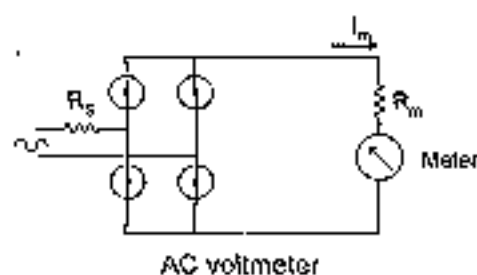
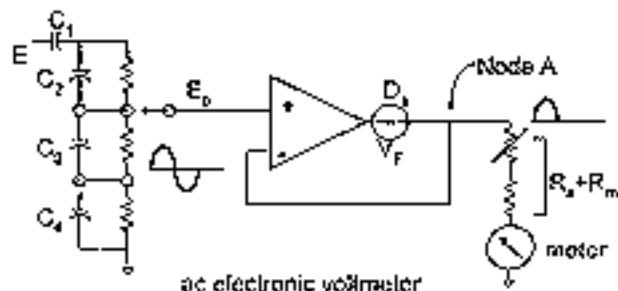


微算機與電儀表學

- What is DMA (Direct Memory Access)? (5%)
 - Explain why DMA I/O is faster than CPU-controlled I/O. (5%)
 - Why does DMA I/O generally have priority over the CPU for access to memory. (5%)
- A computer system supporting virtual memory uses a main memory that has an access time of 500ns. Each page is 512 bytes, and the system can transfer a page from disk to memory or from memory to disk in 50 ms. Estimate the maximum permissible page fault rate so that the effective memory-access time does not increase to more than 800ns. (15%)
- An ac voltmeter uses a bridge rectifier with silicon diodes and a PMMC instrument with FSD=200 μ A. If the meter coil resistance (R_m) is 900 Ω and the multiplier resistor (R_x) is 708 k Ω , calculate the applied rms voltage when the voltmeter indicates FSD and 0.6 FSD. (20%)

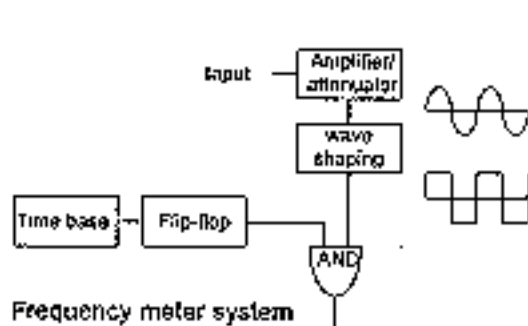


AC voltmeter

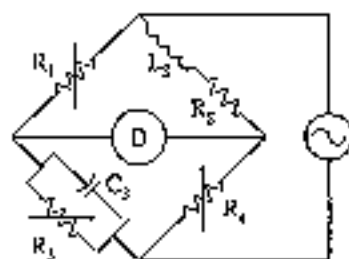


ac electronic voltmeter

- 說明交流電子伏特計(ac electronic voltmeter)各部份元件(電容, 電阻, op amp, 二極體)的功用; 並說明二極體(D_1)放在 node-A 左邊或右邊的影響。(10%)
假如 PMMC meter 之規格為 600 μ A(FSD), $R_x = 460\Omega$, 且 $R_m = 450\Omega$, 求 meter 全偏轉所需輸入電壓($E_{i(max)}$)。(10%)
- 說明「基本數位計頻器(basic digital frequency meter)」(如下左圖示)和「倒數計數計頻器(reciprocal counting meter)」(請畫出系統方塊圖)的運作原理及適用場合。(10%)



Frequency meter system



Maxwell bridge

- 導出上右圖中未知電感之 L_x 及 R_p , 並據以定義電感的 Q-factor, 解釋為何 Maxwell bridge 較適合量低 Q 值的電感。(10%) 何種情況下未知電感以並聯等效電路(L_p 及 R_p)來表示比較好? 修改上面線路以適用量測未知電感之並聯等效電路。(10%)