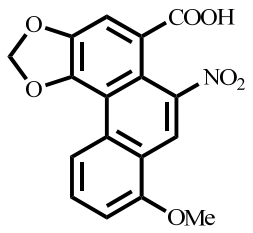
101年公務人員高等考試三級考試試題　　代號：37140　　全一張（正面）

類　　科：藥事
科　　目：藥物分析與生藥學（包括中藥學）
考試時間：2小時　　座號：_____

※注意：㈠禁止使用電子計算器。
㈡不必抄題，作答時請將試題題號及答案依照順序寫在試卷上，於本試題上作答者，不予計分。

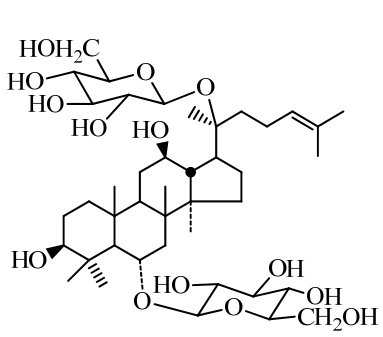
一、馬兜鈴酸之一的馬兜鈴酸甲（AAI）之結構如下：



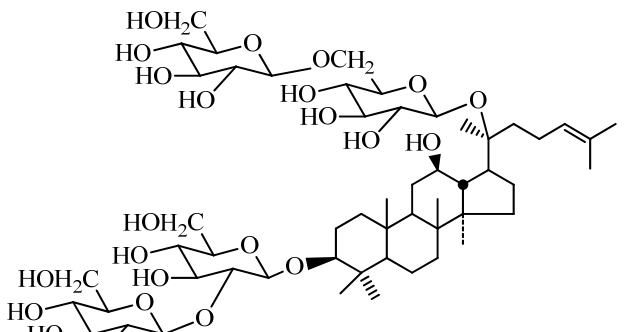
Aristolochic acid I (AAI)

㈠列舉二種含馬兜鈴酸類成分之中藥。（6分）
㈡為何含馬兜鈴酸類成分之中藥被行政院衛生署公告禁用？（6分）

二、Ginsenoside Rg_1及Ginsenoside Rb_1之結構如下：



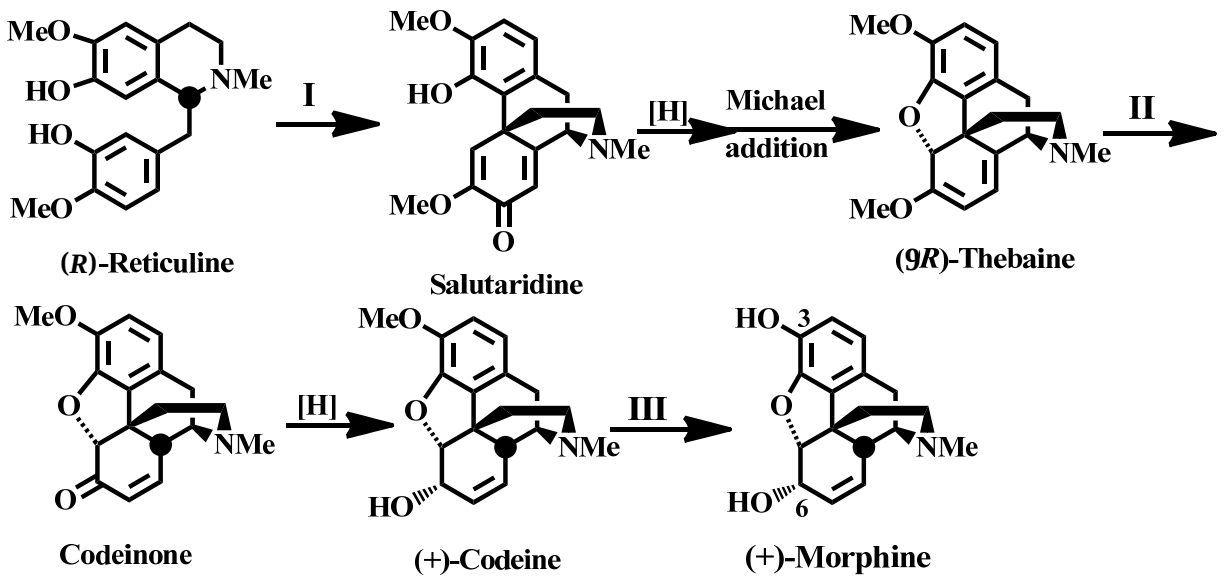
Ginsenoside Rg_1



Ginsenoside Rb_1

㈠此二成分含於何植物科別及何種藥材中？（6分）
㈡本結構在化學分類上屬於何種類別（如 indole alkaloid）？（4分）
㈢此二成分在酸水解去醣基後之產物之分子式分別為$C_{30}H_{52}O_4$及$C_{30}H_{52}O_3$，則其化學結構各為何？（10分）
㈣此二成分之分析宜利用何種層析技術及檢示器？（12分）

