

壹、簡答下列子題：

- (a) Why does a deuterium lamp produce a continuous rather than a line spectrum in the ultra-violet ? (3%)
- (b) Describe the basic design difference between a spectrometer for absorption measurements and one for emission studies. (3%)
- (c) What are the differences between a photon detector and a heat detector ? (3%)
- (d) Why can photomultiplier tubes not be used with infrared radiation ? (3%)
- (e) What are the differences between filters and monochromators as wavelength selectors ? (3%)

貳、試述氣相層析儀(GC)與高效能液相層析儀(HPLC)的偵測原理、儀器組成、用途與定量方法 (20%)

參、利用紅外線光譜儀(IR)進行化合物之鑑定分析是天然藥物研究常用的研究方法之一，試述 IR 的偵測原理、儀器結構與應用 (20%)

肆、試述質譜儀(MS)之偵測原理，並繪出一般質譜儀的組成及說明其在生物醫學與天然藥物研究上之應用 (20%)

伍、試述流式細胞儀(Flow cytometry)的偵測原理，並請簡要說明其在天然藥物相關研究上所能扮演的角色 (10%)

陸、簡答下列子題：

- (a) Describe the types of NMR spectra. (5%)
- (b) What are the advantages of a Fourier transform NMR measurement over a continuous-wave measurement ? What are the disadvantages ? (5%)
- (c) Describe the differences between off-resonance and broad-band proton decoupling in ^{13}C NMR spectroscopy. (5%)