

# Modern Organic Chemistry

Exam 10-04-2018

The first answer sheet must be provided with your name, student number and education.

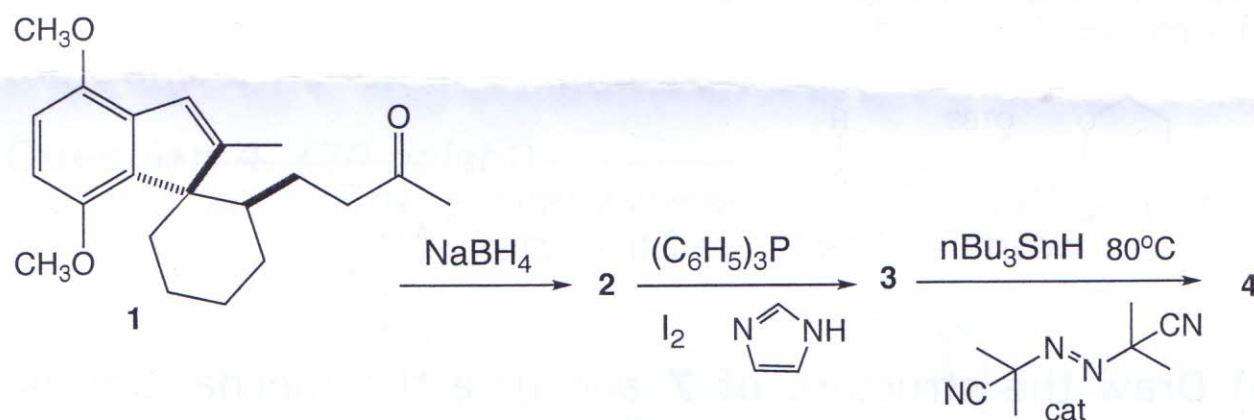
Each answer sheet must be numbered.

It is required that the answers and the structures are correctly numbered.

The maximum number of points for every question is indicated. Duration of the exam is three hours.

## Question 1. (10 points)

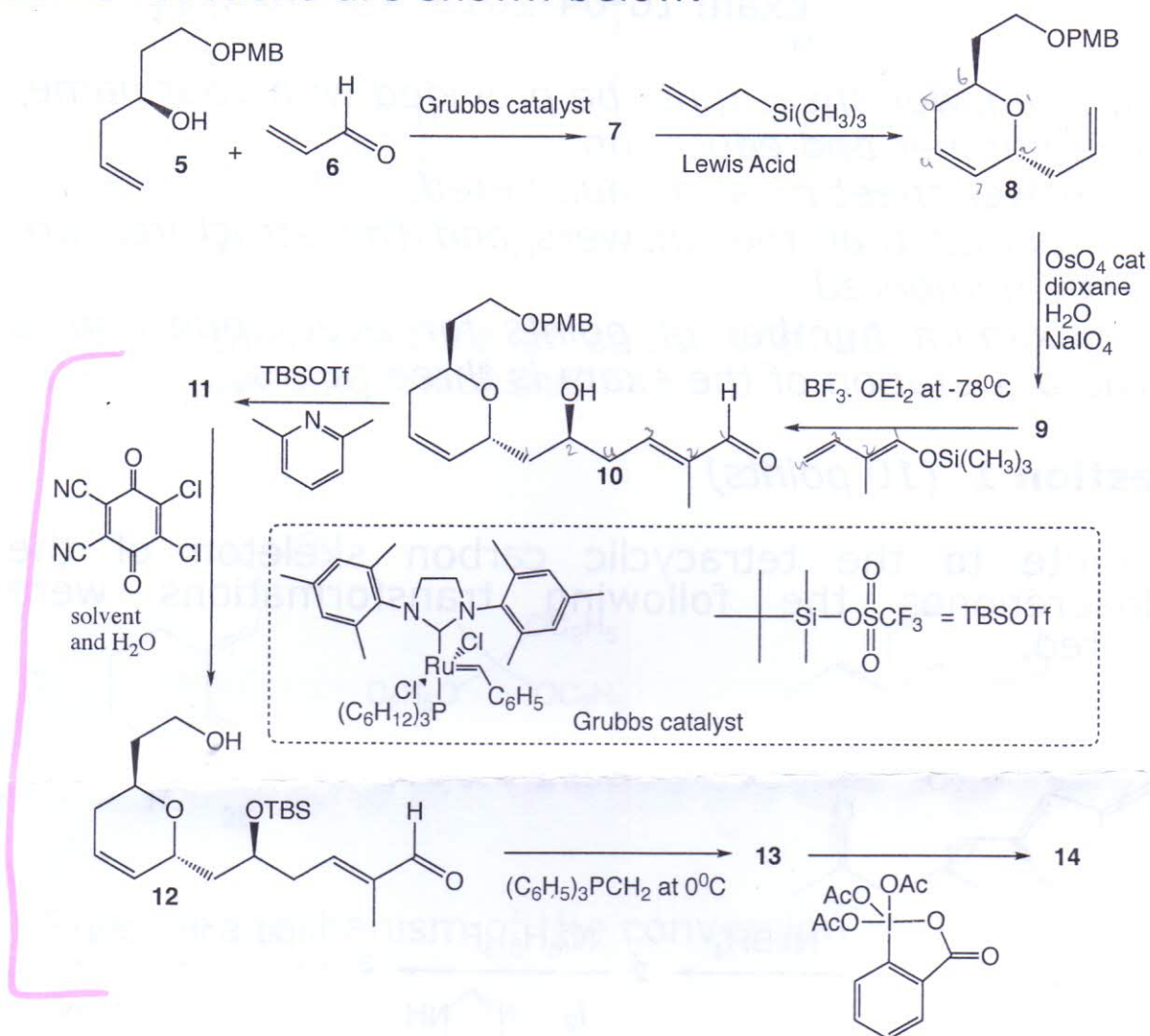
En route to the tetracyclic carbon skeleton of the cycloaurenones the following transformations were executed.



