

2022

1st Semester Examination

CHEMISTRY

Paper : CHEM 102

(Organic Chemistry)

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

1. Answer any *four* of the following questions : $2 \times 4 = 8$
- (a) What is isoprene rule? What is biogenetic isoprene rule?
 - (b) Plant based chemicals can be termed as Renewable Chemicals. Explain.
 - (c) What is Barton reaction? Illustrate.
 - (d) What is phase transfer catalyst? Give an example and its mechanism (in brief).
 - (e) What is Multicomponent reaction?
 - (f) State and explain the principle of microscopic reversibility.

Or

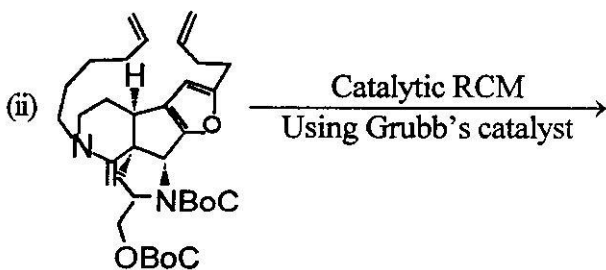
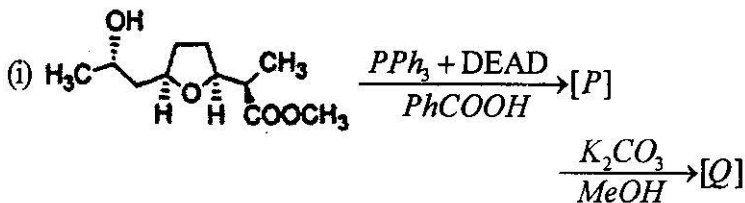
How will you convert Benzaldehyde to ephedrine?

2

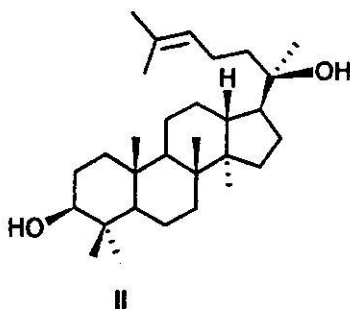
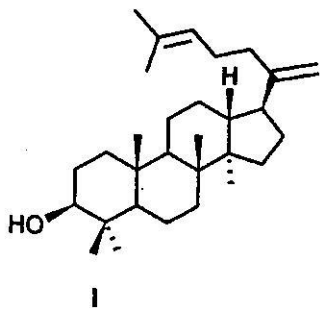
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2. Answer any *four* of the following questions : $4 \times 4 = 16$

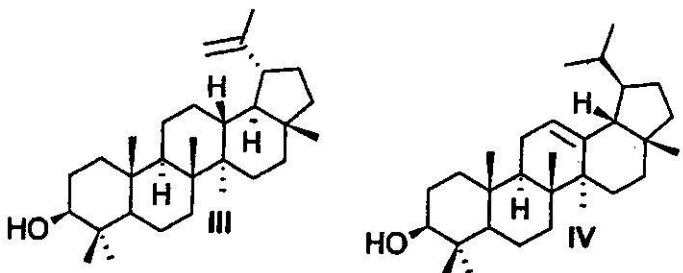
I. Predict the products with plausible mechanism :



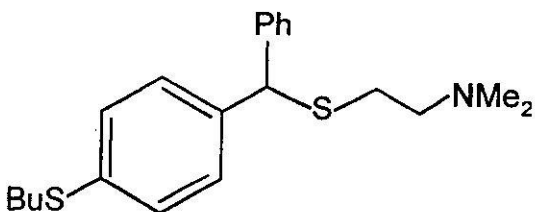
II. (a) Synthesize the following 6-6-6-5 tetracyclic triterpenoids from squalene by applying biogenetic isoprene rule :



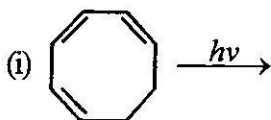
III. Synthesize the following 6-6-6-6-5 pentacyclic triterpenoids lupeol (III) and neolupenol (IV) from squalene :

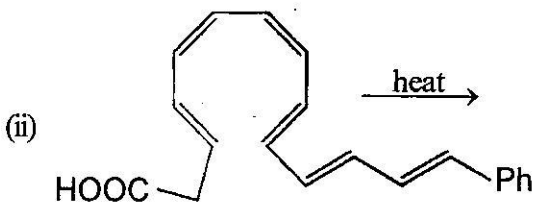


IV. How will you synthesize the following compounds? Use retro-synthetic approach with easily available starting materials. 4



V. Complete the reactions and give the stereochemistry of the products : 2+2





VI. (a) Cite an example of an electrocyclic reaction which does not occur although it is symmetry allowed. Give proper reasoning to support your answer.