三、生合成 Morphine 之部分途徑示於下圖：



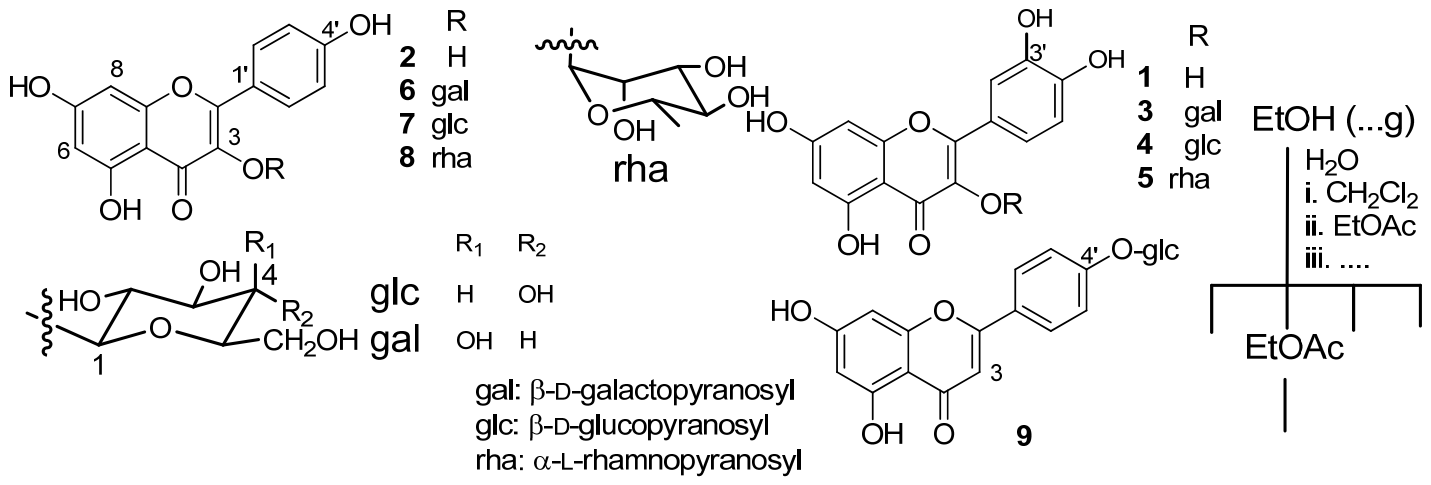
試寫出 **I** 至 **III** 之反應機轉（含參與之酵素）。（12分）

（請接背面）

類　　科：藥事
科　　目：藥物分析與生藥學（包括中藥學）

四、下列九個類黃酮化合物（**1** 至 **9**）係分離自菲律賓楠（*Machilus philippinensis*），其分離方法/步驟如下：

The EtOH extract (160 g) of the dried leaves of *M. philippinensis* (774 g) was partitioned into fractions soluble in CH_2Cl_2 (38.30 g), EtOAc (10.51 g), *n*-BuOH (31.02 g) and H_2O (74.12 g) by a liquid-liquid partitioning process. Part of the EtOAc-soluble fraction (6.03 g out of 10.51 g) was fractionated on a Sephadex LH-20 column (815 × 35 mm, MeOH) to give six fractions (E1~6). An aliquot of fraction E2 (45.0 mg out of 500.7 mg) was separated by a semi-preparative RP-18 HPLC column (Phenomenex® Prodigy ODS-3, 250 × 10 mm, 5 μm), each run 5.0 mg, delivered by 16% MeCN in H_2O for 30 min, to 25% MeCN in 40 min by a linear gradient mode, and then MeCN for 15 min, with a flow rate of 2.5 mL/min and detection at 300 nm. After nine runs, the fractions containing pure compounds were evaporated under reduced pressure to give **3** (2.9 mg, t_R = 21.39 min), **4** (10.0 mg, t_R = 22.61 min), **6** (7.3 mg, t_R = 30.86 min), **7** (4.8 mg, t_R = 36.36 min), and **9** (1.9 mg, t_R = 42.33 min), respectively. An aliquot of fraction E3 (273.8 mg out of 1.20 g) was separated on a Lobar (low-pressure) RP-18 column (LiChroprep RP-18, size B, 310 × 25 mm; 40-63 μm, Merck), delivered by a stepwise gradient of MeOH—H_2O from 30:70 to 100:0, to give six subfractions (E3-1~6). Fractions E3-3 (24.7 mg) and -5 (2.0 mg) were pure **5** and **8**, respectively. An aliquot of fraction E6 (201.0 mg out of 756.0 mg) was separated on the same Lobar RP-18 column, delivered by a stepwise gradient of MeOH—H_2O from 35:65 to 85:15, to give five subfractions (E6-1~5). Fractions E6-2 (14.4 mg) and -4 (2.3 mg) were pure **1** and **2**, respectively.



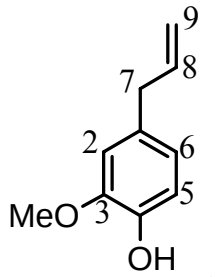
㈠以上圖右之方式表達化合物 **1** 至 **9** 之分離流程。（10 分）

㈡試由分離之結果簡述所使用的層析法之分離原理與特性。（16 分）

五、Eugenol 之結構如下：

㈠此成分含於何植物科別及何種生藥材中？（6 分）

㈡此成分之 ^{1}H NMR在芳香氫區（aromatic proton region）與烯氫區（olefinic proton region）呈現那些訊號（含偶合及偶合常數之分析）？（12 分）



Eugenol