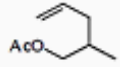
BÖLÜM 5

GENEL PROBLEMLER VE ÇÖZÜMLERİ

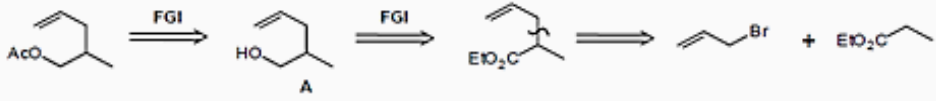
Şimdiye kadar, hem tek grup hem de iki grup parçalanmalarını inceledik ve retrosentetik analiz ve sentezleri konusunda sistematik bilgilere sahip olduk. Bu bölümde, edindiğimiz bilgileri uygulamak için genel problemler üzerinde duracağız. Problemleri çözümüne bakmadan kendiniz çözmeye çalışın, çözemediğiniz durumlarda tekrar metne dönün ve yeniden deneyin.

Problem 1. TM1 bileşiğinin retrosenetezini ve sentezini gerçekleştiriniz.



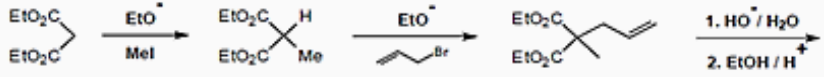
TM1

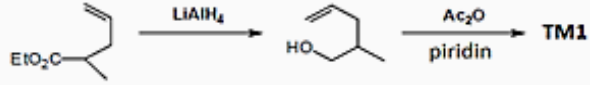
Retrosentetik Analizi: Ester grubunu FGI ile alkole dönüştürmeliyiz ancak alkol A'da bağ kırılması yapmak bizi pek ileri götürmez, bu yüzden bir kez daha FGI yapıyoruz. Çift bağ, bir alil grubu olarak eklenebileceği için yol göstericidir:



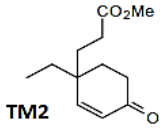
Sentezi:

Çıkış bileşiğinde aktifleştirici gruba ihtiyacımız var:





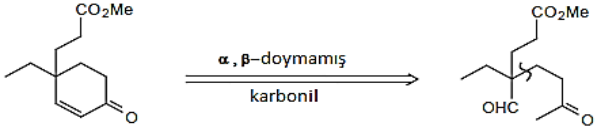
Problem 2. Stork'un kompleks alkaloid aspidospermin sentezinde bir ara ürün olan TM 2 için, bir retrosentez ve buna uygun sentez önerin. (J. Amer. Chem. Soc., 1963, 85, 2872).



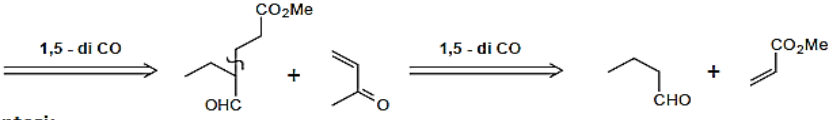
TM2

Retrosentetik Analizi:

Analize, bildiğimiz bir kural olan halkadaki α,β-doymamış keton parçalanmasıyla başlayalım:

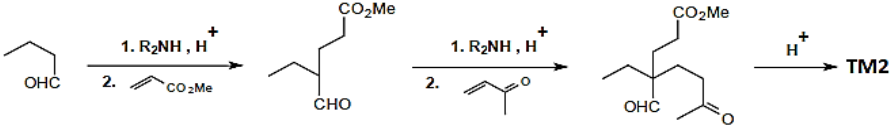


Şimdi iki tane 1,5-diCO ilişkimiz var: önce daha reaktif olanı ayıralım.



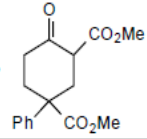
Sentezi:

Her iki Michael reaksiyonu için de alışıldık aktive edici gruba ihtiyacımız olacak: Yer olmadığı için CO2R grubu olamaz, bu yüzden bir enamin olması gerekecek. Dolayısıyla sentez şu şekilde:



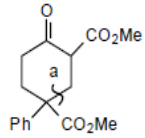
Problem 3. Aşağıda gösterilen hedef molekülün (TM3) retrosentetik analizini ve buna uygun sentezini tasarlayınız.

