

1. 請以若干電阻, 二個電晶體 (npn), 加上適當之電壓源 (Voltage Source) 或電流源 (Current Source) 繪出下列連接法:

- Cascaded CE-CE
- Darlington Pair
- Cascode
- Differential Pair
- Totem pole

並說明每一種線路的最主要特性或用途。(25%)

2. 完成下表, 並以若干個電晶體 (BJT or FET) 電阻及電源 (Current Source or Voltage Source) 各繪一實際線路, 代表不同之四種 Topology. (20%)

Properties of Feedback Amplifier Structures

Topology	Amplifier Classification	Comparison Signal	Output Signal (Sample)	Input Impedance	Output Impedance
Shunt-Shunt			Voltage		
Shunt-Series	Current				High
Series-Series		Voltage		High	
Series-Shunt					

3. 請以若干電子元件 (R, L, C) 及一電晶體 (BJT or FET), 繪出下列各種振盪器 (Oscillator) 之實際線路例子。

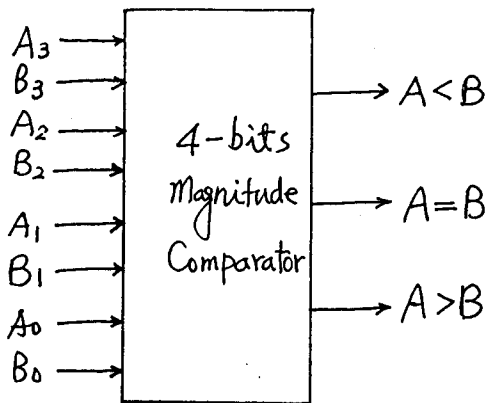
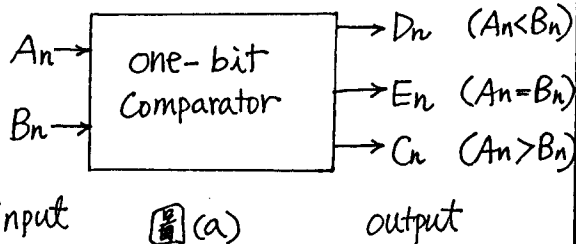
- RC Phase-shift Oscillator
- Colpitts Oscillator
- Hartley Oscillator

並說明 Barkhausen Criterion. (15%)

4. 使用一或二個 OP. Amplifier 及若干電子元件 (R, L, C), 繪出下列各種線路之實際例子。(25%)

- Inverting Configuration Amplifier
- Noninverting Configuration Amplifier
- Noninverting Summer (Adder)
- Differential Amplifier
- Differentiator
- Miller Integrator
- Differential Integrator
- gyrator

5. 請用 AND gates, inverters, NOR gates, 設計出圖(a)中之 one bit Comparator, 再利用圖(a)作為 building blocks, 設計出一 4-bits 之 magnitude comparator. (圖(b)) (15%)



6. 幸甚!(0%)

