

國立臺北科技大學
100 學年度研究所碩士在職專班入學考試

電機工程系碩士班

乙組：電工原理(含基礎電學及電力電子專業實務)試題

填准考證號碼

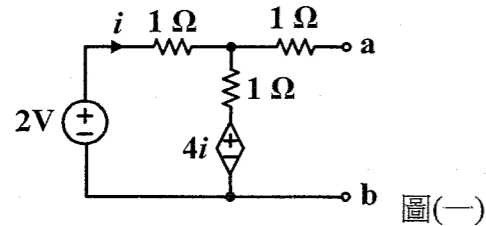
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第一頁 共一頁

注意事項：

1. 本試題共【六】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。

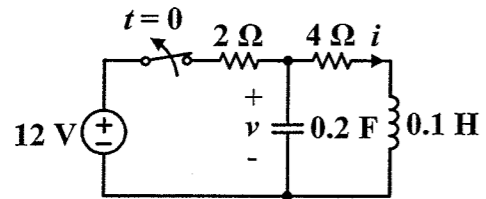
一、求圖(一)所示電路中 a、b 兩端之戴維寧等效電路。(15%)



圖(一)

二、如圖(二)所示之電路， $t=0$ 以前為直流穩態。若開關於 $t=0$ 時打開，則 $t=0^+$ 時 $\frac{di}{dt}$

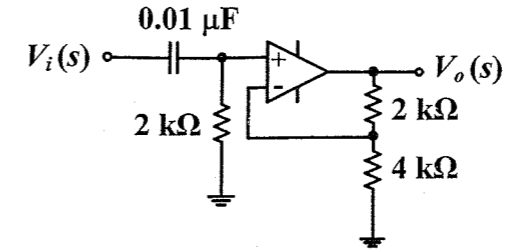
及 $\frac{dv}{dt}$ 為何？ (20%)



圖(二)

三、如圖(三)所示之理想運算放大器電路，試求： (每小題 5%，共 15%)

- (a) $V_o(s)/V_i(s)$
- (b) 此電路可作為哪一種濾波器？
- (c) 濾波器之截止頻率為多少 rad/s？



圖(三)

- 四、Please illustrate the operations of Forward converter in continuous current conduction mode (CCM), including the equivalent circuits for each state, the derivation of voltage ratio, waveforms on the magnetizing winding and the output inductor, and the relationship between duty cycle and turns of the demagnetizing winding. (20%)
- 五、In Boost converter operating in discontinuous current conduction mode under switching frequency 50kHz, the output voltage is regulated at 48V by adjusting the duty cycle, the input voltage can be varied from 12V to 36V, and the maximum output power equals to 120W, please design the desired inductance if all the elements are ideal and the output capacitance is large enough. (15%)
- 六、Please illustrate the differences and properties between the conventional linear power supplies and the switching power supplies briefly and diagrammatically. (15%)