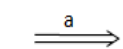
TM3

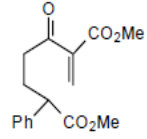


Retrosentetik Analizi:

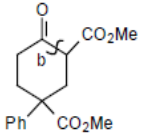
Dikkate almanız gereken iki, 1,5- ve bir 1,3-dikarbonil ilişkisi var. **a** yolundaki parçalanma sorunu hiç basitleştirmezken, **b** yolundaki 1,3-dikarbonil parçalanması, simetrik bir ara ürün verir:

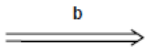


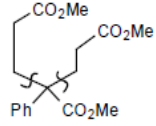


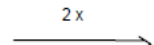


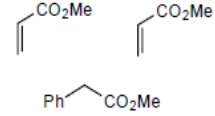
Parçalanma sonucu oluşan bu bileşik problemin çözümünü zorlaştırır



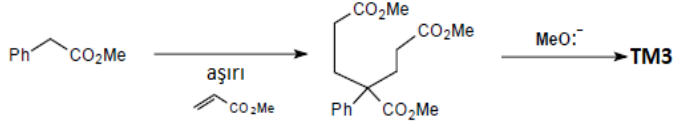




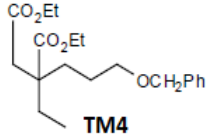




Sentezi:



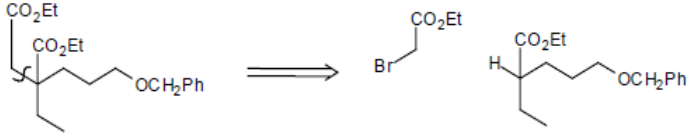
Problem 4. Aşağıda verilen hedef bileşik için retrosentetik analiz ve sentez yöntemi öneriniz.



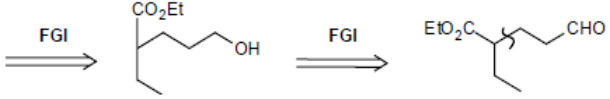
TM4

Retrosentetik Analizi:

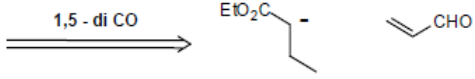
Bu, Kutney alkaloid sentezinin bir parçasıdır (J. Amer. Chem. Soc., 1966, 88, 3667). 1,4- ve 1,5-dioksijenlenme ilişkisi vardır; önce 1,4-'ü seçersek şunu elde ederiz:



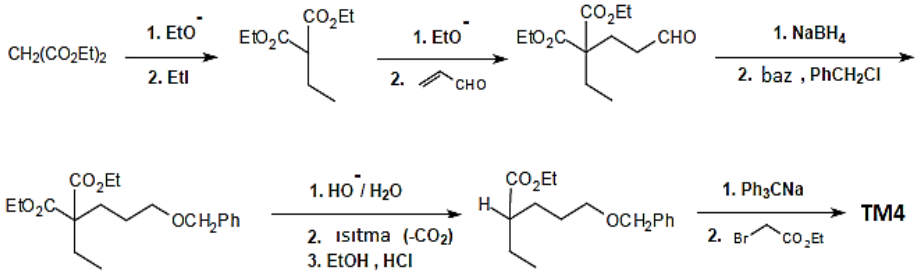
Aktif bir grup için yer olmadığından güçlü bir baza ihtiyacımız var.



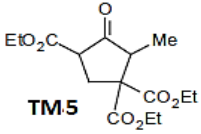
1,5-diCO parçalanması ile analiz tamamlanır.



Sentezi:

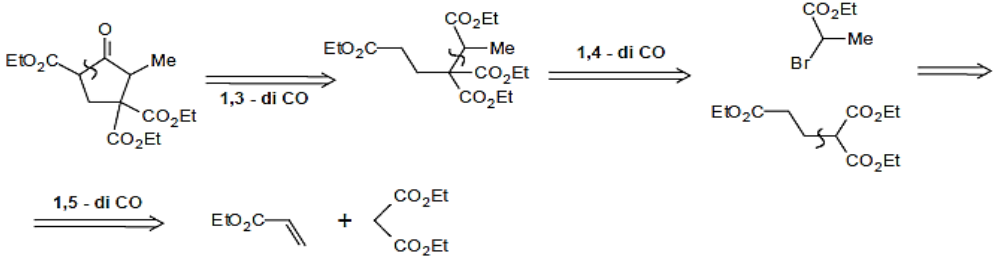


Problem 5. Aşağıda verilen hedef bileşik için retrosentetik analiz ve sentez yöntemi öneriniz.