- Draw the structure of **2** (including the stereochemistry) and give the mechanism of the corresponding reaction.
- Draw the structure of **3** (including the stereochemistry) and give the mechanism of the corresponding reaction.
- Draw the structure of **4** and give the mechanism of the corresponding reaction.

## Question 2. (28 points)

In 2016 a total synthesis to Swinholide A was reported. Some reactions are shown below.

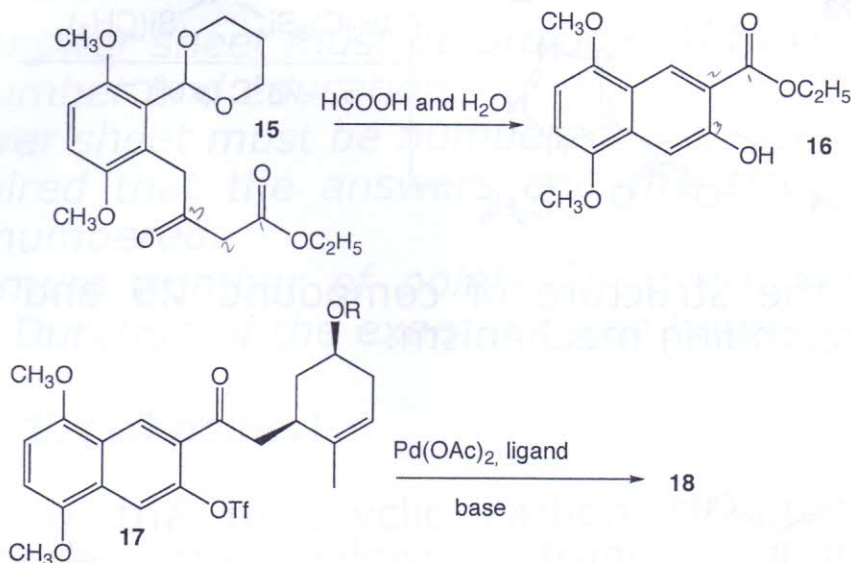


- Draw the structure of **7** and give the mechanism of the corresponding reaction.
- Give the mechanism of the transformation of **7** into **8**.
- Draw the structure of **9** and give the mechanism of the corresponding reaction.
- Give the mechanism of the conversion of **9** into **10**.
- Draw the structure of **11** and give the mechanism for the reaction of **11** with DDQ.
- Draw the structure of **13** and give the mechanism of the corresponding reaction.
- Draw the structure of **14** and give the mechanism of the corresponding reaction.



**Question 3. (20 points)**

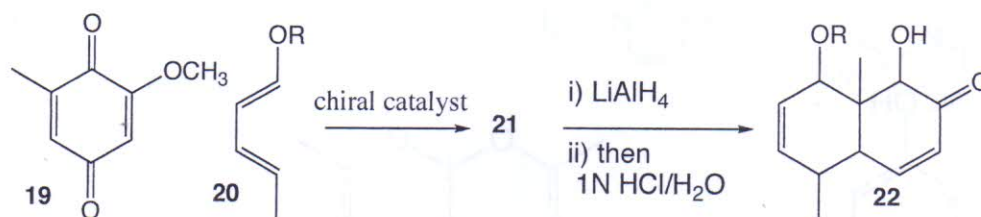
Xestosaprol is a compound isolated from a sponge with interesting biological properties. The total synthesis entails among others the following transformations.



