

UNIVERSITI SAINS MALAYSIA

Peperiksaan Tambahan
Sidang Akademik 1995/96

Mei/Jun 1996

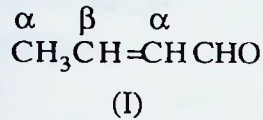
JIK 411 - Kimia Organik III

Masa : [2 jam]

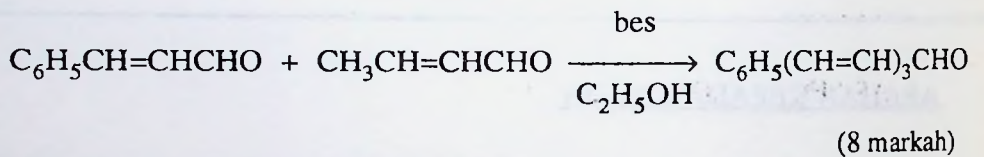
ARAHAN KEPADA CALON:

- Sila pastikan bahawa kertas peperiksaan ini mengandungi LIMA muka surat yang bercetak sebelum anda memulakan peperiksaan ini.
 - Jawab mana-mana EMPAT soalan. Setiap soalan bernilai 25 markah dan markah subsoalan diperlihatkan di penghujung subsoalan itu.
 - Setiap jawapan mesti dijawab di dalam buku jawapan yang disediakan.
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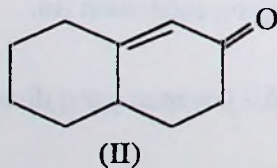
1. (a) Atom-atom hidrogen pada karbon γ -krotonaldehid (I) agak berasid ($pK_a \sim 20$).



- (i) Tulis struktur-struktur resonans yang akan menjelaskan kenyataan tersebut. (5 markah)
- (ii) Tulis satu mekanisme yang menjelaskan tindak balas yang berikut.



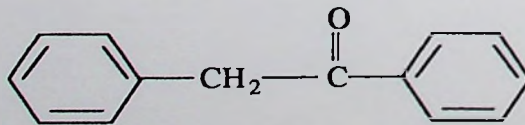
- (b) Tunjukkan bagaimana penambahan Michael diikuti dengan suatu kondensasi aldol dapat menukarkan suatu campuran metil vinil keton dan sikloheksanon menjadi $\Delta^{1,9}$ -oktalon (II).



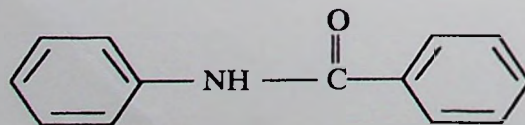
(12 markah)

2. (a) Apakah hasil yang anda jangka akan diperolehi apabila sebatian-sebatian berikut mengalami pembrominan gelang dengan Br_2 dan FeBr_3 ? Jelaskan jawapan anda.

(i)



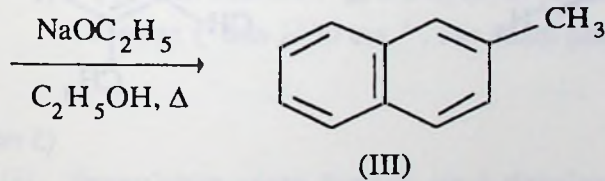
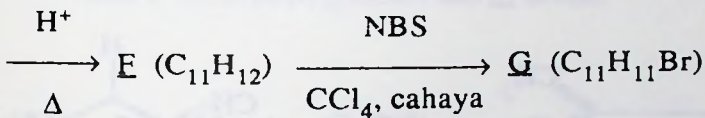
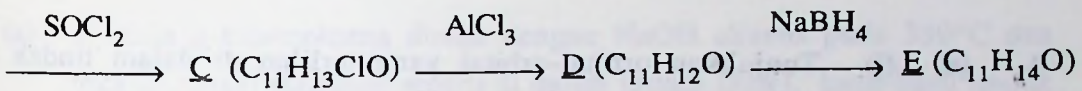
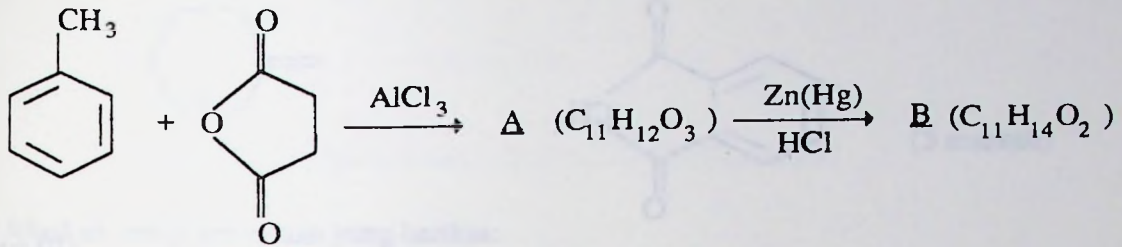
(ii)