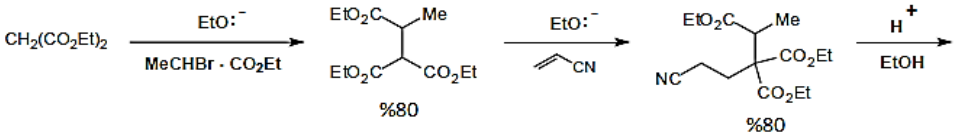


TM-5

Retrosentetik Analizi:



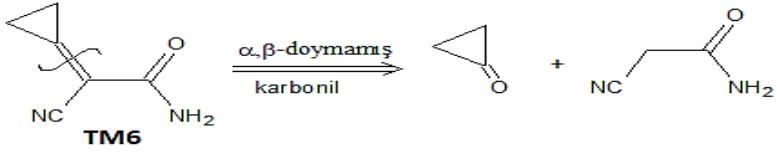
Sentezi:



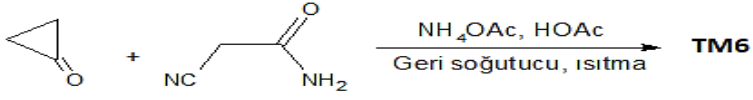
(Zhur. Obshchei Khim., 1957, 27, 742; Chem. Abs., 1957, 51, 16313).

Problem 6. Aşağıda verilen hedef bileşik için retrosentetik analiz ve sentez yöntemi öneriniz.

Retrosentetik Analizi:

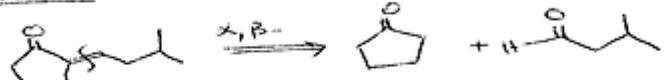


Sentezi:



Problem 7 : TM(7) bileşiğini sentezleyiniz.

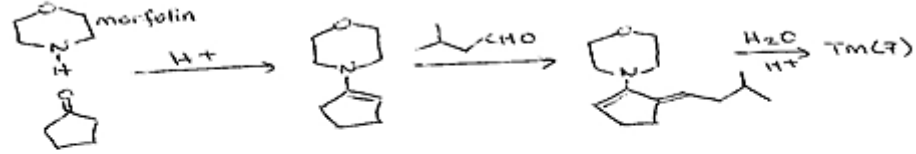
Analiz :



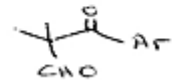
TM(7)

Analizi yapılan enon TM(7), bir aldehit ve daha az reaktif olan ketonun enolü arasındaki kondenzasyon reaksiyonu ile kolayca elde edilebilir. Önce ketonun enaminı hazırlamak gerekir. Bunun için, genellikle sikl ik bir sekonder amin olan morfolin kullanılır.

Sentezi :

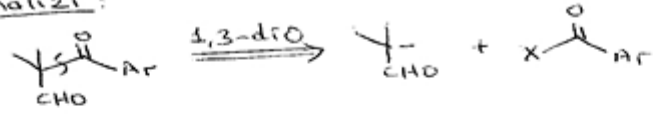


Problem 8 : TM(8) bileşiğini sentezleyiniz.



TM(8)

Analizi :



Sentezi : Enaminler, açillenebilir böylece 1,3-dikarbonil bileşiklerinin sentezinde kullanılır. Önce, uygun bir aldehit sekonder siklik aminle etkileştirilerek enamin hazırlanır. Sonra, açilklorür ile reaksiyona sokulur.

