

國立中山大學 101 學年度碩士暨碩士專班招生考試試題

科目：有機化學【海資系碩士班丁組】

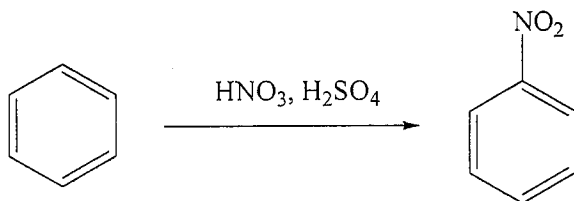
題號：4147
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1. Give structures of the following compounds (20%, 2% each)

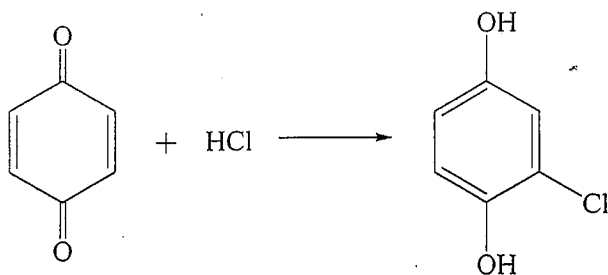
- a. Succinic anhydride
- b. (Z)-3-Methyl-2-hexenoic acid
- c. Methyl 2-aminobenzoate
- d. *m*-Chlorostyrene
- e. 4-Ethoxypyridine
- f. Methyl vinyl ketone
- g. *m*-Chloroaniline
- h. Ethyl acetoacetate
- i. *p*-Toluenesulfonyl chloride
- j. Benzenesulfonic acid

2. Give a mechanism for each reaction. (42%, 7% each)

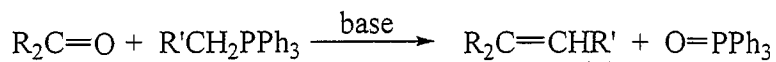
a.



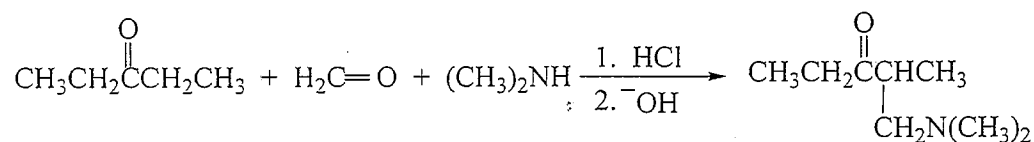
b.



c.



d.

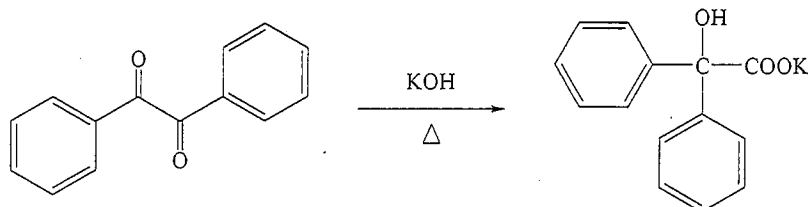


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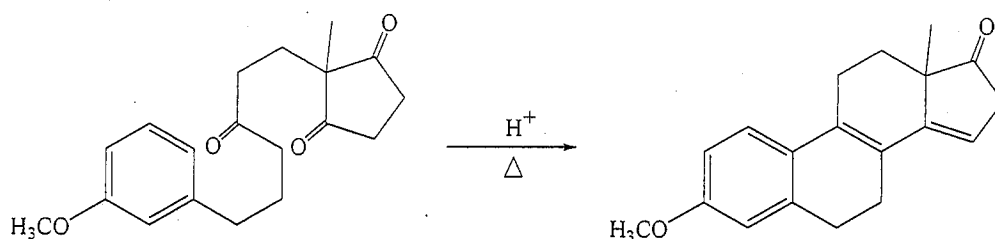
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e.



f.



3. Determine the structure for each compound with the provided molecular formula (or molecular weight) and spectroscopic data. (38%)

a. $C_{15}H_{20}O_4$: 1H NMR δ 0.8 (t, 3H), 1.2 (t, 6H), 2.3 (q, 2H), 4.2 (q, 4H) and 7.3 (s, 5H) ppm (7%)

b. $C_5H_{12}O$: 1H NMR δ 1.0 (s, 9H), 3.0 (s, 1H) and 3.3 (s, 2H) ppm (5%)

c. Molecular weight: 152

IR ν_{max} 3497 and 1686 (s) cm^{-1}

1H NMR δ 3.9 (s, 3H), 6.5 (br s, 1H), 6.9–7.5 (m, 3H) and 9.8 (s, 1H) ppm (7%)

d. $C_{10}H_{12}O_2$

IR ν_{max} 1745 (s) cm^{-1}

1H NMR δ 2.0 (s, 3H), 2.9 (t, 2H), 4.3 (t, 2H) and 7.3 (s, 5H) ppm (6%)

e. Molecular weight: 88

IR ν_{max} 3430 and 1718 cm^{-1}

1H NMR δ 1.4 (d, $J = 7$ Hz, 3H), 2.2 (s, 3H), 3.7 (br s, 1H) and 4.2 (q, $J = 7$ Hz, 1H) ppm (6%)

f. $C_6H_5NCl_2$

IR ν_{max} 3432 and 3313 cm^{-1}

1H NMR δ 4.4 (br s, 2H), 6.6 (t, 1H) and 7.2 (d, 2H) ppm (7%)