(9 markah)

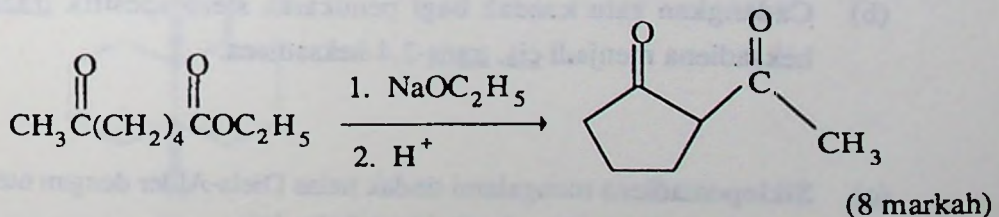
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(b) 2-Metilnaftalena(III) dapat disintesiskan daripada toluena melalui urutan tindak balas yang berikut. Tulis struktur setiap bahan perantaraan $\Delta \rightarrow \text{G}$.



(16 markah)

3. (a) Ester keto boleh mengalami tindak balas pensiklikan serupa dengan kondensasi Dieckmann. Tulis satu mekanisme yang menjelaskan terbentuknya hasil daripada tindak balas yang berikut.

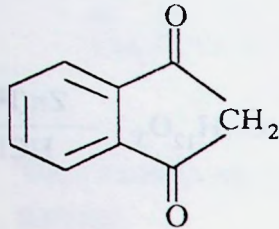


(b) Apabila kondensasi Dieckmann dicuba ke atas dietil suksinat (dietil butanadioat), hasil yang diperolehi mempunyai formula molekul $\text{C}_{12}\text{H}_{16}\text{O}_6$. Apakah struktur sebatian ini?

(7 markah)

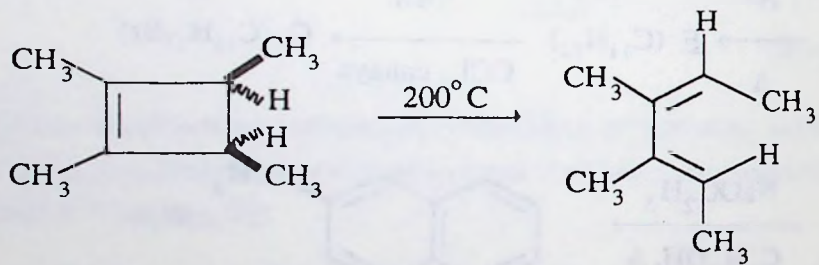
...4/-

- (c) Tunjukkan bagaimana diketon di bawah dapat disediakan dengan suatu tindak balas kondensasi.



(10 markah)

4. (a) (i) Tunjukkan orbital-orbital yang terlibat di dalam tindak balas elektrosiklik terma yang berikut.



(5 markah)

- (ii) Adakah kumpulan-kumpulan itu berputar secara konrotatori atau disrotatori?