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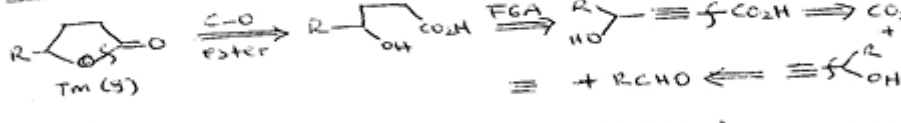
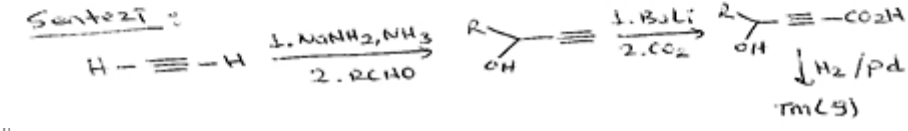
problem 9 : Aşağıdaki γ-laktonu TM(9) nasıl yaparsınız ?

Analizi :



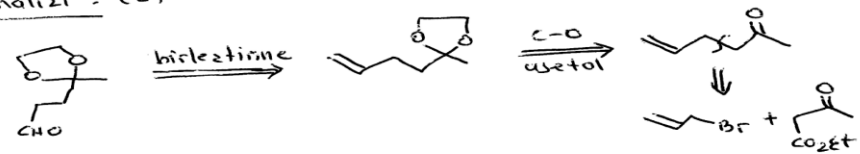
Sentezi :



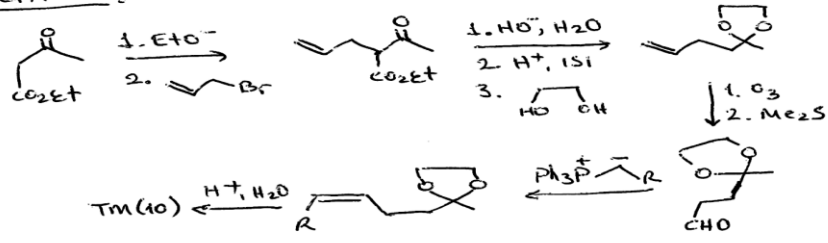
Problem 10: Aşağıdaki cis-enonun (TM 10) analizini ve sentezini tasarlayınız.

Analizi : (1)

Analizi : (2)



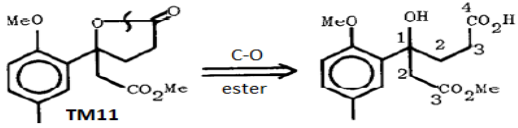
Sentezi :



Yeniden birleştirme (Reconnection), enonların ozonolizi ile α-keto aldehitler veya asitler oluşturduğundan; 1,2-dikarbonil bileşiklerin sentezinde de kullanılmaktadır.

Problem 11. Aşağıda verilen hedef molekül (TM11) için uygun bir retrosentetik analiz yolu öneriniz ve buna göre sentezini tasarlayınız.

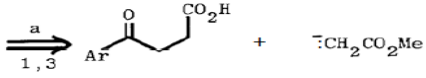
Retrosentetik Analizi:

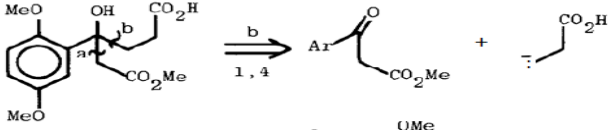


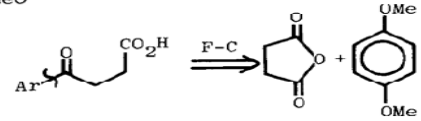
TM11

Burada, 1,3- ve 1,4-diO bağlantıları vardır.

C1 atomundaki dallanmadan parçalamak stratejik olarak daha uygundur. Çünkü 1,4-diO bağlantısıyla oluşacak sinton daha zor bir sintondur.







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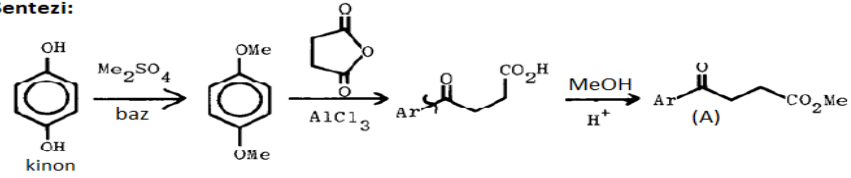
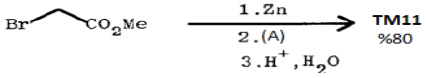
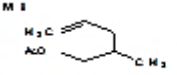


