

1. Draw structural formulas of: (20%)
 - (a) 2-Methyl-1-phenyl-2-propanol
 - (b) *tert*-Butyl iodide
 - (c) Pentachlorophenol
 - (d) Toluene
 - (e) Glycine
2. Explain the following terms: (50%)
 - (a) β - and α -elimination
 - (b) S_N2 vs. S_N1 reactions
 - (c) Diels-Alder reaction
 - (d) Isoelectric point
 - (e) Extensive vs. intensive properties
 - (f) Photoelectric effect
 - (g) Avogadro constant
 - (h) Henry's Law
 - (i) Beer's Law
 - (j) Osmotic pressure
3. Give a structure consistent with each of the following sets of NMR data. (10%)

C_4H_9Br

doublet, δ 1.04, 6H

multiplet, δ 1.95, 1H

doublet, δ 3.33, 2H
4. 當溶液中含有下列化合物的濃度為 1.25 g/L 時, 求其容積莫耳濃度為多少? 作答時, 請考慮有效位數。(a) NaOH; (b) KCl。原子量: H(1.008 g/mole); O(16.00 g/mole); Na(22.99 g/mole); Cl(35.45 g/mole); K(39.10 g/mole) (10%)
5. 具放射性的 P^{32} , 其半衰期為 14.3 天。如果現在有一桶含 P^{32} 的廢液, P^{32} 的濃度為 10.0 mg/L, 問多少天以後, P^{32} 的濃度會降低至 0.25 mg/L? (10%)