(3 markah)

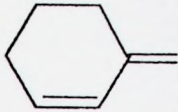
- (b) Cadangkan satu kaedah bagi penukaran stereospesifik trans, trans-2,4-heksadiena menjadi cis, trans-2,4-heksadiena.

(7 markah)

- (c) Siklopentadiena mengalami tindak balas Diels-Alder dengan etena pada 160-180°C. Tulis struktur hasil tindak balas ini.

(5 markah)

- (d) Kenapa molekul yang ditunjukkan di bawah, sungguhpun merupakan suatu diena berkonjugat, tidak mengalami tindak balas Diels-Alder?



(5 markah)

5. Jelaskan setiap kenyataan yang berikut:

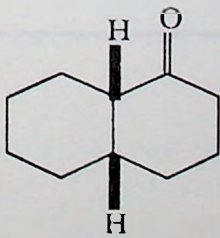
- (a) Apabila o-klorotoluena diolah dengan NaOH akueus pada 350°C dan tekanan tinggi (keadaan seperti di dalam proses Dow), hasil-hasil tindak balas tersebut ialah o-kresol dan m-kresol.

(9 markah)

- (b) Apabila 1,5-heksadien-3-ol dipanaskan, suatu sebatian berisomer H dapat diperolehi kembali. H mempunyai penyerapan IR cirian pada 2700 cm⁻¹, 1736 cm⁻¹ dan 1650 cm⁻¹, dan suatu penyerapan UV lemah pada 290 nm.

(8 markah)

- (c) Pengolahan suatu larutan cis-1-dekalon(IV) dengan bes menyebabkan pengisomeran berlaku. Apabila sistem tersebut mencapai keseimbangan, larutan itu didapati mengandungi 95% trans-1-dekalon dan 5% cis-1-dekalon.



(IV)

(8 markah)

1. (a) *Staphylococcus aureus* is a Gram-positive, spherical bacterium that is commonly found on the skin and in the nose of humans and other mammals. It is a facultative anaerobe and can grow in the presence or absence of oxygen.



(b) *Escherichia coli* is a Gram-negative, rod-shaped bacterium that is commonly found in the lower intestine of warm-blooded organisms. It is a facultative anaerobe and can grow in the presence or absence of oxygen.

2. (a) *Streptococcus pneumoniae* is a Gram-positive, spherical bacterium that is commonly found in the upper respiratory tract of humans. It is a facultative anaerobe and can grow in the presence or absence of oxygen.

(b) *Neisseria meningitidis* is a Gram-negative, spherical bacterium that is commonly found in the upper respiratory tract of humans. It is a facultative anaerobe and can grow in the presence or absence of oxygen.

(c) *Haemophilus influenzae* is a Gram-negative, rod-shaped bacterium that is commonly found in the upper respiratory tract of humans. It is a facultative anaerobe and can grow in the presence or absence of oxygen.

(d) *Mycobacterium tuberculosis* is a Gram-negative, rod-shaped bacterium that is commonly found in the lungs of humans. It is an obligate aerobe and can only grow in the presence of oxygen.

(e) *Coccidioides immitis* is a Gram-negative, spherical fungus that is commonly found in the soil of arid regions. It is an obligate aerobe and can only grow in the presence of oxygen.

(f) *Aspergillus fumigatus* is a Gram-negative, filamentous fungus that is commonly found in the air and soil. It is an obligate aerobe and can only grow in the presence of oxygen.



(g) *Penicillium chrysogenum* is a Gram-negative, filamentous fungus that is commonly found in the air and soil. It is an obligate aerobe and can only grow in the presence of oxygen.

(h) *Saccharomyces cerevisiae* is a Gram-negative, spherical yeast that is commonly found in the air and soil. It is a facultative anaerobe and can grow in the presence or absence of oxygen.

(i) *Candida albicans* is a Gram-negative, spherical yeast that is commonly found in the mouth and vagina of humans. It is a facultative anaerobe and can grow in the presence or absence of oxygen.