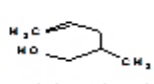


EM1

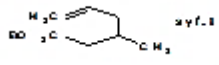


2-methylpent-4-en-1-yl acetate

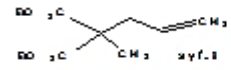
ayf.1



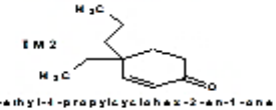
2-methylpent-4-en-1-ol



ethyl 3-methylhex-5-enoate

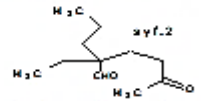


diethyl allyl(methyl)malonate



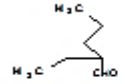
4-ethyl-4-propylcyclohex-2-en-1-one

EM2

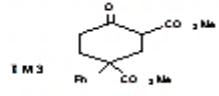


2-ethyl-5-oxo-2-propylhexanal

ayf.2

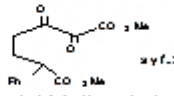


2-ethylpentanal



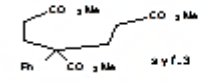
dimethyl 4-oxo-1-phenylcyclohexane-1,3-dicarboxylate

EM3

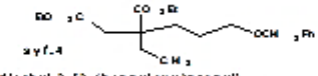


dimethyl 2,3-dioxo-6-phenylheptanedioate

ayf.3

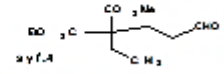


trimethyl 3-phenylpentane-1,3,5-tricarboxylate

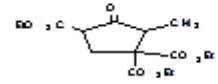


diethyl 2-[3-(benzyloxy)propyl]-2-ethylsuccinate

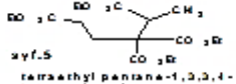
ayf.4



ethyl methyl ethyl(3-oxopropyl)malonate

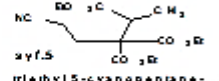


triethyl 5-methyl-4-oxocyclopentane-1,1,3-tricarboxylate

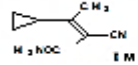


tetraethyl pentane-1,3,3,4-tetracarboxylate

ayf.5

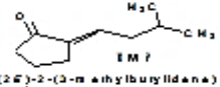


triethyl 5-cyanopentane-2,3,3-tricarboxylate



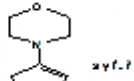
(2Z)-2-cyano-3-cyclopropylbut-2-enamide

EM8



(2E)-2-(3-methylbutylidene)cyclopentanone

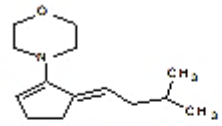
EM7



4-cyclopent-1-en-1-ylmorpholine

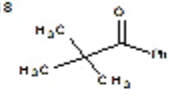
ayf.7

syf.7



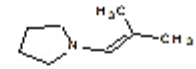
4-[(5*E*)-5-(3-methylbutylidene)cyclopent-1-en-1-yl]morpholine

TM8



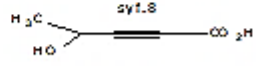
2,2-dimethyl-1-phenylpropan-1-one

syf.8



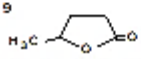
1-(2-methylprop-1-en-1-yl)pyrrolidine

syf.8



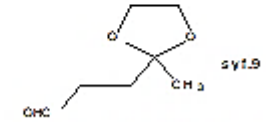
4-hydroxypent-2-ynoic acid

TM9



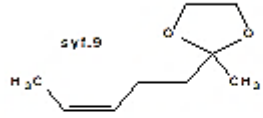
5-methyldihydrofuran-2(3*H*)-one

syf.9



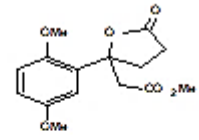
3-(2-methyl-1,3-dioxolan-2-yl)propanal

syf.9

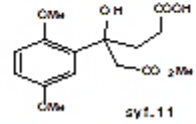


2-methyl-2-[(3*Z*)-pent-3-en-1-yl]-1,3-dioxolane

TM11



methyl [2-(2,5-dimethoxyphenyl)-5-oxotetrahydrofuran-2-yl]acetate



syf.11

4-(2,5-dimethoxyphenyl)-4-hydroxy-8-methoxy-8-oxohexanoic acid

BÖLÜM SONU