(b) What happens when (2E, 4Z, 6Z, 8E)-2,4,6,8-decatetraene is heated? 2+2

3. Answer any *two* of the following questions : 8×2=16

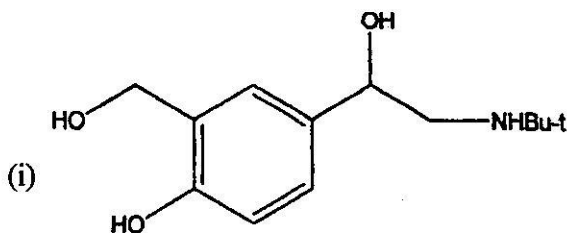
I. (a) What is Nazarov cyclisation? Give a suitable example.

(b) What is correlation diagram?

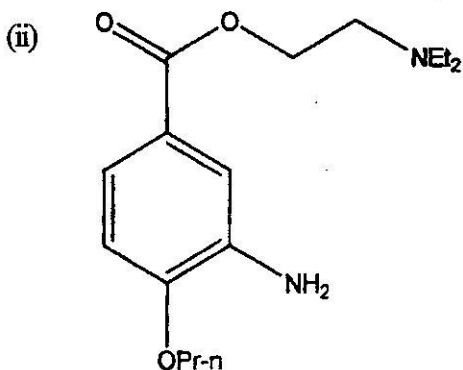
(c) Use correlation diagram to examine whether disrotatory mode of ring-opening of cyclobutene to 1,3-butadiene is thermally allowed or photochemically allowed process.

3+2+3

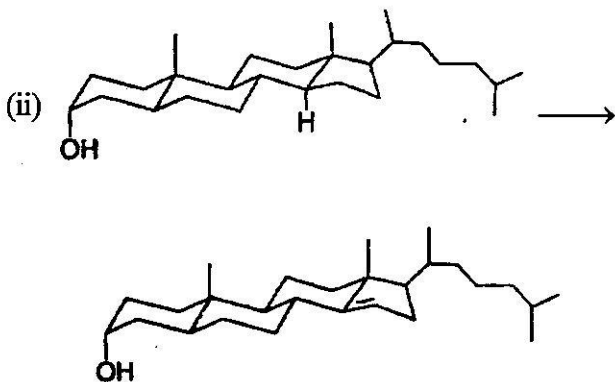
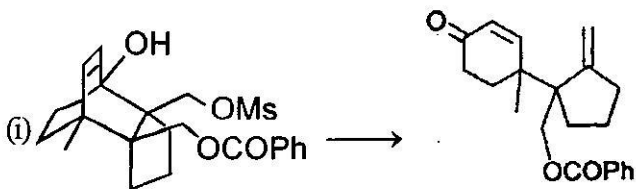
II. Use retrosynthetic approach to synthesize the following compounds : 4+4



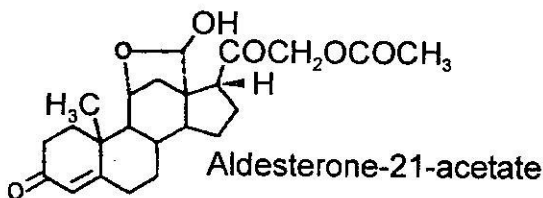
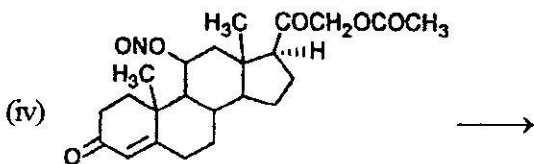
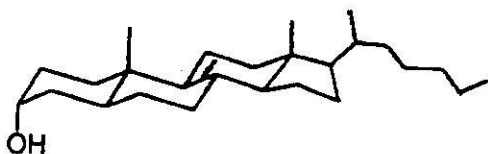
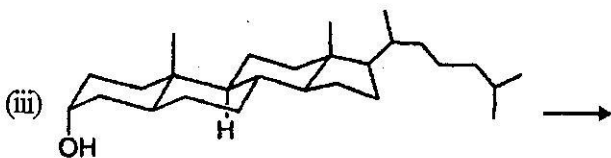
(5)



III. Carry out the following transformation (any *three*)

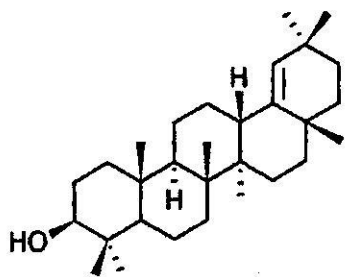


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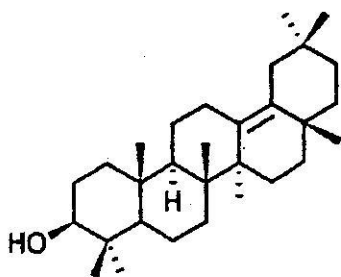


IV. Synthesize any two of the following 6-6-6-6-6 pentacyclic triterpenoids germanicol (V), δ -amyrin (VI) and β -amyrin (VII) from squalene :

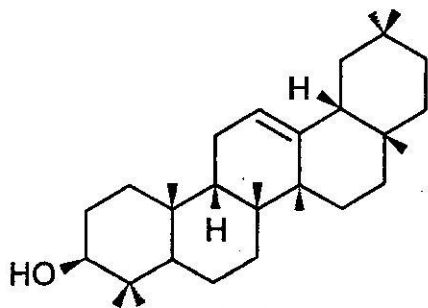
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V



VI



VII