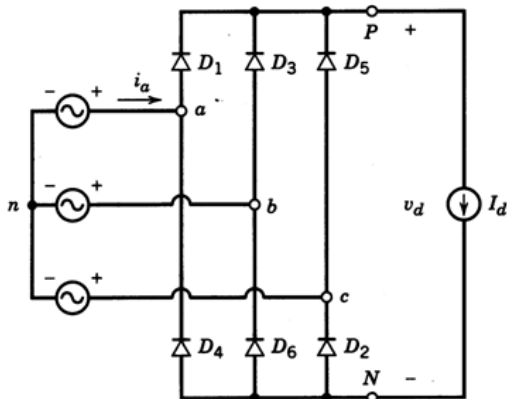
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注意事項：

1. 本試題共【1】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。

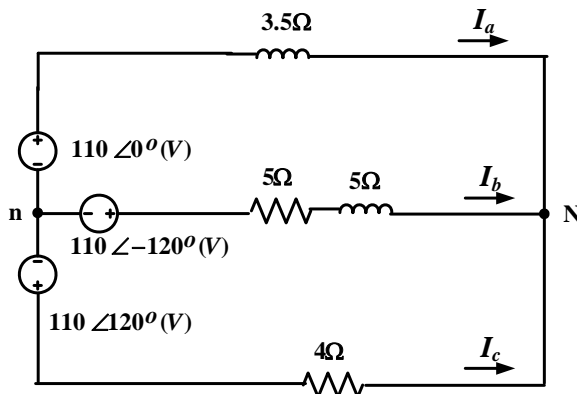
1. (20%) A three-phase diode rectifier circuit is shown below



V_a , V_b and V_c are positive sequence balanced three phase voltage source. Answer the following questions.

- (1) (5%) Plot the current waveform of i_a
- (2) (5%) (Displacement PF) DPF
- (3) (10%) THD%

2. (20%) A three-phase unbalanced circuit is as follows:



- (1) (15%) Obtain the symmetric components I_0 , I_1 , and I_2 .
- (2) (5%) Obtain the negative-sequence current ratio

3. (10%) Explain the reasons to cause waveform distortions and the strategies to improve waveform distortions.
4. (10%) Explain the reasons to cause the frequency variation problems and the affections of the frequency variation problems
5. (10%) What is the meaning of voltage flicker and what is the meaning of $\Delta V_{10\%}$ index?
6. (30%) Explain the meanings of the following items
 - (a) Harmonic distortion factor (DF)
 - (b) Crest factor (CF)
 - (c) Power factor (PF)
 - (d) Distortion index (DIN)
 - (e) Telephone influence factor (TIF)
 - (f) Voltage drop rate percentage ($\Delta V_D\%$)