- Give the mechanisms of the conversion of **15** into **16**.
- Draw the structure of **18** and give the mechanism of the transformation of **17** into **18**.

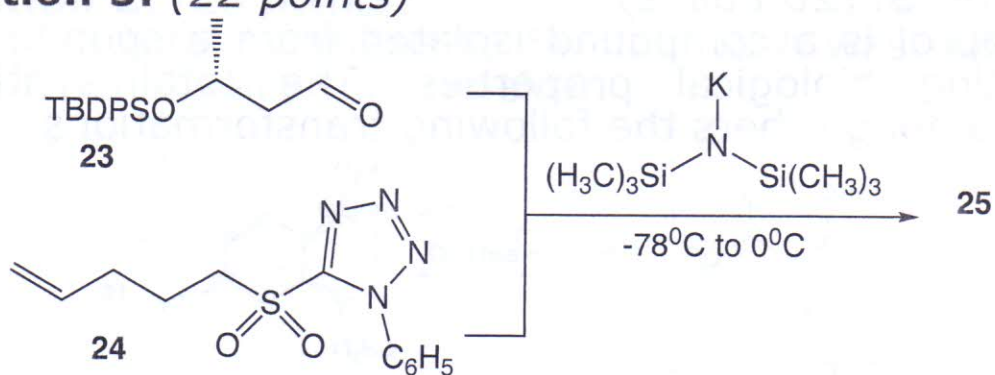
**Question 4. (20 points)**

Nahuoic acid is a potential inhibitor of histone lysine methyltransferase 1. Part of its synthesis is shown.

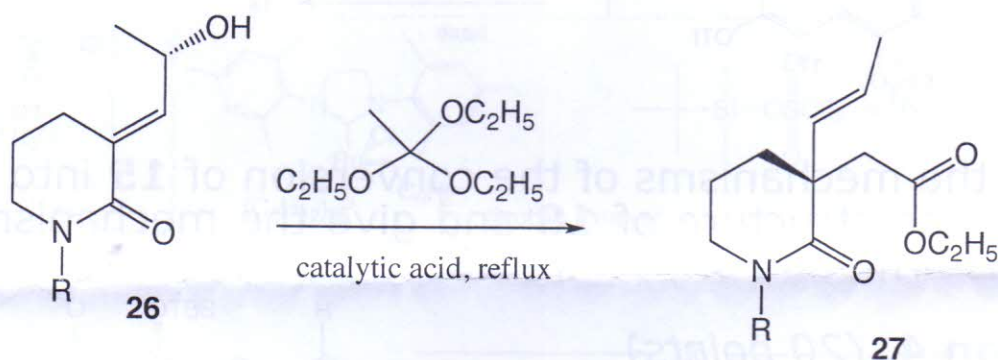


- Draw the structure, including the relative stereochemistry of **21**. Give the mechanism of the conversion of **19 + 20** into **21** and explain the regio- and stereochemistry with the aid of conjugation/resonance structures. Compound **21** is reduced and immediately treated with acid to give **22**.
- Give the mechanisms of the conversion of **21** into **22**.

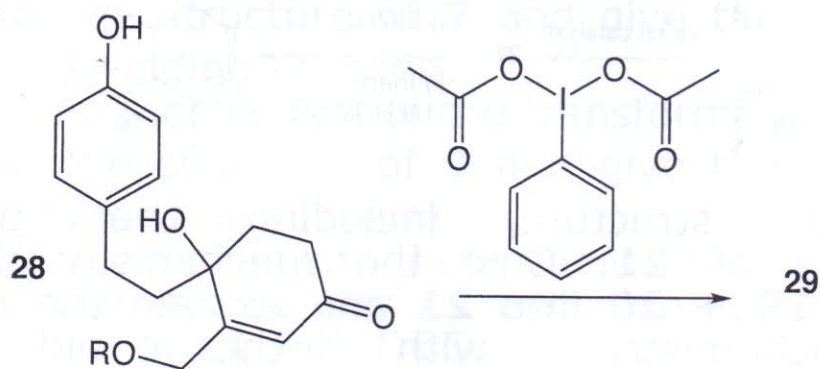
**Question 5. (22 points)**



- a) Draw the structure of compound **25** and give the corresponding mechanism.



- b) Give the mechanism of the conversion of **26** into **27**.



- c) Draw **29** and give the mechanism of the corresponding reaction of the